MATHEMATICS ACHIEVEMENTS AMONG HIGH SCHOOL STUDENTS IN AFGHANISTAN

Gender Difference In Math Achievements

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<tr>
<td>Points</td>
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<td>Date</td>
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ABSTRACT

This is a study of gender difference within the field of mathematics between 857 twelfth grade students (355 boys and 502 girls). The data sample contains a small group of students within two of the 34 provinces in Afghanistan. Ten of the schools were girls’ only, and twelve were boy schools. In this study the data collected was analyzed by comparing the results of test scores of 12th grade math high school students.

The question to be answered within this research: To what extent differences are in mathematics achievements between male and female students at the high school level? The results show that math achievements in grade 12th were different among female and male students. Females’ achievements were lower than males.

Teachers’ teaching experience had no significant influence on the average scores. In regards to students’ exam scores in relation to teachers' education level. The average score of students taught by teachers with grade 16 and grade 14 was not significant different, thus a very small difference.

Additionally, this study concentrated more on factors that affect girls’ math achievements. It also pointed to parental support, self-confidence, students’ interest to math, and cultural issues. As teachers were asked about ability of learning math, it does not relate to student s’ sex. The teachers added those learners who make more efforts have better achievements in mathematics.

The research is based on a small sample which does not cover the whole country. To get a clearer understanding of females achievements in high school math classes, a full country study with thousands of scores to compare, would perhaps bring this small study to the eyes of Ministry of Education and large donors. It would seem that good teaching methodology in math may have better result for females test scores.
Acknowledgements

This thesis would not have been possible without Professor Arne’s support which deeply instructed me and provided access to very important literature for my literature review.

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My special thanks to my trainer Marianne O’Grady, who led me to the system that allowed me to enhance my knowledge and guided me in written elements of the paper.

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INTRODUCTION

Background of the study based on the context of girls’ math achievements

For years educators have searched for ways to more effectively teach mathematics to all students. It is essential that all male and female students receive proper mathematics education. Math education enables learners to meet society demands for a competent and flexible work force (Niss, 1996). School officials try hard to improve the educational achievement of all its students so that all can try to reach the highest level of achievement. Although government and local community together strive to change the situation of education but still there are some problems in front of education and its improvements.

Mathematics improvement is at the core of educational strategy in all over the world, but in Afghanistan still teachers and learners face with math problem and there are gender inequalities in math achievements. Additionally, students’ success in all subject areas is an issue of concern. However a number of male students in grade six of some schools in Afghanistan have achieved higher success than females (average tests scores of boys’ are 52% and girls’ 46%) (Mansory, 2010). Additionally when Taliban were ruling in Afghanistan, girls had no the right to attend to school. It affected learning achievements as well.

Mathematics has been a difficult subject for many students to effectively learn. Female students’ achievement in math is a widely recognized as a national concern. The international data showed gender difference in math achievements (Fennema, 1996). Afghan females are not exception, but there are factors that affect their math achievements. Girls when pass the entrance test for universities usually can’t enter to math related faculty as boys do. In Polytechnic university which is math related, there were 2637 students. Out of those numbers 126 (5%) are female and 2511(95%) are male (MoHE, 2011). This view remains strong in the perception of the public and the quiet hardworking girl is often hidden by her own silence and desire to please. This is a time when girls fall behind as they are not picking up on more efficient mental strategies and also experience a lowering of confidence. Math preparation is at the core of college success. The low score of mathematics in high school is more likely to impact on a girl’s future achievement than on a boy’s. Because of that female students are fewer in engineering faculty (less than five per cent) and in Geology faculty females’ percentage (11% girl students) are less than boys (MoHE, 2011). One contribution to this lowering of scores could be the effects of marking by grade or score. Rather than using a combination of grading techniques, just the one of exam scores can have a dramatic effect on pupils’ perception of their ability. It obviously pushes women backward and creates inequality in social wellbeing and socio-economic development as well. Female learners make efforts more than boy students. We can see these changes in university results. Afghan students that could get highest score in college test they can enter to medical university. Almost half the students in medical university are female (42. %) (MoHE, 2011). In addition the numbers of female learners in schools are less than males overall.
Brief overview on Afghanistan’s education

By about 20th century traditional education was common, long before formal education. Traditional education means different form of Islamic education. The first object of Islamic education is to learn holy Quran. Modern education and formal school established in 1903. The first teacher training collage opened in 1912. As well as the first girls’ school introduced in 1921 (Mansory, 2000).

Situation of education in Afghanistan had different progression and problems. When transitional government established the number of students and schools are decreased dramatically. In 2002 there were 2.3 million learners. Conversely, in 2008 there were 10998 schools with 6.2 million students. Out of these population 30% are female learners. Ministry of Education focussed on quantities but, teachers and learners face to lack of school building, text books, and good school management which effect quality of education. In addition 24% people in Afghanistan are educated but still, eleven million Afghans are illiterate (MoE, 2012).

Statement of problem

The problem of this study mainly concerns with to explore girls’ math achievement in Afghanistan. The difference between scores of the boys and girls, factors which affect females’ math achievements are at the core of this study. This study is based on research in the area of girls’ math achievement and their comparison with of the boys score in high school in Ghazni and Kabul province of Afghanistan. Understanding the ability of learning math, students’ self-confidence, students interest in math, the reason that students don’t like math are other issues to be explored in this research. Understanding the ability to use mathematics in a strong and confident fashion is good way to get a good paying job. When students in Afghanistan graduate from high school, they have to pass a national or concord test to enter into universities. Those students who get higher scores at math more often enter to the better universities and faculties, which can allow for better entrance into the working world.

Females and males are equal in gaining knowledge but social and cultural factors influence on their learning achievements. There is need therefore to give boys and girls exactly the same opportunities to improve their knowledge by extra advanced math courses.

Chiefly Afghan female lay behind in the comparison to males in respect to educational development which had created a wide gap between male and female. Students’ statistic from Ministry of Higher Education showed that number of female students in engineering, Polytechnic, math deportment of science are fewer than male (MoHE, 2011). As well as this problem is seen in foreign countries too. Math score of three year in high school has direct influence on students’ entrance to collage. Those students that fail more than two years during their secondary school in mathematics can’t enter to math related colleges, it occurs more with female students (Gray, 1996). Students who don’t find math useful or who are not confident in math often can’t find the better jobs. There may be difference between math achievement and math interest with girls and boys. Thus the study attempt to seek answer to the following questions;

To what extent the difference are visible in students (girls and boys) mathematics achievements in high school?
What are the general factors affecting girls’ math achievements?

Aim of the study

The aim of this study is to shed light on some aspects of girls’ math achievements at high school (12th grade). This study is intended to accomplish the following objectives:

• To compare math achievements of girls with that of boys.
• To explore some of the factors those generally are known to affect girls’ math achievements.
• To explore it is myth or fact that girls have lower achievement in math.

Research Hypothesis

There is no significant difference between mathematics achievement of male and female students. There are some factors that are known to affect girls’ math achievements.

Outline of the study

This study starts with literature review which contain short summary of education and development. There is some information about education and development, teaching and learning theories. Mathematics education in different societies and perspectives about girls’ math achievements are another important part which gives information about girls’ math achievements and it’s comparisons with of the boys. Learners’ self-confidence, teachers’ responsibility through girls’ math achievements are also the component of this study. Method, research design, population, finding, discussion and conclusion are the basic part of the study.
LITERATURE REVIEW

A short summary of education and development

Mathematics Education in different societies

All subjects are essential for learners and educators, but mathematics education serves a general purpose of school to develop human beings mentally, healthy and physically. It makes people creative and responsible (Niss, 1996). Mathematics education enables learners to meet society demands for adequately qualified and flexible or pliable work force (ibid).

Up to Plato, mathematics had two branches. It was practical and scholarly mathematics. Practical mathematics was reserved to workers in Egypt, so it was thought to workers. Scholarly mathematics was taught and learned in school (D’Ambrosio, 1985). When, new labour structures emerged changes took place in the domain of architectures. As well as when drawing made plan to bricklayer the approximation of practical and scholarly mathematic increased in industrial. As a result, scholarly mathematics and practical mathematics taught and learned in school together. There for, scientists called it ethnomathematics (ibid).

For some scientists ethnomathematics meant to bring, local knowledge of math (knowledge and the mathematical practices of cultural group of people) to school. Sometimes this issue has been confused with ethnic or indigenous mathematics (Pias, 2011). In South Africa the idea of ethnomathematics brought ethnic and rational tensions. Students’ background in the classroom caused inequalities. Whites claimed that they have more abilities to learn math than black because, new technology is the result of their innovation. They finally accept that mathematic is a new and foreign language to all students before they go to school. Students from the beginning are equal to learn this completely new knowledge which is called ethnomathematics (ibid).

Perspectives about girls’ math achievements

Learners see teachers as models of justice but they face discrimination. Male and female students try to learn knowledge without any difference. In Albania teachers claimed that boys are more intelligent in math than girls (UNESCO, 2003/2004).

There are lots of factors that affect girl’s math achievement in different societies like Afghanistan. These factors can be parents’ background, and parental support, cultural issues, learners’ socioeconomic condition, and learners’ self-confidence that may affect their future achievements in math. As well as, these factors influence on their future occupations too. Sometime school location and grades have influence on learners’ achievements too. A survey which has taken place on 3rd grade student in Afghanistan girls’ math achievements was higher than boys in some home school (Mansory, 2000). It might be different in other formal schools. Differences in math score might have relation to differences in some school variables (ibid). In
contrast, to previous sentences when students of grade 3-6 of governmental school were tested out. All of male and female students had better achievements in language than math. In particular, boys’ math average score was higher than girls’ math achievements (Mansory, 2010). However in grade 3-6 students’ achievements were different but comparatively, percentages of female learners were lower than male. A research which was done on grades (1-9) in Afghanistan girls in general had better achievement. So then girls were not conditionally passed to the same extent as boys. The dropout rate was lower than boy students. (Mansory, 2007). At the same time girls achievements are different in country neighbourhood of Pakistan.

Math is a subject which led the learners through developing and understanding. It enables learners to play active role in society. Teaching of mathematics encourages learners to improve their idea and mental ability (Halai, 2010). Among some Pakistani teachers there are beliefs that girls have less achievement in math than boys. Teaches have ideas that boys being more active, deeply asking questions and being encouraged to learn through motivation while girls being hard working, paying attention, trying to learn not asking (ibid). These habits of girls (not asking) prevent them from improvements. If students don’t ask questions it may be unclear (Forster, 2000).

Moreover there are some efforts to be done by many didactic educators. They must know the relationship between learners and their belief about mathematics. Otherwise there is no physical or intellectual difficulty to the participation of female students in mathematics (Fennema, 1996).

In the US by about 1980 when studying of math become optional for students, less females selected mathematics to study than males because young women believed that math is not useful and they had not self confidence in learning mathematics (Fennema, 1996). By the way researchers started an intervention program and explained the effectiveness of math to students it impacted on female confidence. As a result, the number of girls students increased in math classes but the female students had anxiety about math (ibid).

In Pakistan some teachers had an idea that Allah creates male superior than women, because of that boys are better in mathematics. They think deeply and try to find better solutions than girls (Halai, 2010). Moreover girls are obedient and would prepare themselves with family’s rules that they are expected to follow their hard work (ibid).

A research which conducted in US, when teachers evaluated students success in math, teachers had an idea that boys’ success related to their ability but girls’ success more related to efforts (Fennema, 1996). Researchers have different findings about girls’ math achievements. According to Gray (1996), “there are believes that as a matter as genetic disability, women are essentially excluded from the upper end of mathematic achievement curve” (p.27).

It is natural from the begin if you explain something to girls they accept. So then boys from the childhood usually ask lots of questions like what, why, how (Halai, 2010). My idea is different about girls and boys because in my class girls are more active and ask more questions than boys.

In society where culture associates professions strictly with men and there are gender-based stereotypical division of professions and roles particularly those in male dominated societies, this will affect girls’ and women’s future career choices. Girls lowered interest in math impact on their math participation and significant impact on their workforce. These ideas stunt girls’ development and progression (Watt, 2007). Women are more interested to develop capacities to be occupants of house because of that they need financially support. Accordingly their talent and abilities in their work outside impact in gender life too (ibid).
Comparatively to the above statements in a society like Afghanistan, women have interest with part time jobs which are less math related career. In other word, we are living in a society which is male dominant, males are usually making decisions. Female have to do all home chores and take care of children too. In the meantime the decision by a female to not learn mathematic, or not enter a math related career because it may not offer a life they wish (Fennema, 1996).

Women usually start for PhD between the ages of 35-50 because before this age they have to take time out for child-bearing and child rearing. Women, who receive their PhD at a later age such as 40, are at a disadvantage in the job market (Gray, 1996). Feminist critiques of mathematics achievements. They claimed that it relates to subject matter not to the female gender (ibid).

**Learners’ self-confidence**

Math is a subject which is based on questioning when students ask questions, the problem which they have may be clear otherwise all part of the subject might be like a puzzle which makes the environment with less interest of math. Boys are naughty usually they are interested in lots of activities and lots of energy. As well as girls are self-conscious and obedient (Halai, 2010). Accordingly when girls are bashful and shy away of asking questions they think they have no ability of learning math. They lose their self-confidence. Students’ confidence is the way students can ask and be able to explain the issue in the classroom (Forster, 2000).

Girls have less confidence in math ability than boys even when no gender differences are measured in mathematic (Watt, 2007). Self-confidence usually brings changes in learning achievements. There is difference in confidence level between male and female students. These differences emerge in high school and it determines the outcome of females (Gray, 1996). Sometimes self-confidence may become problematic for learners. Those students who have confidence in their ability may bring them to a situation which doesn’t help them when they meet with difficulties (Dweck, 2000).

**Teachers’ responsibility toward girls’ math achievements**

In some case it is teachers’ responsibility to find the ways to have positive impact on female learners. At the same time, competitive activities encourage boys, but it has a negative influence on girls’ math achievements. Additionally research shows cooperative activities are more effective for female students (Fennema, 1996). Cooperative activities are useful for girls. It helps them to learn math, it may make them independent learners, it means they could solve mathematics problem together than they may be able to solve it independently (ibid).

Some teachers believed that girls’ classrooms had different characteristic or ethos as compared to boys’ classrooms. The difference might be in the role that students play in the classrooms. Mostly the teachers might prefer good relationship with learners (Halai, 2010). Educators must promote greater participation for both boys and girls because girls’ under participation and boys’ over participation effect on math related careers (Watt, 2007).There might be relationship between math achievements, belief, and ability. Moreover boys may have more confidence, and they estimate their abilities of math too high. These attitudes of boys have benefits for advanced math preparation (ibid).

Afghan females have more problems with math because there are lacks of professional math teachers in all schools even in capital of Afghanistan. As well as when new text books are
published they are very difficult for learners. Math teachers need more knowledge about the new textbooks. Although Ministry of Education struggles a lot to solve these problems but still high school learners especially girls have lower achievement in math. For the solution of this problem Ministry of Education should pay more attention on this important issue in the future. They must differ professional math teachers form other subject teachers and pay them higher salary than others. They should manage competitive test of math among students continually. As well as competitive test among math teachers too. So then, by this procedure they evaluate progression and math achievements in different schools. Accordingly best learners must be introduced to better universities and the best educators of math must be awarded with good payments and ranks.

**Parental supports**

Educators wish that parents spend more time with children and allow them to ask questions. As well as, improve their interest and ability to math participation. Correspondingly, if parents encourage both girls, and boys to relate activities such as puzzles, problem solving games. For the time being, it empowers girls’ interest through math (Watt, 2007).

Parental support has direct influence on learners’ achievements. In US those students had better achievement that had parental support for mathematic activities without any gender difference (Gray, 1996).

Afghan parents who support their children at home the learners had better achievement than other. In particular fathers that had Islamic education their children were better in reading. Similarly those who were shopkeeper, their children were better in arithmetic. May be those children learned math practically with their fathers in the shop. Those children whose fathers were educated had lower achievements than other because, their fathers were more busy and had no time for their children, or may be those parent had no the skill of teaching the children. (Mansory, 2010).

**Summary**

As result it is found that in international level girls math achievements were lower than boys. Self-confidence emerges in higher school level. It means boys had better self-confidence than girls in high school. Children that supported by their parents had better result. In Afghanistan math achievements had no significant difference between male and female learners in grade 1-9. Some teachers related ability of learning math to students’ sex. In the study girls had less interest with math related subjects. Educators must promote greater participation for both boys and girls and they must use best method to encourage girls in learning math.
METHOD

This study has been conducted in two province of Afghanistan on 12 grade students’ in math achievements. A quantitative research approach, with questionnaires as instrument for data collection has been used. Questioners are varying in term, purpose, size, and appearance. It is designed to collect information to be used for data analysis (Denoscombe, 2010). As well as questioner is widely used and useful instrument for collecting survey information (Cohen, 2010). There were questionnaire for 16 teachers and 24 students. Students’ questionnaire is composed of 21 questions; these questions cover learners’ parent background, students’ background, students’ self-confidence, parental support, and students’ interest through math. It explains the design of the study sample and method of sampling tools, data collection procedures and data analysis.

Research Design

The following research is based on quantitative method. This study is used for the survey design which involves the collection data at, girls and boys math achievements in high school. Gender difference in mathematics achievement (final exam results) is the component in this survey. In addition by filling questionnaires. Information is found about factors that affect girls’ math achievements.

Population and sampling

The study is conducted in two provinces of Afghanistan. The population of this study consist of 857 students of 12th grade math score of government school and 22 teachers. The sample of the school is 24 students that selected for filling the questionnaires in which 50 % students are male and 50 % female of 12th grade. Additionally for more information to find the factors which effect students’ math achievements 16 teachers were selected to fill the questionnaire which contained different questions to complete the survey, out these teachers interview has been done with three teachers.

Data collection procedures

Ministry of Education gave us permission letter for completion of research. Some school principals denied permission to give 12th grade math test score, but I tried hard, many times I followed the procedure I become able to receive the students’ math score from school principals. Ten of those schools were girls only, and twelve o were boys’ schools. In Afghanistan high schools are single sex, but those schools which were survived the teachers were single sex too. It means teachers of female schools were female and vice a versa. Subsequently I chose 24 male and female learners to fill the questionnaires. It was very difficult to find the learners, so I waited almost fifteen days to find them. In Ghazni it was easy to find the students because I found them in math advanced courses, but in Kabul I faced lots problems, because the students were on winter vacation it was difficult to find the learners. After a month school principle arranged.
meeting with students to fill the questionnaires. The study used primary data obtained by recording the mathematics score test in the sample students. The questionnaire aims to capture teachers views about their students learning achievements.

**Data analysis procedures**

In this study collected data has been analysed by using the result test of 12th grade math high school students. For analysing the significance difference between girls and boys mathematics achievement the score entered in to excel sheets. Questionnaire was used as data collection tool. Collected data is presented in tables, which may make the data analysis more comprehensive to its readers.

**Limitations**

The study is limited to the twenty two high schools and 857 students’ math result test of Kabul and Ghazni.

The findings of the study are limited because sample contains (24)small number of students from two high schools,( Afghan Turkish Male High school in Kabul and Haidar Abad Female High school in Ghazni province of Afghanistan,) which may affect the outcome of the study. The questionnaires are filled by students of high school to know the factors which affect girls’ math achievements. For comparing the difference of math score between male and female achievement I collected the math result test of 22 other public schools (857 students). When I collected the data for more information to receive the main point that affect girls’ math achievements an interview was made for three teachers to find the factors. Mostly the interview was about ability of learning math and the reason to find female don’t like math.
FINDINGS

Data for a total of 857 students from 22 classes of 12th grade math test score in two provinces of Afghanistan (Kabul and Ghazni) were organized and entered to Microsoft excel for analysis. The most important points are that the compilation designed by students’ sex, students’ score, teachers’ sex, teachers’ educational level, teachers’ years of experience. The total 857 students’ numbers of male and female learners were not equal in the study: 355, boys; 502, girls. See table 1 below.

Table 1: Number of students and teachers

<table>
<thead>
<tr>
<th>Student sex</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boy students</td>
<td>355 In 12 classes</td>
</tr>
<tr>
<td>Girl student</td>
<td>502 In 10 classes</td>
</tr>
<tr>
<td>Total students</td>
<td>857 22 classes</td>
</tr>
<tr>
<td>Male teachers</td>
<td>355</td>
</tr>
<tr>
<td>Female teachers</td>
<td>502</td>
</tr>
<tr>
<td>Total teachers</td>
<td>857</td>
</tr>
</tbody>
</table>

Research questions mainly related to the below tables. The answer for the first research question can be found in table (2 and 5). Mainly these findings contain gender difference in mathematics achievement which is the most important component in this survey. As well as the answer of the question number two can be found in table (13-15) By the same token table (6-12) contain the some aspect of factors that affect girls’ math achievements.

Table 2 compares the level of math achievement of 12th grade students of high school. It shows total 857 numbers of students that passed the test. As seen in below table boys average scores are higher than girls (boys 46, and girls 38) when T-Testis applied , it was found that the observed difference between boys and girls mean score in math is statistically significant on very high level of confidence (T-Test, 5.0315E-21).

Table 2: Students average score, mode, median and standard deviation

<table>
<thead>
<tr>
<th>Student sex</th>
<th>Number of Students</th>
<th>Scores (max 60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boy students</td>
<td>355 Average scores</td>
<td>46 Mode 60 Median 46 Std 10</td>
</tr>
<tr>
<td>Girl student</td>
<td>502 Average scores</td>
<td>38 Mode 36 Median 38 Std 13</td>
</tr>
<tr>
<td>All students</td>
<td>857 Average scores</td>
<td>41 Mode 60 Median 41 Std 13</td>
</tr>
</tbody>
</table>

The findings show that there is not only difference in mean score but also in scores’ mode there is significant difference( boys 60 and girls36) Girls’ score at mode stood at 36. It means many girls received 36 scores in math. Boys received 60 scores it shows increasingly differences.
Additionally, significant difference is seen in standard deviation too. Male students had less separation in their number (10), but this situation increased with girls’ score (standard deviation 13). Standard deviation measures how spread are students score.

Table 3 Shows that the average scores of boy students are higher than girls (boys’ 46 and girls’ 38) respectively. When TTest was used there was a significant difference between average score of boys and girls.

### Table 3. Students average scores (as % of total 60)

<table>
<thead>
<tr>
<th>Student sex</th>
<th>Number of Students</th>
<th>Average scores</th>
<th>Average scores (as % of total 60 scores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boy students</td>
<td>355</td>
<td>46</td>
<td>77</td>
</tr>
<tr>
<td>Girl student</td>
<td>502</td>
<td>38</td>
<td>63</td>
</tr>
<tr>
<td>All students</td>
<td>857</td>
<td>41</td>
<td>68</td>
</tr>
</tbody>
</table>

As regards students’ exam scores in relation to teachers’ education level a relation is found between teachers’ education level and students’ achievements. The average score of students taught by teachers with grade 16 was 69 % and when taught by teachers of grade 14 the mean test is 67 %; thus a very small difference is seen.

### Table 4. Students’ score relate to teachers educational level

<table>
<thead>
<tr>
<th>Teachers’ education level (grades)</th>
<th>Number of students</th>
<th>Average scores</th>
<th>Average scores (as % of total 60 scores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 12</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grade 14</td>
<td>479</td>
<td>40</td>
<td>67</td>
</tr>
<tr>
<td>Grade 16</td>
<td>336</td>
<td>41</td>
<td>69</td>
</tr>
<tr>
<td>Grade 18</td>
<td>41</td>
<td>45</td>
<td>76</td>
</tr>
</tbody>
</table>

As seen the below in table 5 the length of teachers’ teaching experience has no significant influence on the average scores. Only small difference is seen in average score of students taught by teachers with 5-8 years’ experience.
Table 5. Boy and girl students' math exam scores relate to teachers experience.

<table>
<thead>
<tr>
<th>Teachers' teaching experience (years)</th>
<th>Number of students</th>
<th>Average scores</th>
<th>Average scores (as % of total 60 scores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2 years</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2-4 years</td>
<td>162</td>
<td>40</td>
<td>67</td>
</tr>
<tr>
<td>5 - 8 years</td>
<td>270</td>
<td>43</td>
<td>72</td>
</tr>
<tr>
<td>More than 8 years</td>
<td>424</td>
<td>40</td>
<td>67</td>
</tr>
</tbody>
</table>

Factors that affect students’ math achievements

There are many factors that could affect students’ math achievements.

Parental support

As can be seen in table 6 around one third of the boys (33 %) replied that their parents sometimes helped them with math homework. This situation was different for girls. Only 13% of the girls some time get help in math homework by their parents. Some of the students (13% of boys and 33 % of girls) stated that they never got help in math homework.

Table 6. Parents helped children with math homework

<table>
<thead>
<tr>
<th>Detail</th>
<th>Boy</th>
<th>Girl</th>
<th>Girls %</th>
<th>Boys %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very often</td>
<td>1</td>
<td>1</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Yes sometime</td>
<td>8</td>
<td>3</td>
<td>13%</td>
<td>33%</td>
</tr>
<tr>
<td>Never</td>
<td>3</td>
<td>8</td>
<td>33%</td>
<td>13%</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>12</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Rewards

Students were rewarded when they got higher scores in math (see table 7 below). 17% of both sex were rewarded by their parents as verbal rewards. 29% of both sex received gifts. However, 8% of the girls were never rewarded by their parenta even when they got highest score at math. Their parents were mostly illiterate. One student said: “My parents do not see the value of highest score of math,” open ended questionnaires.
Table 7. Parents rewarded children when they got highest score at math.

<table>
<thead>
<tr>
<th>Detail</th>
<th>Girls</th>
<th>Boys</th>
<th>Boy%</th>
<th>Girl%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal reward</td>
<td>4</td>
<td>4</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>Gifts</td>
<td>6</td>
<td>6</td>
<td>29%</td>
<td>29%</td>
</tr>
<tr>
<td>Money</td>
<td>0</td>
<td>1</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>No reward</td>
<td>2</td>
<td>0</td>
<td>0%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Students’ Self Confidence

The below table shows students’ perspective about learning of math. For the reason to know students’ selfconfidence some questions were made to know wether math is easy or difficulct the below table indicate to students’ perspiciate at maht. 29% of boy students replied that math is easy while 8% of girls said math is easy. When turned to difficulcties 29% girls and 4% boys answered that math is difficulct. In contrast to being very easy one fourth of boys showed that math is very easy but none of those girls were agree to this option.

Table 8. Students views about math.

<table>
<thead>
<tr>
<th>Detail</th>
<th>Boy</th>
<th>Girl</th>
<th>Boy%</th>
<th>Girl%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.very difficult</td>
<td>1</td>
<td>3</td>
<td>4%</td>
<td>13%</td>
</tr>
<tr>
<td>somewhat diffic</td>
<td>1</td>
<td>7</td>
<td>4%</td>
<td>29%</td>
</tr>
<tr>
<td>I don't know</td>
<td>0</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>easy</td>
<td>7</td>
<td>2</td>
<td>29%</td>
<td>8%</td>
</tr>
<tr>
<td>very easy</td>
<td>3</td>
<td>0</td>
<td>13%</td>
<td>0%</td>
</tr>
</tbody>
</table>

There are diversity if idea between male and female learners. Most of boy students rated themselves above average. While only 8% of girls rated above average. When we turn to average of score both sexes is almost parallel. In addition big number of girls rated themselves below average.

Table 9. Students own rating in math

<table>
<thead>
<tr>
<th>Detail</th>
<th>girls</th>
<th>Boy</th>
<th>Girl%</th>
<th>Boys%</th>
<th>Average score of bo</th>
<th>Average scor of girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>2</td>
<td>7</td>
<td>8%</td>
<td>29%</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Average</td>
<td>5</td>
<td>4</td>
<td>21%</td>
<td>17%</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Below average</td>
<td>5</td>
<td>1</td>
<td>21%</td>
<td>4%</td>
<td>43</td>
<td>54</td>
</tr>
</tbody>
</table>

The below table shows that most of the boy students evaluated that they are best at math while more girls answered that they are good. However small number of girls said they were best, but 8% assess themselves that they are not good at math.
Table 10. Student own assessment in math.

<table>
<thead>
<tr>
<th>Detail</th>
<th>Girls</th>
<th>Girls %</th>
<th>Boys</th>
<th>Boys %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>7</td>
<td>29%</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>Better</td>
<td>2</td>
<td>8%</td>
<td>3</td>
<td>13%</td>
</tr>
<tr>
<td>Best</td>
<td>1</td>
<td>4%</td>
<td>7</td>
<td>29%</td>
</tr>
<tr>
<td>Bad</td>
<td>2</td>
<td>8%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>worst</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Worst</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

When students were asked about future career 21% of the boys answered that they were interested in become engineers in the future (see below in table 11). Comparatively 21% of girl students respond that they want to become teachers in the future, both boys and girls had interest at medical university by the same percentage. There was a girl want to become policewoman.

Table 11. Students interest in future occupation

<table>
<thead>
<tr>
<th>Detail</th>
<th>Boy</th>
<th>Girl</th>
<th>Boys' %</th>
<th>Girls' %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>4</td>
<td>4</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>Engineer</td>
<td>5</td>
<td>1</td>
<td>21%</td>
<td>4%</td>
</tr>
<tr>
<td>Teacher</td>
<td>0</td>
<td>5</td>
<td>0%</td>
<td>21%</td>
</tr>
<tr>
<td>Pilot</td>
<td>1</td>
<td>0</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>Police</td>
<td>0</td>
<td>1</td>
<td>0%</td>
<td>4%</td>
</tr>
<tr>
<td>Business man/woman</td>
<td>1</td>
<td>0</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>Lawyer</td>
<td>1</td>
<td>1</td>
<td>4%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Teachers’ perspective and evaluation

Some teachers were asked about the reason that the students have no interest at math. Most of the teachers responded that majority of learners don’t know mathematics from the foundation. And 33% of the teachers mentioned that math is difficult.

Table 12. Reason students have no interest at math.

<table>
<thead>
<tr>
<th>Detail</th>
<th>Teachers’ response</th>
<th>As%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is difficult</td>
<td>6</td>
<td>38%</td>
</tr>
<tr>
<td>Students don't know the foundation of mathematics</td>
<td>10</td>
<td>63%</td>
</tr>
<tr>
<td>They have no ability of learning math</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100%</td>
</tr>
</tbody>
</table>
One fourth (4 out of 16) of the teachers replied that math is interesting but most of them (12 out of 16) mentioned that mathematics is important for college entrance test.

Table 13: Reason students have interest at math

<table>
<thead>
<tr>
<th>Detail</th>
<th>Teachers' response</th>
<th>As %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math related to well pay job</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>It is interesting to learn</td>
<td>4</td>
<td>25%</td>
</tr>
<tr>
<td>Easy to learn</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Help to pass college test</td>
<td>12</td>
<td>75%</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 14 shows that most of boy students interested natural science and one fourth of girls like it. Half of all the girl liked social science it indicated that there is significant difference among male and female interests.

Table 14. Students interested in social science, natural science, and language

<table>
<thead>
<tr>
<th>Detail</th>
<th>Girl</th>
<th>Boys</th>
<th>Girls %</th>
<th>Boys' %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social science</td>
<td>6</td>
<td>1</td>
<td>25%</td>
<td>8%</td>
</tr>
<tr>
<td>Language</td>
<td>2</td>
<td>1</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Natural science</td>
<td>4</td>
<td>10</td>
<td>17%</td>
<td>83%</td>
</tr>
</tbody>
</table>

The table shows that there is no significant difference among boys and girls that make effort to learn math but 56% of teachers responded that both sex make effort in learn math.

Table 15. Students’ effort to learn math

<table>
<thead>
<tr>
<th>Detail</th>
<th>Teachers’ response</th>
<th>As %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>4</td>
<td>25%</td>
</tr>
<tr>
<td>Girls</td>
<td>3</td>
<td>19%</td>
</tr>
<tr>
<td>Both of them</td>
<td>9</td>
<td>56%</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100%</td>
</tr>
</tbody>
</table>

In the questionnaire there were some open ended questions, when Teachers were asked whether ability of learning of math relate to students’ sex. They replied that both sex have the same ability of learning math. Teachers indicated that there is no gender difference (44%girls and 44% both sexes)
Table 16. Students’ ability to learn math

<table>
<thead>
<tr>
<th>Detail</th>
<th>Teachers’ response</th>
<th>AS %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>2</td>
<td>13%</td>
</tr>
<tr>
<td>Girls</td>
<td>7</td>
<td>44%</td>
</tr>
<tr>
<td>Both of them</td>
<td>7</td>
<td>44%</td>
</tr>
<tr>
<td>None of them</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100%</td>
</tr>
</tbody>
</table>

Summary of Findings

To summarise the findings it shows that there are difference among male and female math achievements. Average score were different. Boys mean score were higher than girls. Factors that affect girls’ achievements were clear. Boys get more parental support than girls. Self-confidence was completely different among boys and girls. Female learners rated themselves below average while boys showed they are above average. Girls usually interested with social science and boys liked natural science. Teachers’ perspectives were similar about girls and boys ability through learning math. They stated that there is no difference in their ability. Those learners that make more effort they have best achievements in math. Teachers’ experience had not any significant difference in math achievements thus a very small difference was seen in with teachers’ educational level.
DISCUSSION
The study shows math achievements in grade 12th were different among female and male students. The findings indicate that females’ achievements were lower than males in all tables. Learning achievements were related to teachers’ gender, experience, educational level and students’ gender. In addition, numbers of female learners were higher than male (355 males and 502 females) likewise, diversity of scores were clear from students’ result sheet or shuqa.

Teachers’ educational level and teaching experience
The quality input related to teachers’ educational level leads to differences. Math courses of high school is advanced algebra and for this reason all high schools need at least teachers with 16 grade education or university level education. That is to say most of math subject taught by those teachers whose educational level was 14th grade which doesn’t provide the skills needed to assist students learn math. In regards to students’ exam scores in relation to teachers’ education level, a relationship is found between teachers’ education level and students’ achievements. The average score of students that taught by teachers with grade 16 and grade 14 was not significant difference thus a very small difference. It is because in this study most of teachers had 14 grade educations and less number of teachers had 16 grade educations. If we compare two classes of 16 and 14 grade there is significant difference. Math achievement of students’ taught by 16 grade teachers might be better it is because in this study one of the teachers had 18 grade education the classes which taught by grade 18 had the best achievements. Teachers’ teaching experience had no significant influence on the mean scores. Average score in all tables indicated higher achievements of males and lower achievements of female students. We must pay attention to factors that affect females’ achievements too.

Parental Support
Parental support was one of the factors; Mostly males received help from their parents for math homework, but one fourth of the females never received help by parents to do math homework. One of those learners strongly focused on both father and mother encouragement and support and thus his score on the final exam was 60 - the maximum (open ended question). There are gender inequalities in families and societies too. They usually invest on boys’ education than girls. For Afghan parents boys’ education is valuable than girls. Findings confirm these social inequalities too. Most of the mothers were illiterate and did not know the value of math in school. Fathers had private jobs or official posts but most mothers were housewives.

Students’ self confidence
The findings also indicate to student’s self-confidence which played a role in the achievement of math lessons. Students’ perspective about learning of math was one part of questionnaire, in order to understand students’ self-confidence. Some questions included to seek information about whether math is easy or difficult. Most of males had a higher level of confidence. They claimed that math is very easy for them, they rated themselves above average at math, therefore, most of them had chosen math related universities for their future career such as engineering, polytechnic, medical and math related universities. As the authors mentioned self-confidence emerge in higher school level, when this can come as the result of being in new situation and lesson get difficult, it influence more on female learners. It is because they are shy of asking question while math is based on questioning. They think they are not capable of
learning math. Because they felt that math is very difficult. They rated themselves below average or average. They had less interest with math, their self-confidence had faded. They usually chose educational sector or medical university for their future career.

Self-confidence emerges in high school, the differences determines the outcome of females in various careers (Gray, 1996). However, if you see table 9 female students had better achievement at math but they rated themselves below average it usually occurs in high school but in lower grade it was different. As Wardak (2010) writes “It turned out that the mean math score grade six males and females are not different in Afghanistan” (p, 14).

**Students’ ability and interest in mathematics**

For more information teachers were asked about students’ ability through learning math. Most of the teachers responded that there is no gender difference among male and female students. “When we teach the learners, both sexes have the same ability.” High schools in Afghanistan are usually single sex when the question was asked from governmental school teachers they did not focused on it. When this question was asked from math teachers that taught in Teacher Training Centre and teachers of math advanced private course where the teachers taught both genders. They replied that the learning of math do not relates to ability, it relates to effort. “Students who do more effort they learn better without gender difference.” Open ended question.

In the above finding some tables shows that most of the female learners were interested in social science and male students interested in natural sciences. So than these reason might be the fact. As Watt, said “ math is often taught in skill- based on abstract and decontextualized way and is unlikely to capture girls interest”(2007, p.40). Additionally, most male students liked math related university for future career and females wanted to be teachers or doctors. The reason given when asked, “Math is difficult. Usually when female students faces to difficulties they escape from it, but male students do not afraid of difficulties they try to enter among the problem and solve them.” It was an open ended question also the above table confirms teachers respond too (Table, 12).

Teachers indicated that most of students interested in math because it is important for university entrance test. Less numbers of teachers responded that math is interesting but as they had experience they responded most of students learn math to successfully pass college entrance exam. In Afghanistan math is the core of university entrance test. Advanced privet math courses are the witness of these facts. Advanced privet math courses are usually established to prepare the learners for concord test.

These statements showed that students’ achievement is related to factors which include parental support, self-confidence, professional math teachers, and social indicators. In this study less number of girls students interested in math than boys .As Watt stated “girls are less interested and have less liking for math than boys” (2007, p.38). These factors had direct influence on learner’s achievements. The open ended questionnaire showed that teachers had equal assessment of students’ ability in learning math. It is because they had experience of teaching they observed these abilities during their teaching. Most of the teachers answered that learning of math was related to effort not to abilities. It is teachers and parents responsibility to strength both learners self-confidence and use better method to encourage the learners to do more effort in learning math.
CONCLUSION

In recent years no major study conducted about female math achievements verifying any solid understanding of why females don’t score better than males. It would be an important study to understand how culture in Afghanistan plays a role in the achievement of females in math fields. In Afghanistan there is gender disparity in family and society life. This may play a role and have an influence on learners too. Because families mostly pay more attention to their males’ education than females. Most students of advanced math courses are male. It is common in Afghanistan that women must be housewife and take care of children. If parents encourage both genders to learn math there might not be difference among average scores.

It is important to understand if there is difference between schools achievements. In this study only two province of Afghanistan were surveyed. In other provinces there may be different achievements. This study focused on factors such as parental support, student self-confidence, students’ interest in math and reasons that students have no interest in math. Although some international research shows that female students have lower achievements in math, but this study revealed the students of medical university had different outcomes. Because the number of female learners is almost equal with male students in relation to math scores. As teachers mentioned, the ability of learning math did not relate to students’ sex, it is clear that there are factors that affect females’ math achievements.

Research shows that boys have higher math achievements compared to girls globally. The finding of this research project confirms the global evidence in the context of Afghanistan as girls’ achievements are less than boys in maths. There are many questions which need deep thinking and research to understand the patterns. When a survey was conducted on 1-9 grade classes, both genders had the same achievements in math (Mansory, 2007). It would be informative to find why in upper classes some difference emerges. When the time begins and the math text books for high school become difficult, but teachers’ knowledge though are very weak, there seems to be the difference in achievements. Mathematics of high school must be taught by a teacher with grade 16 while most of teachers at high schools are with grade 14. Math is like a chain, each link relates to each other; when students in lower classes did not understand basic math, in high schools the problem get emerge. In all part of the study same result were repeated and these statements get strength when I turned to researchers statements. The research tools can be replicated and whether they produce the same results repeatedly under similar conditions is called reliability (Denscombe, 2010). The study becomes interesting when the difference found between two groups. For answering question such as ‘is there a significant difference between male and female math achievement? ’Such question requires measure of difference. For this reason TTest is use to discover whether there is statistically significant difference between the means of boy and girl students score. When TTest is used the result showed that there is statistically significant difference between average score of male and female learners. This is because math of high school got more difficult than primary and secondary grades. In primary grades both male and female learners had same achievements but this situation changed in upper grade which needs deep attention.
REFERENCES


Teacher questionnaire:

1. School:
   School name:___________, Village:______

2. Type of school:
   a. High school   b. Secondary school

3. Total number of students: _________ students. Boys: _____ Girls: ________

4. Number of students in grade 12: ______ Boys: _____ Girls: ________

5. Teacher Gender:   a. M   b. F

6. Age:   ______

7. Years of teaching experience----------

8. Please indicate your education level:
   a. Grade 8 or less b. Grade 9 – 11 c. Grade 12 d. Grade 14 e.16 f. Religious schooling

9. Have you received any math training or workshop?
   a. No.   b. yes   c. math’s method of teaching   d. knowledge of math

10. How long have you been teaching? _______

11. How many years have you been teaching math? _______

12. Which of those students are more interested with math?
   a. Boys   b. girls

13. Which activities are more effective for learning math?

14. Which of those students have more ability in learning math?

15. Does math achievement related to abilities?
   1. Yes  2. No

16. What is the reason that students have more interest at math?
   1. Math related to well pay jobs  2. It is interesting to learn  3. Easy to learn  4. Help to pass college entrance test

17. What is the reason that students have no interested with math?
   1. It is difficult  2. They don’t like math  3. They interested with languages  4. They don’t know the basic knowledge of math
Pupils’ questionnaire

The following questionnaire deals with some information about you and your interest in math. Fill in this questionnaire and answer all of the questions with your honest thoughts. There are some questions which have multiple answers, please mark them by circling the letters you agree with or write your ideas about the issue.

1. Name: ___________________                     Father Name: ___________________

1. B 2. G

2. What grade are you in? ________

3. What education level do your parents have?

Father: a. university   b. secondary  c. primary  d. mosque  e. no school

Mother: a. university   b. secondary  c. primary  d. mosque  e. no school

4. a. What is your father’s occupation?

______________________________.

b. What is your mother’s occupation?

______________________________.

5. Do you like or have interest in any of the following academic areas?

a. social science  b. Languages  c. natural science
6. Rank the following subjects in order of importance on a college test. Higher rank is (5) and lower is (1)
   Language    social science    math    natural science    religion

7. Circle any interested option related to math?
   a. I like math very much   b. I like math a little   c. I don’t know
d. I don’t like math so much   e. I don’t like math at all

8. Is math difficult or easy to learn? It is:
   a. Very difficult   b. somewhat difficult   c. I don’t know   d. Easy   e. Very easy

9. How would you rate yourself in math in your class?
   a. Above average   b. Average   c. Below average

10. How often do you get math homework?
    a. Never   b. Sometimes   c. Every day

11. Is math useful for your future life?
    a. Very useful   b. Useful   c. I don’t know   d. somewhat useful   c. Not useful

12. What are you doing when you return from school? ______________

13. What would you like to become in the future? __________

14. What do you think you could become in future? _______________

15. What do your parents want you to become? ________________

17. Do your parents or anyone else from your family help you with your math homework?
    a. Yes, very often   b. Yes, sometimes   c. Never

18. Are you rewarded by your parents or teachers when you get highest score in math?
    1. Yes   2. No 3. You can answer in your own language…………………..

19. Do your parents make you interested to learn math?
20. When you were child did your parent focus on which of those skills?

1. Writing 2. Reading 3. counting  If counting, how? ________________

21. Do your parents or anyone else ask you math questions at home?

a. Yes, often  b. Yes, sometimes  c. Never