PRINT: ISSN 0975-1122 ONLINE: ISSN 2456-6322
Int J Edu Sci, 31(1-3): 94-100 (2020)
DOI: 10.31901/24566322.2020/31.1-3.1145

Experiences of Mathematics Students in Federal Government Schools of Islamabad

Fouzia Ajmal[1,*], Sana Iqbal[1] and Muhammad Hafeez[2]

[1]Department of Education, International Islamic University Islamabad, Pakistan
[*]E-mail: fouzia.ajmal@iiu.edu.pk
[2]Allama Iqbal Open University Islamabad, Pakistan

KEYWORDS Difficulty in Learning. Experiences. Mathematics Education. Secondary Education. Pakistan

ABSTRACT Mathematics is critical and significant to recognise the computerised world and match with the newly developing information technology knowledge that is penetrating everywhere in the world. By knowing the importance of Mathematics, this research was set out to describe and explain the difficulties of secondary level students of science group who are facing difficulties in Mathematics. The study was conducted at Federal Government Schools of Islamabad. The study investigated questions concerning experiences of high school (grade 9th and 10th) students' in Mathematics classroom and the possible reasons for these difficulties. The study was carried out to analyse students' experiences in the subject of mathematics, and whether the teaching method of mathematics enhances the students' mathematical thinking and prepares them for pedagogical aspects of Mathematics for future teaching.

INTRODUCTION

The first stage of education is called primary level and the next stage is called the elementary stage and the stage after that is called secondary stage. The grade levels of 9th and 10th come under this latter stage. Mathematics is taught in all grades and is compulsory from 1st grade to 10th grade and is optional after secondary level. In Pakistan, Mathematics as a subject is considered as one of the core curriculum. It is taught in all sectors whether public or private for middle and secondary classes. A variety of concepts are to be learnt in Pakistan as well as Islamabad from the grade level 1st to 10th. It is considered that Mathematics is not fun for majority of the students. Mathematics curriculum holds specialised knowledge, which desires certain attitude, frame of mind and effort on the part of the learner (Ellis 2011; Government of Pakistan 2009).

Mathematics is the one of the most importance subjects in human life. Without the knowledge mathematics, one can say nothing possible in the world. Nowadays mathematics is globally accepted but locally useless. Mathematics has been accepted as an important component of formal education from the ancient period to the present day. History shows that ancient scholars developed mathematics practically being obliged to day-to-day problems. In the ancient period, mathematics was developed by great shepherds. Mathematics is the body of knowledge in the area of science and technology (Acharya 2017). Mathematical education is a part of the system of continuing education and is of great importance in ensuring the development of human intellectual abilities in modern society. In the secondary education system, teaching mathematics takes a special place in the development of cognitive abilities and logical thinking of students (Kudaibergen 2020).

In Pakistan, the primary objective of secondary school educ ation in mathematics is to pro duce students who have the capacity to deal with real-world challenges. Mathematics at secondary school level provides the foundation for higher education (Singh and Kumar 1993). Mathematics plays a significant role in light of its utilisation and request. The quick advancement in mathematics has incremented the group of numerical information and prompted more broad utilisation of Mathematics in everyday life and innovation. This advancement demands to improve and redesign the arithmetic educational plan (Kiani et al. 2012). There are many concepts of mathematics, which can be effectively taught by the help of audio and visual aids. Teachers use teaching aids to support teaching and learning activities of Mathematics at school. Ashfaq (1998) has mentioned regarding the use of audio visual aids that they make the learning more concrete, richer and meaningful by providing direct experience.

Literature Review

Arithmetic is considered as the investigation of subjective connection. It is the study of structure, request, numbers, space and connections about tallying, estimating and depicting of shapes and items (Shapiro 2000). Science gives assistance to the person to perceives the world and its condition, and to give precise record of physical wonders around each individual (Graeber and Weisman 1995). Mathematics assumes a significant central function in day-to- day life, which influences each part of life. Mathematics is found in every aspect of life and every field of life it is used, like in banking, accounts, industries, educational institutions, home, shops, agriculture, research, business, science and others (Singh and Kumar 1993). Mathematics is considered an important subject and skill because of its application that is used everywhere, as without Mathematics one cannot survive in social life (Sheerazi 2000).

The National Council of Teacher Mathematics developed standards in 1989 for the curriculum and evaluation of Mathematics at all grade levels. These include the students' abilities to solve mathematical problems, become confident in their abilities to do it, communicate and reason mathematically (National Council of Teacher of Mathematics 1989). The Government of Pakistan (2002) states the seven objectives of Mathematics at Secondary School level as follows.

1. To provide students to acquire the concept and skills of Mathematics and use and implement it to solve the real world problems.
2. To provide fundamentals for specialisation of Mathematics at a higher level. So that they can utilise it in the scientific and technological fields of study.
3. To enable students to reason constantly to draw conclusion of the hypothesis.
4. To enable students to communicate their thoughts through symbolic expression and analytically.
5. To build the sense of identifying dissimilarity between relevant and irrelevant data.
6. To provide the learner with the fundamental understanding and awareness of the power of Mathematics in generalisation and abstraction.
7. To provide the spirit of discovery and exploration.

According to Fraser (1998), an effective teacher of Mathematics is one who explains clearly, whose prior concern is towards the learner, who provides a friendly environment such that there is no fear of the teacher, as it is an obstacle towards learning and asking question for the clarification of the concept, who teaches in a lively way, ensures that the student understands, and is well prepared and answers the students' queries. By providing more exercises to the student the teacher may generate a lively atmosphere to remember to keep good order and a good learning environment, which is not boring for the classmates and they engage in learning, and at the end of lesson provides them a platform of discussion and generates the opinion whether they have learnt the concept or not. Lastly, providing them post assessment is also helpful (Wong 1998).

The teacher plays a vital role in the process of learning Mathematics, and as far as the quality of student learning is concerned a teacher's knowledge is very important in this regard (Askew 2008). Grossman and Stodolsky viewed that most of the Secondary School Mathematics teachers consider it as an inflexible body of information and think that their only responsibility is to transmit their knowledge to the students (Staples 2007). Mathematics is considered as teacher-centred with greater emphasis placed on lecturing rather than on helping students to think critically so that they can apply their knowledge to solve real world problems (Cobb et al. 1992).

The utility of Mathematics has made it an unavoidable course of study for school life everywhere around the world, and yet what a difficulty is with respect to this noteworthy subject is that most of the learners fear it (Susan 1992). It is considered that Mathematics is fun and yet arithmetic is an issue for some students. The general presentation of Mathematics students is low in Pakistan (Majoka et al. 2007). In general students have a fear with Mathematics learning. There are many reasons due to which students are unable to learn the fundamental concepts and techniques of Mathematics. For common students, mathematics is a tougher subject and they normally try to avoid it (Furner and Duffy 2002). Another study regarding Mathematics shows that students have a tendency to identify mathematics by its terminology and subject content (Wong 1991).

Audio and visual aids in teaching plays a very important role in understanding skills of Mathematics (Graeber and Weisman 1995). Audio visual aids make the learning fun and interesting. By the use of appropriate AV aids, a teacher gets the attention of their students towards the content because they see the real object, model, picture and other audio visual aids. It is to be said that Mathematics is best taught with the help of audio and visual aids by correlating the skill with real objects, for example using marbles and sticks for the counting (Bengtsson 2012). The general view is that the fundamental need of a teacher is to effectively communicate the idea. It is not only dependent upon new knowledge but also a good extent on communication. Now there is new and newer scientific advancement seen in the teaching learning process of all subjects. Generally in Mathematics with results that the audio visual aids expanded from the black or white board and chalk or marker there come more and more modern equipment such as models, projectors, slides, videos, etc. Ashfaq (1998) said that teaching aids make learning more concrete, richer and meaningful by providing direct experience.

The researcher (Rich et al. 2019) listed the numbers of problems that seriously affect the teaching of Mathematics as the problem of planning, problem of management, large classrooms overcrowded with students, teacher centred approach, boring syllabus, lake of motivation from teachers and the examination system. The factors that distress the students' learning process of mathematics at secondary school levels stated by Askew (2008) included overcrowded classrooms, shortage of educational facilities (labs, instructional material, like mathematics geometry box, etc.), lack of suitable guidance (motivation to learning), lack of communication (freedom of feedback or freedom to ask question) and physical punishment. There are some of the environmental factors as well, which are too affecting the students learning process (Mercer and Miller 1992).

Objectives of the Study

The objective of the research was to analyse the experiences of secondary school students in learning Mathematics.

METHODOLOGY

In order to get accurate data on learning difficulties faced by science group students in Mathematics, the research was carried out at the Urban Federal Government Schools of Islamabad. Descriptive research design was used. There were 300 science group students of Mathematics from secondary level (9^{th} and 10^{th} grades) for data collection. A questionnaire was developed to collect the data from students. Pilot test was conducted on the representative group of students and the researchers excluded the questions that were not according to understanding the level of the learner.

RESULTS

The questionnaires data were analysed and results have been illustrated in the Table 1.

Statement 1

It reveals that before starting each lesson, the teacher creates interest before learning the lesson. Zero percent of students reveal that they are Strongly Disagree with this statement, eighty percent of students reveal that they are Disagree, ten percent students were Neutral, ten percent students reveal that they Agree, and zero percent were at Strongly Agree. It is concluded that most of the Mathematics teachers do not create interest before teaching the lesson.

Statement 2

It shows the percentage of using different examples for clarification of the concepts by teachers. Zero percent students were at Strongly Disagree, ninety percent were at Disagree, zero percent were Neutral, ten percent were at Agree and zero percent were at Strongly Agree. It is concluded that ninety percent teachers do not use examples for clarification of the concept.

Statement 3

It reveals that how many students understand better with the help of simple examples. Here, a simple example means that teachers explain the concept with the help of daily life examples. The students who were Strongly Disagree with this

Table 1: Analysis of questionnaires data

S. . No.	*Statements*	*Level (Percentage)*				
		Strongly disagree	*Disagree*	*Neutral*	*Agree*	*Strongly*
1	Teacher develops interest before starting each lesson	0	80	10	10	0
2	Teacher use different examples for clarification of concept	0	90	0	10	0
3	Students understand better with the help of simple example	0	0	0	0	100
4	Teacher use black board for solving problems	0	0	0	10	90
5	Teacher use different instructional material (AV aids) for teaching a lesson	0	50	5	35	10
6	Teacher use different instructional material (AV aids) for teaching a lesson	5	45	35	15	0
7	Teacher explain each step when solving a problem on board	10	0	10	80	0
8	Students have freedom in class during lesson to raise a question	10	0	10	80	0
9	Teacher make cooperative learning groups of student when needed	80	20	0	0	0
10	Teachers make connection between mathematics and other fields	0	70	20	1	0
11	Teacher refer guide book to solve problem	30	40	20	10	0
12	Students will choose the subject Mathematics in future	10	30	10	45	15

statement are zero percent. Zero percent students were at Disagree, zero percent were at Neutral, zero percent at Agree and one hundred percent were at Strongly Agree. It is concluded that all the students need simple examples to understand the concepts of Mathematics.

Statement 4

It presents that percentage of using a blackboard for solving problems by teachers. Zero percent students were at Strongly Disagree with this statement, zero percent students were disagreeing, zero percent were Neutral, ten percent were agree and ninety percent were Strongly Agree. It is concluded that maximum students were at Strongly Agree that their teachers used the blackboard for the solution of problems.

Statement 5

It shows the percentage of how many teachers use different instructional material or audio visual aids for teaching Mathematics. AV aids are pictures, models, slides, geometry box, etc. Study shows that zero percent were at Strongly Disagree, fifty percent students were at Disagree, five percent were Neutral, thirty-five percent students were at Agree and ten percent were at Strongly Disagree. It is concluded that half of the sample were at disagree with this statement that teachers use AV aids for teaching a lesson.

Statement 6

It reveals how many students enjoy the Mathematics lesson. Study shows that five percent students were at Strongly Disagree, forty-five percent at Disagree, thirty-five percent were at Neutral, fifteen percent students were at Agree and zero percent students were at Strongly Disagree. It is concluded that majority of the students disagreed, which means that they do not enjoy the mathematics lesson.

Statement 7

It shows how many teachers used to explain each step when solving a problem on the blackboard. Ten percent students were at Strongly Disagree that their teachers do not explain each step while solving a problem on the board, zero percent were at Disagree, ten percent were at Neutral, eighty percent were at Agree and zero per-

cent were at Strongly disagree. It is concluded that majority of the students agree that their teachers explain the problem solved on board.

Statement 8

It reveals how many students feel that they have freedom in class during the lesson to ask questions to their teacher. Students' responses were ten percent strongly disagree, zero percent were at Disagree, ten percent students were remaining Neutral, eighty percent were Agree and zero percent were Strongly Agree. It is concluded that maximum students were agreeing with this statement that they have the freedom to ask questions during the lesson for clarification of a concept.

Statement 9

This statement reveals how many teaches made cooperative learning groups of students when needed. The data reveals that eighty percent students were strongly disagree with this statement, twenty percent were Disagree and no one was at Neutral, Agree and Strongly Agree with this statement. It is to be concluded that there is no concept of making cooperative learning groups.

Statement 10

It shows how many teachers make connections between Mathematics and other fields. It is found that zero percent students were at Strongly Disagree, seventy percent were at Disagree, twenty percent were at Neutral, ten percent were at Agree and zero percent were at Strongly Disagree. It is concluded that majority were in disagreement with this statement.

Statement 11

It shows the percentage of teachers who refer to a guidebook for the solution of problems. The data reveals that thirty percent students were at Strongly Disagree, forty percent were at Disagree, twenty percent remain Neutral, and ten percent were at Agree, while zero percent students were at Strongly Disagree. It is concluded that majority of the teachers do not prefer a guidebook for the solution of a problem.

Statement 12

It reveals how many students will choose Mathematics in the future, for example, in intermediate and in higher levels. Data reveals that ten percent students will not choose Mathematics for future studies, thirty percent were at Disagree, ten percent were Neutral, forty-five percent were at Agree and fifteen percent Strongly Agreed. It is concluded that majority will choose Mathematics in the future.

DISCUSSION

Competency in mathematics has become a rather important skill for every individual today. Learning of basic mathematics at secondary level is the foundation for the understanding of higher level mathematics concepts. Failure in mastering the secondary level mathematics concepts will affect the ability in acquiring mathematics skills at a higher level. In addition, inability in understanding and learning of mathematics concepts at an early stage also affects students' interest and confidence in learning new mathematics knowledge (Kelanang and Zakaria 2012). Mathematics problems are really difficult. "I did not know how to do it, that's why I did not finish it. I don't like Maths." are statements quite familiarly heard when students are inquired about their homework (Tambychik and Meerah 2010).

Tezer and Ozrecberoglu (2015) claimed that the teachers should not only show the result, which is the easy way of mathematics but also they should also make them focus on the process of solving, which requires making effort as well.

Students of secondary schools faced a lot of problems in taking the courses of mathematics, which is also mentioned by Guerrero (2020). The data show that most of the students have no interest in taking the mathematics course at secondary level, which is also reported by Veesar and Khaskheli (2019).

CONCLUSION

The study reveals that most of the Mathematics teachers do not create interest before teaching the lesson, ninety percent teachers do not use examples for clarification of concepts, the entire sample of students need simple exam-

ples to understand the concepts of Mathematics, half of the samples disagreed with this statement that teachers use AV aids for teaching a lesson, majority of students disagreed that they do not enjoy mathematics lesson, majority students agreed that their teachers explain the problem solution on the blackboard, maximum students agreed with this statement that they have freedom to ask questions during the lesson for clarification of a concept, there is no concept of making cooperative learning groups, and it is concluded that majority will chose Mathematics in the future.

RECOMMENDATIONS

The recommendations of the study are as follows. Teachers may give a proper introduction before starting each lesson so the students could understand the basic concept of that chapter. A teacher may use simple and interesting examples to develop interest in students because mostly students are able to learn with simple and interesting examples. Teachers may use audio and visual aids for teaching mathematics, such that students can learn more attractively by using these aids. The teacher-student relation may be flexible such that students can ask any question related to the topic without any hesitation and extreme fear of the teacher. Teachers may make cooperative learning groups of students such that average students can solve their problems quickly by the help of brilliant students without feeling any hesitation. In this way, confidence level may increase among students. A teacher may create interest among students that they will choose this subject in the future.

ACKNOWLEDGEMENT

The authors would like to express gratitude to all individuals who participated in the study.

REFERENCES

Acharya BR 2017. Factors affecting difficulties in learning mathematics by mathematics learners. *International Journal of Elementary Education*, 6(2): 8-15.

Ashfaq M 1998. *The Study to Evaluate the Availability and Utilization of Teaching Aids at Secondary School Level*. MEd Thesis, Unpublished. Rawalpindi: University of Arid Agriculture.

Askew M 2008. Mathematical discipline knowledge requirements for prospective primary teachers, and the structure and teaching approaches of programs designed to develop that knowledge. In: P Sullivan, T Wood (Eds.): *The International Handbook of Mathematics Teacher Education*. Rotterdam, the Netherlands: Sense Publishers, pp.1: 13-35.

Bengtsson M 2012. Mathematics and multilingualism—where immigrant pupils succeed. *Acta Didactica Napocensia*, 5(6): 17-24.

Cobb P, Wood T, Yackel E, McNeal B 1992. Characteristics of classroom mathematics traditions: An interactional analysis. *American Educational Research Journal*, 29(3): 573-604.

Ellis AB 2011. Generalization promoting actions. How classroom collaborations can support student's mathematical generalizations. *Journal for Research in Mathematics Education*, 42(4): 308-345.

Fraser BJ 1998. 5.1 science learning environments: Assessment, effects and determinants. In: B **Fraser**, K Tobin (Eds.): *International Handbook of Science Education*. Netherlands: Springer, pp. 527-564.

Furner JM, Duffy ML 2002. Equity for all students in the new millennium: Disabling math anxiety. *Intervention in School & Clinic*, 38(2): 67-75.

Government of Pakistan 2009. *National Education Policy*. Pakistan: Curriculum wing, Ministry of Education, Islamabad.

Government of Pakistan 2002. *National Curriculum Mathematics for IX-X*. Islamabad: Ministry of Education, Curriculum Wing.

Guerrero ER 2020. *Math Anxiety and Financial Literacy among Latino Secondary Students in the United States*, Doctoral Thesis. Oregon: Oregon State University

Graeber P, Weisman CY 1995. School science and mathematics. *Journal for Research in Mathematics Education*, 26(4): 327-345.

Kelanang JGP, Zakaria E 2012. Mathematics difficulties among primary school students. *Advances in Natural and Applied Sciences*, 6(7): 1086-1092.

Kiani MNUH, Malik S, Ahmad SI 2012. Teaching of mathematics in Pakistan-Problems and suggestions. *Language in India*, 12(5): 134-146.

Kudaibergen AA 2020. Word Problems in the School Mathematics Course. In: *Proceedings of International Young Scholars Workshop*, 9: 23-29. doi:10.47344/iysw.v9i0.115:

Majoka MI, Saeed M, Mahmood T 2007. Effect of cooperative learning on academic achievement and retention of secondary grader mathematics students. *Journal of Educational Research*, 10(1): 44-56.

Mercer CD, Miller SP 1992. Teaching students with learning problems in math to acquire, understand, and apply basic math facts. *Remedial and Special Education*, 13(3): 19-35.

National Council of Teachers of Mathematics. 1989. *Curriculum and Evaluation Standards for School Mathematics*, Reston, VA.

Rich KM, Yadav A, Schwarz CV 2019. Computational thinking, mathematics, and science: Elementary teachers' perspectives on integration. *Journal of Technology and Teacher Education*, 27(2): 165-205.

Shapiro S 2000. *Thinking about Mathematics: The Philosophy of Mathematics*. Oxford: OUP.
Sheerazi SSA 2000. *Re-orientation of Mathematics Teaching: An Experimental Study*. PhD Thesis. Karachi: Pakistan: Hamdard Institute of Education & Social Sciences, Hamdard University.
Singh A, Kumar M 1993. *Engineering Mathematics*. Delhi: Dhanpat Rai.
Staples M 2007. Supporting whole-class collaborative inquiry in a secondary mathematics classroom. *Cognition and Instruction*, 25(2-3): 161-217.
Susan ES 1992. *Challenging Pupils In Mathematic: A Way Forward to the Year 2000, A Series of Discussion Papers.* Teaching Committee of Mathematics Education, UNESCO, Paris.
Tambychik T, Meerah TSM 2010. Students' difficulties in mathematics problem-solving: What do they say? *Procedia-Social and Behavioral Sciences*, 8: 142-151.
Tezer M, Ozrecberoglu N 2015. Students' view of the problems faced with the measurement and evaluation system in the Primary School Mathematics Education System. *Procedia-Social and Behavioral Sciences*, 186: 856-861.
Veesar MH, Khaskheli GA 2019 Effects of teaching strategies on students' motivation in learning of Mathematics at secondary level. *The Sindh University Journal of Education* 48(I): 63-80.
Wong KM 1998. How authentic should the situation in mathematical problems and tasks? (In Chinese). *Edu Math*, 7(6): 25-39.
Wong NY 1991. The impact of hi-tech on the teaching of school mathematics. *Math Media*, 60(1): 112-118.

Paper received for publication in September, 2020
Paper accepted for publication in September, 2020