Language Issues in Teaching and Learning of Mathematics

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Abstract

Today as in the past, many students struggle with mathematics and become affected as they continually encounter obstacles to engagement. Mathematics is generally seen as a difficult subject and how this subject is communicated to pupils will influence how pupils learn the subject. Classroom routines play an important role in developing student's mathematical thinking and reasoning.

Language makes it possible for the child to objectify and conceptualize his world and himself and to share the responsibility for his destiny. Language is a prime vehicle of expression and exchange of thought in the classroom. Studies over a period 1956 – 2007 addressed language issues in mathematics learning were reviewed. The studies reviewed stress the necessity of adequate language input in teaching of mathematics.

Language Issues in Teaching and Learning of Mathematics

Introduction

Mathematics is the most international of all curriculum subjects and mathematical understanding influences decision making in all areas of life including personal, social, and civil. Mathematics education is a key to increasing the post school and citizenship opportunities of young people. Mathematics enables people to make sound decisions and judgments to solve problems.

Lamb (1997), shows that success in school mathematics is the best predictor for success in life. Thus, it is important for all students to succeed in school mathematics-regardless of background, gender, or language. But among the school subjects, study of mathematics is considered by the students as a Herculean task. A high proportion of students hates mathematics and performs very badly in mathematics examination. Today as in the past, many students struggle with mathematics and become affected as they continually encounter obstacles to engagement. Mathematics is generally seen as a difficult subject and how this subject is communicated to pupils will influence how pupils learn the subject. Classroom routines play an important role in developing student's mathematical thinking and reasoning.

Various studies have indicated that the language problem is one of the major factors contributing towards the poor performance of many students in mathematics (Secada1992, Barton, and Barton 2003). The results all point to the fact that linguistic factors have significant effect on learning of mathematics.

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Studies reviewed

Studies over a period 1956 – 2007 addressed language issues in mathematics learning were reviewed.

Bernstein's (1956) studied Remedial arithmetic found out that 80% of the errors with fundamentals made by 9^{th} graders are in three categories viz; the use of zero in multiplication and division, borrowing in subtraction and the understanding of the decimal point in all four operations.

Gibb (1956) found out that the highest degree of pupil attainment in subtraction was on take – away problems, lowest on comparison problems. In a study on backwardness in Mathematics and basic arithmetic skills,

Halliday (1975) drew attention to the notion of Mathematics register as a set of specific uses of natural language in Mathematics including particular lexical and syntactical uses as well as meanings.

Grewal (1976) studied difficulties of students in learning elementary arithmetic. He observed the reasons for poor performance in arithmetic as little time available for giving practice, poor study habits, lack of individual attention, fear of being wrong etc.

Rastogi (1983) found out that the important causes of backwardness in Mathematics were the poor command over basic arithmetic skill.

Resnick (1984) in his study indicated that systematic errors probably arise from a basics failure to mentally represent arithmetic procedures in terms of operations on quantities within a principle number system.

According to IAE (1986), students need to be taught now to communicate mathematically, give sound mathematical explanations, and justify their solutions. Effective teachers encourage their students to communicate their ideas orally, in writing, and by using a variety of representations. Allen (1988) found out that appropriate language is the key to making Mathematics intelligible.

According to Brodie (1989), language is a necessary condition for understanding and a pre-requisite for thoughts. Gawland (1990), the language of the classroom has a formative effect on the learner's understanding of mathematics.

Pimm (1991), remarked that most of the tasks involved in the teaching and learning of mathematics involves some form of communication between teacher

and pupils and between pupils. Being able to make good use of language is an essential skill for a mathematics teacher.

Rastogi (1991) conducted a study on the weakness in mathematics as related to academic achievement considering the deficiencies due to lack of language ability. It has been found out that retardation in further stage of learning mathematical skills in incumbent upon the weakness in basic arithmetic skills.

According to Secada (1991), performance of students in mathematics is below expectations and the mathematical background, seems to be shaky and concluded that the language factor might be perhaps one of the causes of the low performance of students.

According to Cline and Fredrickson (1996), linguistic factors have a significant effect on student learning in mathematics. Ellerton and Clarkson (1996), communicating mathematical ideas are essentials for any successful mathematics teaching and learning process.

According to Bell (1998), language of the student influences how he will interprets and builds understandings. Shield (1998), there is certainly a place for quality text books that supports teachers and students in quality learning experiences.

Stard, A. *et al.* (1998) emphasized that it is the responsibility of a mathematics teacher to ensure that the class room discussion doesn't damage

mathematical learning. Brown *et al.* (2000), identified language as some sort of a medium for creating, preserving, and communicating mathematical thinking. Language is essential if teachers and students are to communicate and share mathematical ideas and beliefs.

According to Silby (2000), communicating mathematics to students in a classroom is mediated by language. Therefore, language has a crucial role to play in communicating and developing mathematics education.

National Council of teachers of Mathematics (NCTM) (2000) stressed the importance of role of language in mathematics teaching and learning. In the study, communication has been emphasized as an essential part of Mathematics and Mathematics education.

Setati (2001) argued for the use of learner's first language as a support in the teaching and learning of Mathematics. Khisty and Chval (2002) establish the role of language and teacher talk in Mathematics learning. According to them, understanding how students solve problems, how their thinking develops and how language impacts learning can foster teacher understanding of how instruction can promote mathematical learning. According to Perry (2002), without sufficient language to communicate the ideas being developed, children will have their Mathematical development seriously curtailed.

Unnikrishnan (2003), remarked that teachers most often misunderstood that local colloquial languages can be used. This deteriorated the standard of first language and resulted severe criticisms on the part of the parents. According to Barton and Barton (2003), language problem is one of the major factors contributing to the poor performance of many students in mathematics especially those who are bilingual and multilingual.

Bryant (2005) found that several difficulties were common in children with mathematical weakness, but the commonest problem was difficulty in carrying out multi step arithmetic. Jamison (2006) in his study learning the language of Mathematics mentioned about the use of language as a tool for teaching mathematical concepts. He found out that language could be major pedagogical tool.

Ongstad (2006) pointed out the explicit role of language and communication in Mathematics and found out that teaching mathematics needs to seen as communication. According to Khalid (2007), Teacher plays a big role in encouraging and determining the success of communication in any class.

Conclusion

Language is one the manifestations in the mind. It is in its capacity to represent a (logical, grammatical) system of relations that language is analogous to Mathematics. Language symbolically represents both the relation of mind to the

world and relation of human knowledge to divine knowledge. Language reveals the character of the race. The studies reviewed stress the necessity of adequate language input in teaching of mathematics.

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