

## ROLL OF MATHEMATICS IN ENGLISH LANGUAGE LEARNING (ELL) AND IN WOMEN EMPOWERMENT

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### **ABSTRACT:**

This article discusses ways in which middle school mathematics teachers can assist their students, and particularly ELLs, in a two-for-one learning experience learning both mathematics and the discourse skills needed to successfully participate in reform oriented mathematics classrooms. English is the international communication language. The objectives of this study are to discuss the challenges language has on the teaching and learning mathematics when both academia and students are confronted to teach and learn through the medium of a new language. The policy of changing the medium of instruction in the teaching of mathematics and science. The achievement of students in mathematics and science subjects after considering the impact of prominent independent variables such as, the school, class and home environment, the teaching methodology and the teachers' attitude. Study observes teaching and learning in few aspects such as the readiness of lecturers to teach in English, the inclination and perception of students to learn in English and students proficiency in the language. The focus on the unique characteristics of common mathematical discourse, the challenges it can pose to ELLs, and strategies that can help students learn to "talk mathematics."

**KEYWORDS:** communication language, student's proficiency, teaching methodology, teaching mathematics, teaching science, effective learning

### **INTRODUCTION:**

The importance of language in mathematics education is crucial for it covers aspects of teaching, learning, understanding and communication of mathematics. Through the use of language, mathematics becomes meaningful and students are able to communicate the language of mathematics adequately [1]. The objectives of mathematics education are for the students to understand mathematical concepts and possess ability to express their understanding of these concepts [2]. The Mathematics learners are required to be competent in both communication and mathematics specific language. Neglect of mathematics works injury to all knowledge, since he who is ignorant of it cannot know the other sciences or the things of the world.

### **MATHEMATICS:**

Mathematics is a branch of science, which deals with numbers and their operations. It involves calculation, computation, solving of problems etc. Mathematics reveals hidden patterns that help us to understand the world around us. Now, much more than arithmetic and geometry, Mathematics today is a diverse discipline that deals with data, measurements and observations from science, with inference, deduction, and proof; and with mathematical models of natural phenomena, of human behavior, and of social systems.

Many sayings "Mathematics is a way to settle in the mind of children a habit of reasoning". "Mathematics is a science whose subject matter is special forms and quantitative relationships of

the real world.” we can say that mathematic has originated from numbers and number system is a special field of it, from which other branches of mathematics are developed. It is a systematized, organized and an exact branch of science. Mathematics helps the man to give exact interpretation to his ideas and conclusions. It is the numerical and calculation part of man’s life and knowledge. It plays a predominant role in our everyday life and it has become an indispensable factor for the progress of our present day world.

### **MATHEMATICAL EMPOWERMENT:**

Mathematical empowerment concerns the gaining of power over the language, skills and practices of using and applying mathematics. From a cognitive psychology perspective, mathematical empowerment concerns the ‘acquisition’ of the facts, skills, concepts and conceptual structures of mathematics, and the general strategies of problem solving [5]. Mathematical empowerment consists of power over the language, symbols, knowledge and skills of mathematics and the ability to confidently apply this in mathematical applications within the context of schooling, and possibly to a lesser extent, outside of this context. to achieve the epistemological empowerment of learners through Mathematics it is not enough for them to gain mastery over some mathematical knowledge and skills. There needs to be a personal engagement with mathematics so that it becomes an integral part of the learner’s personal identity. This means that the learners need to:

1. be confident in their mathematical knowledge and skills
2. be confident in their ability to apply these capabilities both in routine and non-routine mathematics tasks, and in applied social contexts
3. be confident in their ability to understand mathematical ideas and concepts including new ones
4. Have a sense of mathematical self-efficacy, i.e., a confident self image of themselves as successful in mathematics;
5. Have a sense of personal ownership of mathematics including a sense that they can be creative in mathematics.

### **MATHEMATICS AND ENGLISH LANGUAGE LEARNERS (ELL):**

English language learners are very different from each other as well as from native speakers. Many will belong to very low-income families, although their parents may be highly educated and once held professional positions. Some will speak a degree of English, and some will speak no English at all. In spite of these differences, there are needs all ELLs share. In addition to having to build their oral English skills, they also need to acquire reading and writing skills in English, while at the same time keeping up their learning in all content areas, including mathematics. The development of the *math register*, that is, the language used to talk about mathematics, is a critical component of developing mathematical understanding in all students, including ELLs. But research on language acquisition suggests that mathematical discourse and representations have features that make it difficult for ELLs to draw meaning.

It seems almost unbelievable now, but many people in education used to think that mathematics classes in English would be easy for English language learners (ELLs) because math was less language-dependent than other subjects, as it dealt with numbers. When I was a bilingual teacher in the 1970s, it was routinely recommended that bilingual students be placed in math as their first mainstream subject. People really believed that math was nonverbal.

Over the years, a respectable body of knowledge has been developed about what kinds of language cause difficulty for ELLs. This research makes it very clear that math is *not* nonverbal. Anybody who has ever tried to teach math to ELLs will have come to the same conclusion, since it is obvious that mathematics involves critical thinking, reasoning, and problem solving.

Most studies of language difficulties in math are descriptive, listing and explaining the kinds of vocabulary that ELLs have trouble with, what sentence structures cause problems, how the correspondence or non-correspondence of words and symbols affect math learning, characteristics of word problems that make their comprehension difficult, and so forth. These features of the special language of mathematics are often referred to as a *math register*.

Recently, the studies of language difficulties in math have become more explanatory. They go beyond merely lists of the difficulties to an explanation of why they occur. For example, Ron (1999) develops the concept of "mathematized language," which can help explain why many ELLs progress well with the language of mathematics at first but then hit a plateau. This theory begins with everyday language, which is acquired naturally through social interaction. Mathematized language is similar to everyday language, but makes the mathematical concepts that are present in the everyday language explicit. Mathematized language can be used to help build up mathematical language. Ron provides an example of how a child uses everyday language to talk about wanting to buy a doll but not having enough money. Through natural acquisition with some instruction, the child learns to state this in mathematized language, by saying how much money she has and how much the doll costs and asking how much more money she needs. This mathematized language makes the transition to the language of mathematics easier.

Another area of language difficulties that has received a good deal of research attention is word problems. In order to solve a word problem, ELLs must be able to understand the language in the problem, interpret that language so they can identify the math relations and understand what the problem is asking, and convert the language and the math relations to abstract symbols. All of this is made more difficult by the fact that word problems are artificial situations described using the mathematical language of problem solving, which makes it difficult to use reading skills learned in other contexts to help understand the problem. Students who have difficulty understanding word problems often adopt strategies for solving them that may or may not work. They tend to pay more attention to the mathematical content of the problem than to the verbal content.

Looking at how teachers and students use mathematical language in classrooms and how they organize instruction is another area of research that can be helpful to teachers of ELLs. There has been more interest in classroom discourse since the math reform movement of the 1990s, because part of that reform movement included putting a much greater emphasis on ensuring that students are able to explain their reasoning, their use of strategies, and their solutions. Researchers are exploring questions such as whether and how collaborative learning facilitates math learning, whether and how teachers and students use mathematical language in classrooms, and how teachers' beliefs affect the way they organize their classrooms.

All teachers of mathematics to ELLs must know how to structure small-group interaction so students can and will take advantage of the safe environment of small groups to use academic math language as they talk about math processes and concepts. They must know how to scaffold students' interactions in small groups and how to gradually reduce the scaffolding so students will become comfortable interacting in whole-class situations.

All teachers of mathematics to ELLs must become familiar with their students' backgrounds in order to make the math curriculum culturally relevant by drawing on the knowledge and resources of students' homes and communities.

All teachers of mathematics to ELLs (actually, to any student) must understand the math they are teaching, and must know the academic language associated with it, well enough to be able to use it automatically in their classroom interactions with students. They must also understand the importance of explicitly teaching the language of mathematics, and know how to effectively teach academic language to ELLs.

## **THE ROLE OF MATHEMATICS IN WOMEN EMPOWERMENT:**

The importance of Mathematics as a tool for science and technology is continually increasing. While science and technology have become so pervasive, mathematics education has continued to dominate the school curriculum and remains a key subject area requirement in higher education and employment sector. Empowerment provides opportunities to increase knowledge and vocational skills for survival and also improves accessibility to more enterprising career paths for women.

The hue and cry which follows the publication of mathematics results has become an annual ritual. The postmortems about the results eclipse a number of areas where female students have lagged behind. This has also impacted on courses and careers sought by women in the working world. They have attributed their failure to perform to expected standards to lack of sound background knowledge of mathematics. It is this realization that the skills learnt at school have had very little if any, bearing on what society needs in terms of productive citizens. In this regard, the gender imbalances in enrolment, achievement at school level, colleges and universities and the employment sector were also issues of concern. Our societies are becoming more and more technological with a mathematical bias, more attention being focused on attainment of mathematical competencies.

Empowerment provides opportunities to increase knowledge and vocational skills for survival and also improves accessibility to more enterprising career paths for women. Imbalances in enrolment, performance, subjects and subsequent employment in jobs that have a mathematical inclination underscored the need for intervention programs to bridge the gap while it revealed the need for a curriculum reform as a mechanism for improving the quality of education.

Corresponding changes in assessment procedures are seen fit to accompany these reforms so as to ensure a holistic approach to learning. This triggered the need for research into aspects pertaining to the role of mathematics education in assisting career choices undertaken by women.

The argument is, to what extent does Mathematics education offer new challenges and opportunities for women advancement? The research sought to provide a diagnostic tool from which to view other changes that will seen fit in the teaching, learning and assessment of Mathematics in the context of women empowerment. It may also discuss why it is important to improve the present situation in mathematics education as a way of addressing gender inequalities. It will also provide a forum for creating a women-friendly environment through systematically documenting and publicizing the areas women find problematic apart from trying to establish ways of implementing a series of equal opportunities and affirmative action activities in the classroom and employment sector. In addition the research may also aimed at undertaking sensitization and social mobilization in support of the concerns of women, supporting the development and proper functioning of organizations that support women's concerns. By revealing the existing structural, organizational and institutional practices, the research may target at how policies pertaining to these could accommodate the needs of women.

## **CONCLUSION**

The mathematics is a language is a useful metaphor, it should not be allowed to obscure the complex role of language in mathematics and Teaching Mathematics acknowledges English provides the means for children to think about mathematics, as well as to express that thinking. The importance of language as a medium for knowledge acquisition, communication and reference cannot be denied. However, in the knowledge transfer process, the native language plays an important role and should be emphasized to ensure the knowledge presented can be grasped completely. Based on both a theoretical analysis and on professional experience, these appear to be the most important factors. However, even if these recommendations were based on research

evidence there would be no guarantees that implemented over an extended period of time they would succeed in empowering all learners as epistemological agents. Human beings are complex and self-constructing entities and their reactions are simply not mechanistically predictable. In some cases not all factors will be necessary. Indeed, as indicated above, sometimes a single incident can initiate a shift towards engagement, confidence and epistemological empowerment. In other cases, despite the best efforts of teachers to structure classroom mathematics in these listed ways students may not gain the required confidence or sense of autonomy. After all, experiences in mathematics classes contribute only a small part to learner identity construction. Other factors such as emotional insecurity or strong peer identification may overwhelm such positive experiences. Nevertheless over an extended period these factors should have a dramatic impact on the confidence and mathematical powers of most students.

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