Factors Affecting on Teaching of Mathematics Subject at Secondary School Level

Shivaprasad S,
Department of Post Graduate and Research in Education,
Gulbarga University, Kalaburgi.: Email.Id sshivaprasad376@gmail.com
Dr.Hoovinbhavi B.L,
Professor, Chairman & Dean of Department of Post Graduate and Research in Education,
Gulbarga University, Kalaburgi.
Email.id:hoovinbhavibl@gmail.com

Abstract:-

For proper understanding of Mathematics has a key role during the academic journey of the learner, which later on becomes the foundation of a good citizen of any country. But unfortunately, researchers found that majority of Mathematics teachers deals mathematics mechanically, the ignore its disciplinary demands and they more focused on the transmission of knowledge by engaging students in memorizing Mathematical rules and formulae, rather than on engaging them in constructing Mathematical knowledge and understanding of Mathematical concepts. Thus, this conceptual or theoretical paper focuses on concept of mathematics, difficulties encountering in teaching mathematic subjects at secondary school level and factors or problems for lack of proper understanding and learning mathematics subject at secondary school level. Thus, this theoretical or conceptual papers convey that, teaching of mathematics at secondary school level having few difficulties factors which hindering in the learning of mathematic subject among students. Apart from students point of view students also having few difficulties to understand and learning mathematics, unless if teacher followed effective mathematical strategies in their teaching process, then only the problems or factors which impacting on teaching and learning mathematic at secondary school can be solved.

Key words:-*Mathematics, Visual and Spatial Aspects, Meta- cognitive factors, & mathematical strategies.etc.*

Introduction

The belief that Mathematics is a key discipline as the determiner of the economy of a country is widely shared by politicians and social planners, the corporate sector, parents, and the general public. Mathematics as a subject got the most important place among all the subjects of any curriculum at School level. It appears in all walks of an individual's life ranging from a mason to engineer, peon to executive, farmer to government servant, hawkers to shopkeepers, people to priest and etc. At School level the young learners must have the proper understanding of mathematics so that the today learner can enrich personality, which not only academically but personally too, contributes to the nation through the overall achievement filled with values of Mathematics. It passionately helps in the proper development of decision making, logical thinking, power of expression and ability of concentration. All these aspects have a vital role in various parts and phases of practical life, whether it is personal, professional and social life.

Difficulties of Mathematics subject in teaching process

Math disabilities can arise at nearly any stage of a child's scholastic development. While very little is known about the neurobiological or environmental causes of these problems, many experts attribute them to deficits in one or more of five different skill types. These deficits can exist independently of one another or can occur in combination. All can impact a child's ability to progress in mathematics.

- **Computational Weakness:-**Many students, despite a good understanding of mathematical concepts, are inconsistent at computing. They make errors because they misread signs or carry numbers incorrectly, or may not write numerals clearly enough or in the correct column. These students often struggle, especially in primary school, where basic computation and "right

answers" are stressed. Often they end up in remedial classes, even though they might have a high level of potential for higher-level mathematical thinking.

- **Difficulty Comprehending the Visual and Spatial Aspects and Perceptual Difficulties.-**A far less common problem -- and probably the most severe -- is the inability to effectively visualize math concepts. Students who have this problem may be unable to judge the relative size among three dissimilar objects. This disorder has obvious disadvantages, as it requires that a student rely almost entirely on rote memorization of verbal or written descriptions of math concepts that most people take for granted. Some mathematical problems also require students to combine higher-order cognition with perceptual skills, for instance, to determine what shape will result when a complex 3-D figure is rotated.
- **Difficulty Transferring Knowledge:-**One fairly common difficulty experienced by people with math problems is the inability to easily connect the abstract or conceptual aspects of math with reality. Understanding what symbols represent in the physical world is important to how well and how easily a child will remember a concept. Holding and inspecting an equilateral triangle, for example, will be much more meaningful to a child than simply being told that the triangle is equilateral because it has three equal sides. And yet children with this problem find connections such as these painstaking at best.
- **Incomplete Mastery of Number Facts:-**Number facts are the basic computations (3 + 9 = 12 or 4x 2 = 8) students are required to memorize in the earliest grades of elementary school. Recalling these facts efficiently is critical because it allows a student to approach more advanced mathematical thinking without being bogged down by simple calculations.
- **Incomplete Understanding of the Language of Math:-**For some students, a math disability is driven by problems with language. These children may also experience difficulty with reading, writing, and speaking. In math, however, their language problem is confounded by the inherently difficult terminology, some of which they hear nowhere outside of the math classroom. These students have difficulty understanding written or verbal directions or explanations, and find word problems especially difficult to translate.
- **Making Connections:-** Some students have difficulty making meaningful connections within and across mathematical experiences. For instance, a student may not readily comprehend the relation between numbers and the quantities they represent. If this kind of connection is not made, math skills may be not anchored in any meaningful or relevant manner. This makes them harder to recall and apply in new situations.

Difficulties of learning Mathematics subject among school students.

Students with reading disabilities, when math difficulties are present, they range from mild to severe. There is also evidence that children manifest different types of disabilities in mathematics. Unfortunately, research attempting to classify these has yet to be validated or widely accepted, so caution is required when considering descriptions of differing degrees of math disability. Still, it seems evident that students do experience not only differing intensities of math dilemmas, but also different types, which require diverse classroom emphases, adaptations and sometimes even divergent methods.

- **Arithmetic Weakness/Math Talent:** Some learning disabled students have an excellent grasp of math concepts, but are inconsistent in calculating. They are reliably unreliable at paying attention to the operational sign, at borrowing or carrying appropriately, and at sequencing the steps in complex operations.
- **Cognitive factors:** Most students with mild to moderate disabilities have cognitive factors that impede learning. These may be perceptual, memory, attention, or reasoning factors. Perception involves taking in information from the environment and processing that information for storage or use. It's not just seeing the symbols for numbers but seeing and copying them.
- **Habits of learning:** A combination of environmental, cognitive, social, and emotional factors, habits of learning are formed from an early age but certainly can be modified throughout the lifespan. "Habits of learning" refers to how individuals view and participate in learning, their self-discipline and self-motivation, goal setting, engagement in learning activities, and acceptance of challenges.

- **Language problems:** Most students with mild disabilities have primary or secondary language problems. A language disorder, according to the American Speech-Language-Hearing Association, is "impaired comprehension and/or use of a spoken, written, and/or other symbol system". The disorder may involve form, content, or function of the language. Even if a student does not have an identified language disorder, he or she may exhibit language deficiencies related to his or her disability.
- **Mastering Basic Number Facts:** Many learning disabled students have persistent trouble "memorizing" basic number facts in all four operations, despite adequate understanding and great effort expended trying to do so.
- **Meta- cognitive factors:** Meta-cognition is an awareness of the skills, strategies, and resources that are needed to perform a task and the ability to use self-regulatory mechanisms, including adjustments, to complete the task. Sometimes called "thinking about one's own thinking," meta-cognition is the process involving being aware of and monitoring the use of executive and cognitive strategies. Students with meta-cognition problems have trouble selecting and using effective learning strategies. They don't monitor their own use of strategies and have difficulty with generalization across time and setting.
- **Motor factors:** Motor problems with written work are most evident in younger students but even adolescents with no physical disabilities can struggle with number and symbol formation. Motor skills, like perceptual ones, involve more than one process. They may involve memory of the symbol along with its actual formation (visual and motor memories). They may involve visual perception and transfer (copying). Or they may involve integration of fine muscles with task demands. Indicators of motor problems are highly visible: poorly formed symbols, little control of spacing, excessive time for a task, and avoidance of written work.
- **Social and emotional factors**: Sometimes overlooked in the academic realm, social and emotional factors can cause as many learning problems as cognitive ones. The range of these factors is as diverse as the students served.
- **The Language of Math:** Some mathematics LD students are particularly hampered by the language aspects of math, resulting in confusion about terminology, difficulty following verbal explanations, and/or weak verbal skills for monitoring the steps of complex calculations. Teachers can help by slowing down the pace of their delivery, maintaining normal timing of phrases, and giving information in discrete segments. Such slowed down "chunking" of verbal information is important when asking questions, giving directions, presenting concepts, and offering explanations.
- **The Written Symbol System and Concrete Materials:** Many younger students who have difficulty with elementary math actually bring to school a strong foundation of informal math understanding. They encounter trouble in connecting this knowledge base to the more formal procedures, language, and symbolic notation system of school math.
- **Visual-Spatial Aspects of Math*:*** A small number of mathematics LD students have disturbances in visual-spatial-motor organization, which may result in weak or lacking understanding of concepts, very poor "number sense," specific difficulty with pictorial representations and/or poorly controlled handwriting and confused arrangements of numerals and signs on the page. Students with profoundly impaired conceptual understanding often have substantial perceptual-motor deficits and are presumed to have right hemisphere dysfunction.

Mathematics strategies for teaching and learning process for school students

Some of the following math strategies and suggestions may help students who are experiencing problems with mathematics. Identify strategies that will help our students and teacher about using some of the strategies in school.

- ✓ **Give opportunities to connect mathematical concepts to familiar situations:** when introducing measurement concepts, have children estimate their measurements before measuring classmates' and family members' heights or weighing their book bags' when empty and when full.
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- ✓ **Help student apply math concepts to new situations:** how to use percentages to understand the price of a pair of shoes on sale at the mall or the amount of their allowance they spend on snacks.
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- ✓ **Help student keep track of problematic areas:** When doing math homework, students may benefit from having their most common errors listed on flashcards. They can then refer to the cards while completing their assignments.
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- ✓ **Make our expectations explicit:** Tell student the procedures would like them to use when solving a problem, model each procedure for them, and then have them tell what they are expected to do. Some students benefit by having a math notebook filled with examples of completed problems to which they can refer if they become overwhelmed or confused.
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- ✓ **Provide access to programs or tutors that can help a student improve his or her math skills:** Tutors can assist student with

weak math sub-skills, such as multiplication and division. Provide tutors during summer months or after school to boost performance and ensure that the student retains his or her skills.

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- ✓ **Provide specialized materials:** To help student organize their calculations, have them use graph paper (or lined paper turned sideways) to keep numbers in columns. Encourage the use of scrap paper to keep work neat, highlighters to underline key words and numbers, and manipulative such as base-ten blocks or fraction bars.
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- ✓ **Provide time for checking work:** Emphasizing that completing math assignments is a process, encourage students to become comfortable reviewing their work, making changes, or asking questions when they are unsure of their answers.
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Conclusion:-

Factors affecting on teaching of mathematics subjects and teaching performance could be improved with addressing knowledge, attitude, skill, belief and attitude towards mathematics. All these have their significant role to enhance to reduce the factors affecting on teaching mathematics and the teaching on students performance .With their relationship, it can support the way of teaching style by managing the process in the sense that focuses on determining the factors in influencing the teaching and learning performance. Thus, this theoretical or conceptual papers infer that, teaching of mathematics at secondary school level having few difficulties factors which hindering in the learning of mathematic subject among students. Apart from students point of view students also having few difficulties to understand and learning mathematics, unless if teacher followed effective mathematical strategies in their teaching process, then only the problems or factors which impacting on teaching and learning mathematic at secondary school can be solved.

Reference

1. Angier, C., &Povey, H. (1999). One teacher and a class of school students: Their perception of the culture of their mathematics classroom and its construction. Educational Review, 51, 147-160.
2. Anthony, G. & Walshaw, M. (2009). Characteristics of Effective Teaching of Mathematics: View from the West. Journal of Mathematics Education.2, (2).R
3. Ball, D. L. (1993). With an eye on the mathematical horizon: Dilemmas of teaching elementary school mathematics. Elementary School Journal, 94(4).

4. Bass, H. (2005). Mathematics, mathematicians, and mathematics education. Bulletin of the American Mathematical Society, 42(4), 417–430.
5. Boaler, J. (2008). Promoting 'relational equity' and high mathematics achievement through an innovative mixed-ability approach.British Educational Research Journal, 34, 167-194.
6. Cobb, P., Wood, T., &Yackel, E. (1990).Classrooms as learning environments for teachers and researchers. In R. B. Davis, C. A. Maher, & N. Noddings (Eds.), Constructivist views of the teaching and learning of mathematics: Journal for Research in Mathematics Education – Monograph 4 (pp. 125-144). Reston, VA: National Council of Teachers of Mathematics.
7. Davis, B. (1996). Teaching mathematics: Towards a sound alternative. New York: Garland Publishing.
8. Forman, E., & Ansell, E. (2001).The multiple voices of a mathematics classroom community. Educational Studies in Mathematics, 46, 114–142.
9. Franke, M., &Kazemi, E. (2001). Teaching as learning within a community of practice: Characterizing generative growth. In T. Woods, B. S. Nelson, & J. Warfield (Eds.), Beyond classic pedagogy: Teaching elementary school mathematics (pp. 47-74). Mahwah, NJ: Lawrence Erlbaum Associates.
10. Henningsen, M., & Stein, M. (1997). Mathematical tasks and student cognition: Classroom-based factors that support and inhibit high-level mathematical thinking and reasoning. Journal for Research in Mathematics Education, 28, 524–549.