

**L**earning

**T**heories

(Proceedings of a Two Day National Seminar, 27-28, June 2019)



**Centre for Teacher Resource and Academic Support (CTRAS)**  
**School of Education**

Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching  
(an MHRD Project, Govt of India)



**Manonmaniam Sundaranar University**

*(Reaccredited with 'A' Grade by NAAC)*

**Abishekapatti, Tirunelveli – 627 012**

**Tamilnadu**



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# Awareness and Remediation of Learning Disabilities in Mathematics: A Challenge for New Generation Teachers

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## Abstract

*This paper focusses on the need of the new generation teachers being aware of the learning disabilities prevailing in children, especially the mathematics learning disability called dyscalculia and adopting remedial measures to overcome or minimise the extent of the condition. In many of the schools, teachers may come across certain children who have diverse learning abilities and special learning needs. When a child has difficulty in reading, writing or arithmetic, the possibilities of learning disability can be suspected. The most common types of learning disabilities are dyslexia (disorder of reading), dysgraphia (disorder of written work) and dyscalculia (disorder of performing arithmetic calculations). The awareness regarding various learning disabilities and the mitigation of these disabilities by treating the learning disabled is a challenging task for the school teachers. While various learning disabilities occur in school children, it is a fact that the specific learning disability called dyscalculia is very much prevalent. If left undiagnosed and untreated, it may reduce the capacity of the individuals to develop their full potential for work and achievement. It is essential for educators at all levels to be aware of the learning problems of such children and take suitable steps to mitigate this learning disorder by adopting different educational strategies.*

**Keywords:** Learning disability - dyscalculia - dyslexia - dysgraphia - diverse learning abilities

## Introduction

Education is considered to be a powerful instrument in developing the basic skills that are needed for learning. These skills include the various language skills and numerical skills which are needed to lead a successful life in society. Various skills such as listening, thinking, speaking, understanding, reading, writing, reasoning, calculating etc., are essential to achieve in academics.

Learning disability is a widespread issue in today's society. It is always associated with deficit in academic performance. Learning disabilities are disorders that interfere with the development of the basic academic skills. It is a condition where a child's achievement is substantially below what one might expect for the child. There are a variety of skills impacted by learning disabilities which include language and reasoning abilities as well as calculation and motor



skills. The learning disabilities which impact a child's ability to learn are *dyslexia* (reading deficiency), *dysgraphia* (writing deficiency) and *dyscalculia* (arithmetic deficiency). Children with learning disability like dyscalculia may be found in most schools. Teachers at all levels have a great role to play in the minimization of difficulties in learning among these educationally handicapped children.

### Learning Disabilities - The Concept

Learning disability is an umbrella term coined in the 1960's and Samuel Kirk first used the term to describe the children who had specific learning deficits. He suggested the word 'learning disabilities' to describe such children's behavioural symptoms that arise from dysfunction of the central processing mechanisms. This term described a group of children who had disorders in the development of language, speech and associated communication skills needed for social interaction (Reddy & Sujathamalini, 2003).

The National Joint Committee of Learning Disabilities defines learning disability as a generic term that refers to a heterogeneous group of disorders which is manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities (Reddy, 2006). Like other categories of disabilities like physical impairments or speech handicaps, children with learning disabilities are also children with special needs who require special attention. Indeed, learning disability is a challenging area in the field of special education.

A learning disability is not a type of mental retardation as mistaken by many people. Learning disabilities do not include problems that are primarily the result of intellectual disabilities, emotional disturbances or visual and auditory disabilities. A misconception that was quite prevalent in the past was that a child with a learning disability lacked in intellect. The fact is that children with learning disabilities are as smart as and even in some cases even smarter than their peers (Saravanabhavan, 2008).

### Dyscalculia - The Specific Learning Disability

Specific learning disabilities call for focused instruction and guidance. A child with a learning disability has problems in most types of subject matter while a child with a specific learning disability has a major problem with one type of subject material (Jaya & Geetha, 2004).

A specific learning disability is marked by significant difficulties in the acquisition of basic skills in reading, written language or mathematics. The learning disabilities such as dyslexia, dysgraphia and dyscalculia are called specific learning disabilities. They are specific in the sense that each of these

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disorders significantly affects a relatively narrow range of academic and performance outcomes. Dyscalculia is the most widely used term for the learning problems and difficulties in mathematics faced by the learning-disabled children (Mangal, 2007).

Dyscalculia is a mathematical disability which can be defined as the inability to develop mathematical concepts, difficulty in implementing calculation procedures or to reason with numbers. The neuropsychological profiles of dyscalculia resemble acquired mathematical disability due to brain damage. It is characterized by misreading arithmetical operations, difficulty with place values and decimals, number omissions, number rotations etc. (Karanth & Rozario, 2005).

There are a range of warning signs that a dyscalculic learner may have in mathematics. These include slowness in giving answers to mathematics questions in comparison with other learners, difficulties in mental calculations, using fingers to count simple totals, mistakes in interpreting word problems, difficulty to remember basic mathematics facts, losing track when counting or saying multiplication tables, difficulty in remembering the steps in a multistage process, difficulties with position and spatial organization etc. (Hannell, 2005).

Learning disabilities like dyscalculia may affect individuals differently at different stages of life - early childhood, elementary school years, primary school years, adolescence and adulthood. Students with learning disabilities may be identified at any age, but most of them are first noticed in early elementary school grades. A correlational survey study (Osisanya et al, 2013) which examined the prevalence of dyslexia and dyscalculia among persons with academic deficits in English Language and Mathematics in public primary schools, revealed that dyslexia and dyscalculia were prevalent among pupils with academic deficits in English Language and Mathematics and that pupils with both dyslexia and dyscalculia were in the larger percentage.

If the problems faced by learning disabled children, especially those with dyscalculia, go undetected, it may persist on to higher stages of education which may lead to failure in their academic achievement. So, they need to be identified in the earlier stages of learning and hence the teachers need to have awareness regarding the problems faced by such children.

### **Coping Strategies for Dyscalculic Children**

Some researches reveal about remedial measures to be adopted to overcome the problems faced by dyscalculic children. Hence, there is a hope that there are certain strategies that can be implemented to cater to the needs of such learners.



Kumar and Raja (2012) had done an experimental investigation to examine the effectiveness of remedial instruction to enhance the mathematical ability of dyscalculics and the findings indicate that remedial instruction fosters better understanding in learners through the usage of different ways of presenting information in the classroom such as through visual representations and kinesthetic experiences.

Computer-based education has an important role to play as an advanced technological instruction. It employs different instructional techniques to meet the diverse needs of the learners through the use of technology in classroom instruction. In an experimental study (Kumar & Raja, 2010) done to examine the effectiveness of using computers for teaching mathematics to dyscalculic children at the primary level, it was revealed that computer-supported instruction enhanced the mathematical ability and academic performance of those children. A study conducted by Mutlu and Akgun (2017) also reveals that Computer Assisted Instruction Materials are effective in improving the numerical skills of dyscalculic learners.

Multimedia applications can be used for the benefit of learners with special educational needs. The various technological devices provide the learners with visual, auditory or kinesthetic experiences. Different multimedia applications can be used to enable the disabled learners to adopt their own style of learning (Raja & Kumar, 2010). By choosing materials and activities suited to their level of learning and by stimulating their urge to bring out their best, the present day teachers can help the pupils with mathematical learning disabilities to turn their difficulties into special opportunities to be model achievers.

Heo (2007) conducted an experimental investigation on the impact of multimedia anchored instruction on 80 randomly selected seventh-grade students with 28 students having a learning disability and findings of the research indicate that students with learning disabilities who received the anchored instruction improved in their motivation to learn and also in their academic achievement to a level similar to students without learning disabilities.

Educational technologies like web-based learning can help the mathematically disabled children in overcoming severe learning problems and permit a greater number of opportunities for learners' epistemological styles, pace of learning, flexibility, self-correction and modification of learning. On investigating the strategies and limitations students with learning disabilities namely dyslexia, dysgraphia and dyscalculia face in a web-based instruction environment and the contributions of web-based instruction course designers and their impact on web course design, it was revealed that learning through the

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web helps to increase students' motivation, self-esteem and a sense of autonomy (Tandoh, 2003). Opitz (2003) on determining the effects of web-based learning modules for adolescents with learning disabilities found that web sites created using universal design guidelines that adhere to federal recommendations for web accessibility may assist all types of students in improving the accuracy of response when using information from a website.

Teachers have a great role to play in moulding the mindset of children with learning disabilities in such a way as to enable them to convert their challenges into chances for their intellectual and emotional development. They need to provide their students with positive role models by bringing to their attention the anecdotes from the lives of great personalities like Thomas Alva Edison, Albert Einstein and Winston Churchill who in spite of their learning disabilities like dyslexia, dysgraphia and dyscalculia rose to the peak of excellence in their careers as scientists, mathematicians or statesmen (Kumar & Raja, 2009).

Moreover, it is essential on the part of the teachers at all levels to have greater awareness about learning disabilities like dyslexia, dysgraphia or dyscalculia in order to investigate about new technologies that can be most appropriately used to facilitate the learning of the educationally handicapped children. Also the teachers have to be aware of the compensatory strategies that they can use to make these students to cope up with their academic tasks. Different communication technologies such as Electronic learning, Mobile learning, Ubiquitous learning etc., can be used to enrich, enliven or add variety to the learning of such educationally handicapped learners. Technologies have the potential to create a conducive atmosphere to active learning by the students. It can help students with learning disabilities in developing motivation and self-esteem by allowing students to take more responsibility for their learning (Raja & Kumar, 2010).

The present era is the age of technology. It is necessary for the new generation teachers to get rid of techno-phobia and be familiar with all aspects of technology. It is essential for teachers to be acquainted with the new technologies, learn more about them, and also determine how they may be most appropriately used to facilitate learning. It is essential that teachers adopt different kinds of technologies in the classroom to meet the needs of dyscalculics, so as to overcome their learning problems in mathematics and attain tangible improvement in mathematical abilities (Raja & Kumar, 2011).



## Conclusion

Learning disability is a life-long condition but the effects of this disorder can be controlled with appropriate support, guidance and intervention. Dyscalculia is a learning disability which requires special support apart from classroom teaching. Once the teachers notice that children have severe problems with academic skills, they should seek help from qualified professionals. For treating the dyscalculic learners, teachers can also get special support which includes the roles of special educators, medical experts and therapists.

Dyscalculics require help to learn normally through early recognition and specialized approaches in teaching. Rehabilitation programmes have to be planned for these special learners according to their level and nature of dysfunction. The task of instructing a child with dyscalculia is indeed challenging and by becoming aware of the strategies that can mitigate the learning difficulties, instructors can grow in confidence in accomplishing this complex task.

Careful and patient attention is needed for treating and teaching dyscalculics. Adopting suitable strategies for transacting the mathematics curriculum according to the pace of the student is a challenge to be faced by the teacher. It is the duty of the teacher to diagnose dyscalculic learners in the class and adopt suitable strategies and programmes to and to develop appropriate methods of assessment to mitigate their deficiencies in learning. Especially, mathematics teachers have a great role to play in moulding the mindset of the mathematically disabled children to enable them to convert their challenges into opportunities.

## References

- Hannell, G. (2005). *Dyscalculia: Action plans for successful learning in mathematics*. NY: David Fulton Publishers.
- Heo, Yusung. (2007). The impact of multimedia anchored instruction technology on the motivation to learn of students with and without learning disabilities placed in inclusive middle school language classes. *Dissertation Abstracts International*. 68(12), 5031-A.
- Jaya, N., & Geetha. T. (2004). *Remedial package for dyscalculic children*. Coimbatore: Avinashalingam Institute of Deemed University for Women.
- Karant, P., & Rozario, J. (2003). *Learning disabilities in India*. New Delhi: Sage Publications.
- Kumar, S. P., & Raja, B.W.D. (2009). High self-esteem as a coping strategy for students with learning disabilities. *i-manager's Journal on Educational Psychology*, 2 (4), 14-19.