



# International Journal of Research in Academic World



Received: 21/December/2025

IJRAW: 2026; 5(2):01-05

Accepted: 05/February/2026

## Inclusive Strategies and Technology Integration for Students with Learning Disabilities

\*<sup>1</sup>Dr. Sadiya Siddiq\*<sup>1</sup>Assistant Professor, Department of Education, Regional Institute of Education (NCERT), University of Mysore, Mysore, Karnataka, India.

### Abstract

Learning disabilities affect the child from a variety of angles- but mostly, self-esteem and self-confidence. Learning Disability is a neurological condition that is beyond the control of the individual. Such a student is more normal than different. The degrees of Learning Disability are mild, moderate, and severe. Learning Disability creates a gap between a person's ability and performance caused by an alternation in the way information is processed. Negative experiences in the school, especially in terms of learning incapacity can leave long lasting scars of being demeaned, belittled, or accused of being disruptive as they struggled to understand what was being taught. Thus, Learning Disability is a term used to denote a neurological handicap that interferes with a person's ability to receive, process, store, and retrieve information. Problems associated with Learning Disabilities can be categorised under Behavior Problems, Emotional Problems, Family background and so on. Learning Disabilities are majorly seen under three types as Dyslexia, Dysgraphia and Dyscalculia. This paper suggests the Inclusive strategies and Technology Integration to make the learning easy and effective among the students with Learning Disabilities.

**Keywords:** Learning Disability, Dyslexia, Dysgraphia, Dyscalculia, Inclusive strategies, Technology Integration.

### Introduction

International policy and legislation on the rights of persons with disabilities is strongly in support of children with disabilities receiving their education in an inclusive, rather than segregated, school setting. Children with diverse needs including disabilities are the valued members of the school community. Teachers can facilitate a positive environment in the school that respects inclusiveness and provides equal opportunities to the children with special abilities, from varied social backgrounds and diverse learning needs. Hence, inclusive classroom promotes learning of all children, with special abilities, with various social background and with diverse learning needs. Technology is one of many supports that can enable the realization and implementation of inclusive education. Technology has a major role to play in enabling educational authorities, teachers, students and parents to move towards a more inclusive educational system. A significant number of students with learning disabilities, or special needs, require assistance and support in their learning. The introduction of Technology and use of the Internet have played a major part in shaping the knowledge and skills of these students. Assistive technology has introduced awareness for both educators and students and for the past decade there has been a growing effort in the design and development of Technology-based platforms to enhance the learning outcomes of these students.

Learning disability (LD) is a term used to denote a

neurological handicap that interferes with a person's ability to receive, process, store, and retrieve information. LD creates a gap between a person's ability and performance caused by an alternation in the way information is processed. Repetition and drilling do not alter this processing, but presenting materials in a different way helps. Individuals with LD are generally of average or above average intelligence. It is thought that up to 15 percent of any population anywhere contains learning disabled. Specific learning disabled (LD) persons find it difficult to succeed in conventional classroom. Therefore, it is essential that all teachers, preschool through university, will have LD students in their classes, unrecognized, undetected and therefore considered to be the "dullard," the backbenchers. LD is a neurological condition that is beyond the control of the individual. Such a student is more normal than different. There are degrees of LD are mild, moderate, and severe. It might go undiagnosed as late as secondary school, university, or even never at all. They younger the child when diagnosed, greater is the possibility of remediation. When a student is older, it is coping strategies that need to be strengthened.

### Types of Learning Disabilities:

- i). **Dyslexia:** A person has trouble understanding written words, sentences or paragraphs.
- ii). **Dysgraphia:** A person finds it hard to form letters or writes within a defined space.

iii). **Dyscalculia:** A person has difficulty solving arithmetic problems and grasping math concepts.

### 1. Dyslexia

Dyslexia is a disorder manifested by difficulty in learning to read, despite conventional instruction, adequate intelligence and socio-cultural opportunity. It is dependent upon fundamental cognitive disabilities, which are frequently of constitutional origin. 143

**Characteristics of Dyslexia:** Speech difficulties are common in children with dyslexia. Stuttering and lispings are quite common. Delayed spoken language is often an indicator of dyslexia. Spatial difficulties-leading to reversal of letters (B-d), words (saw, was) and sometimes even sentences and difficulty in scanning from left to right. Visual memory difficulties in recalling sequence of letters in words (spelling). Difficulties in visual and motor figure ground- resulting in illegible handwriting, difficulties in scanning lines and discrimination of letters. These characteristics appear more often in combination. Apart from difficulties with phonological processing, dyslexia is also associated with differences in cognition and learning.

### 2. Dysgraphia

A neurological-based writing disability in which a person has difficulty expressing thoughts on paper and with writing associated with unreadable penmanship and problems in gripping and manipulating a pencil. The written form of language is the highest the most complex form of communication. In the hierarchy of language skill, writing is the last to be learned. Prerequisite to writing is a foundation of previous learning and experiences in listening, speaking, and reading. Even though dysgraphia is difficulty with handwriting, the other components of written expression-spelling and written expression which are impaired in children with learning disabilities need to be considered.

**Common Signs of Dysgraphia:** Bad or illegible handwriting. Awkward or cramped pencil grip. Avoidance of tasks involving writing. Inconsistent in the way letters and words look. Difficulty in expressing ideas on paper. Inability to properly form letter. Writing may be slow and labored. Difficulty keeping letters on the line. Inability to understand the relative sizes of letters. Crowding of letters within words. Poor spacing between words. Difficulty in reading written work even when the spelling is correct. LD students usually encounter many different types of written language problems. They have difficulties in handwriting (formation, size and spacing irregularities, pressure marks and erasures), spelling and written expressions.

### 3. Dyscalculia

Dyscalculia is the type of learning disability resulting in difficulty in learning numerical and mathematical ideas and concepts. Clinical Signs of Dyscalculia include Difficulty with common math processes such as addition, subtraction, multiplication. Difficulty with math concepts such as sequencing of numbers, and sequencing of rules required in mathematical problems. Poor retention and retrieval of math concepts. Inability to work with numbers or symbols. Inconsistency in understanding and application of math rules. Poor sense of direction and time, e.g., difficulty with reading maps, telling time, etc. Difficulty in applying rules in sports. Trouble keeping track of scores and players during card and board games. Inability to handle money transactions in day-to-day living.

**Difficulties in Mathematics:** Shape discrimination-confusion in recognizing shapes may cause difficulty in recognizing numbers. Size discrimination-concepts like, big, small, long and short are very important for mastering abstract quantitative concepts like more, less, greater than, less than, etc. This may also lead to difficulties in estimating area, perimeter, etc., at a later stage. Classification-categorizing objects into sets is a very important concept for mastering maths. Difficulties in this can also lead to difficulties in simple operation like counting. One-to-one correspondence-lack of understanding of this could cause problems even with counting. This may also lead to failure in understanding ordinal numbers. Auditory-visual integration- necessary to remember names of symbols (numbers, signs, etc.). Memory deficits could aggravate the problem. Place value-confusion in this area can lead to difficulties in addition (involving borrowing and carrying over), division and multiplication. Computation skills – in understanding commutative properties of addition/multiplication and concepts that subtraction is an inverse operation of addition and division in an inverse operation of multiplication. Problem solving-difficulties in solving word problems due to problems in language, lack of analysis, and reasoning. Spatial concepts-difficulty in making measurements of time, distance, etc.

### Inclusive Strategies and Technology integration for students with Learning Disabilities

Students with Learning Disabilities may take much longer to learn and can also tire quickly. Break activities into small, sequential tasks. Give specific examples. Repeat, repeat, repeat – both old and new materials, in different ways. Provide the amount of structure and support that the student needs. Do not expect the student s to listen and write simultaneously.

Mark positively- tick the good bits. Mark for content – not presentation or mark for presentation and not content. Do not use playtime to finish work and reward all good behavior. Very important, seek opportunities to praise and build self-esteem

Dyslexics should be taught in a structured, logical step-by-step way, beginning with single-letter sound linked to letter names and letter shapes, working in stages through simple one-syllable words to complex multi syllable words.

The teaching drills should be based on a multi-sensory technique. In other words, all-around approach that utilizes the student's senses of sight and hearing, as well as involving writing down and reading back aloud what has been written-an- that is particularly successful with dyslexics.

The association between single-letter name, sound, and shapes should be taught first, along with the knowledge of that some of these letter are vowels, which will be needed in every word. Gradually, the complete range of spelling patterns and sentences is taught. The teacher should thoroughly understand the structure of the language and how it develops. Dyslexic students should be introduced by dictation to sentence formation in its simplest form.

Asking the child to repeat sentences while dictating also helps to improve memory for sentences. More sophisticated sentences are introduced gradually. Dyslexic students have to be taught reading, and spelling in a scientific manner with every step distinctly clarified and presented in a comprehensible manner.

In addition to specially tailored reading and writing tuition, specialist dyslexia therapy should also give help, when needed, with mathematics, directional confusion, telling the

time and all the other typical problems for the dyslexic. This drill is repeated with each set of new sound patterns. The association between single-letter name, sound, and shapes should be taught first, along with the knowledge of that some of these letters are vowels, which will be needed in every word. Gradually, the complete range of spelling patterns is taught and sentences. The teacher should thoroughly understand the structure of the language and how it develops. Dyslexic students should be introduced by dictation to sentence formation in its simplest form.

Asking the child to repeat sentences while dictating also helps to improve memory for sentences. More sophisticated sentences are introduced gradually. Teaching reading and writing simultaneously to enhance language comprehension through visual perception, auditory perception and tactile perception.

Focusing on most basic perceptual associations that the child is familiar with. Teaching whole word instead of isolated letters to provide complete language experience. Planning learning experiences that the child can perform successfully. Constructing reading experiences that use the skills that the child has learned previously. Emphasizing on over learning till it becomes automatic

**Handwriting Activities for Left-handed Students:** Observe whether the child uses the right positioning. The left-hander's writing should be slightly sloped to the left-tape the student's paper in the right positioning, if necessary. Seat the child in the left corner of the classroom away from the aisle, if possible, to ensure movement space. Has a good tripod grasp. Able to draw horizontal line (left to right) and vertical line (top to bottom). Able to draw a circle. Copies letters and words

**Writing Letters:** Place a little green dot at the starting position for the letter stroke and a small red dot at the termination point. Arrow clues to indicate the direction of the stroke could also be provided. Teach the basic strokes for most letters sequentially. For example, teach the letter "t" as two separate strokes: and eventually, encourage the child to join the basic strokes together. Teach letters with easier strokes first. The following letters are considered the least difficult for children to learn: c,i,l,o,t,v. Tape an alphabet chart to the child's desk. Use clean, lined paper for children with aligning and spacing difficulties. Teach children to "talk out" strokes in making specific letters. For example, W - Slant down, slant up, slant down, slant up. I - short line, dot.

**Cursive Writing:** Devise games for students to practice various cursive strokes. For example: Stringing beads. Making waves. Making curly hair. Use dot-to-dot or dash-to-dash letters to informally assess readiness for cursive writing. Gradually fade out the dots or dashes, allowing the child to make the complete letter independently.

Teach letters with similar movement patterns sequentially. The following four groups contain similar strokes:

- i). a,c,d,g,o;
- ii). b,h,f,k,l,e,
- iii). i,j,p,r,s,t,u,w;
- iv). m,n,v,x,y,z.

Place a heavy (possibly weighted) bracelet or wristband on the wrist of a child who had difficulty keeping his wrist in the proper position on the desk. Use verbal cues in teaching cursive writing. Teach letters with similar strokes in sequence so that the child can more easily follow the cues. For example, use the "a" strokes in teaching the "g" strokes: "First come around like the 'a', then go down...."

Identifying the problem areas in maths is the first step towards helping the child. Concretizing the concepts, use of multisensory approach, repeated drill and revision exercises once understanding of the concept is ensured, will help in consolidation and retention. Gradually increasing the difficulty level of the concepts, using examples from real life and weaving stories around mathematical concepts can be attempted to get the child involved in learning.

### **Technology integration for students with Learning Disabilities;**

Accessible Technologies hold the potential to enable students with disabilities to receive education and become independent in social and economic life of their communities. Moreover, they provide equitable learning opportunities through enabling communication with teachers and fellow students. They also provide access to learning materials, so that students can do the course work, assignments and appear for examinations. In general, accessible Technologies enable greater learner autonomy; unleash hidden potential for those with communication difficulties; enable students to demonstrate achievement in ways which might not be possible with traditional methods; and enable tasks to be tailored to suit individual skills and abilities. Below are some examples for Technology integration in reducing Learning Disabilities:

- i). **The smartphone + keyboard combination** allows children who are visually impaired or blind to access written material (using the smartphone's screen reader), but also to express themselves in writing (take notes, submit homework, etc.) using the keyboard.
- ii). **Proloquo2Go** is an application that allows students with cognitive and/or speech difficulties to express themselves. The student selects images/symbols representing what he/she wants to express and the application oralises it.
- iii). **Digital textbooks, eBooks, and Audio-books:** Digital textbooks (both online and CD-based) offer options for accessing the same content at different levels of complexity. The digital format offers an advantage over traditional textbooks because digital publications can incorporate time-based and interactive media directly within the text. CD-based digital textbooks provided by textbook publishers, offer a variety of features, including pronunciation guides, text-to-speech, and vocabulary support, as well as features that allow the reader to change the formatting of the text to improve readability. Many digital textbooks allow students to hear the text. This feature supports students with learning disabilities who benefit from the ability to hear and view the text simultaneously.
- iv). **CAST UDL Book Builder:** builder. Developed and hosted by the Center for Applied Special Technology (CAST), Book Builder helps educators "create, share, publish, and read digital books that support diverse learners according to their individual needs, interests, and skills." The database and the tool integrate several technologies like 'screen-reading software' to make content accessible to students with learning disabilities, yet at the same time 'integrating functionality', it engages the reader through the use of built-in avatars who pose questions and offer ideas as the students read. Some learning situations may require further customization not possible via prefabricated content. In these situations, the teacher must seek tools for enhancing text as opposed to

already enhanced text. One of the tools is the CAST UDL Book Builder (<http://bookbuilder.cast.org/>), a free digital book database and book, games and gaming, mobile phones, art packages, using sound, visualisers, podcasting, digital animation, iPods and iPads, dance mat technology, digital storytelling, wikis, online reading schemes, satnav, story boarding

- v). **Digital posters:** Digital poster displays, like those created using Glogster EDU (<http://edu.glogster.com/>) and incorporate media elements like images, videos, audio recordings, and drawings with text. Students, who are gifted or thrive on creative freedom, find engagement and challenge in such a format; whereas students with learning disabilities find support in the options for expression. For a thorough discussion of using digital posters in the classroom, see the article “Digital Posters: Creating with an Online Canvas (<http://www.learnnc.org/lp/pages/6542>).”
- vi). **VoiceThread:** Voice thread (<http://voicethread.com/>) is an online platform where students can respond to a topic using text, audio, video, or images. The variety of options makes it possible for students with learning disabilities to contribute to the presentation using the method that works best for them. The option to record an oral response, rather than delivering it ‘live’ in class, benefits students who need time to compose their thoughts, as well as students who have speech disorders like stuttering. In an example of a picture book of poetry for class III, students have commented with both text and audio (<https://voicethread.com/myvoice/thread/119840>).
- vii). **Digital Storytelling:** Digital storytelling projects, in which students tell fictional or true stories, are another example of differentiating product by student interest: Each learner draws on his or her background or interest to provide the content for the product. Digital stories can be created in a range of formats, including pure audio, image slideshows with static text, image slideshows with voiceovers, and pure video. The options that prioritize audio over text benefit students who have difficulty with writing. (The University of Houston offers a useful introduction to using digital storytelling in the classroom, visit: <http://digitalstorytelling.coe.uh.edu/>)
- viii). **Support for Evaluation: Rubistar:** To succeed on any class project, all students need the support in terms of clear guidelines. But students with special needs may need additional support to stay on task and complete each step in completing a project. Creating separate rubrics for students who have different skill sets, can provide the appropriate level of support for such students. For example, an oral presentation rubric might include a criterion like, “Share multiple drafts with teacher,” to remind students with organizational/procedural issues of importance of viewing the final presentation as a series of tasks. Web-based tools like Rubistar (<http://rubistar.4teachers.org/index.php>), a free rubric generator, can help teachers easily create a master rubric and then adapt it for students with special needs.

As an illustration of Inclusive Strategies for teaching mathematical concepts are given below.

- i). **Teaching Pre-concepts, Mathematical Operations:** Prepare a worksheet with missing math signs. Ask the students to fill them in. Promote understanding of the terms longer and shorter by drawing lines of various lengths the chalkboard and asking the students to make

them longer or shorter. Use number line to develop vocabulary such as before, after, between, larger than, smaller than, and the same as. Permit students to refer to the number lines in answering questions (e.g., what number comes just before 7? What number comes just after 13? What number comes between 6 and 8?). Give students a set of cards numbered from 1 to 10. Instruct them to turn up one card and ask whether that number comes before or after a number that you choose at random. Also, use more or less and smaller than or larger than for this activity. Print operational sign on flash cards. Let the students practice with the cards every day. Add kinaesthetic clues by cutting the signs out of sandpaper and pasting them on the cards. Provide colour cues for operational signs to call attention to the signs. Also, draw circles or boxes around the signs to enable students to attend more closely to the signs

- ii). **Teaching Fractions:** Not only children but many adults also have difficulty in understanding fractions. To understand fractions, we should be aware that: Fractions make sense only when viewed in relation to a whole number. They make no sense as independent entities. The understanding of the symbols of the fractions: denominator-the number of parts the whole is divided into; and the numerator – the number of parts of whole which are in consideration. Materials and experiences should be provided to the children to master these basic facts. Fraction and equal sharing – give children a bag of marbles, sweets, etc., and ask them to share equally between 2,4,8 and 10 children and write the fractional equivalent. Fractions and shapes – draw and cut symmetrical shapes and ask children to fold into  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{1}{8}$ , etc. Fractions/lengths – estimating or measuring length of a long strip, its  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{1}{8}$ , etc. This activity could be done with capacity, weight, time, etc., for generalization. Charts could be drawn to illustrate the relationship of fractional parts to the whole. Gradually introduce assignments requiring to work with fraction without visual clues. Use the measurements in simple recipes to reinforce fractional components.

### Conclusion

It should be kept in mind that each intervention strategy is a unique instructional design based on the kind of learning difficulty the child has and the nature of the mathematical concept itself. Hence, it implies lot of creativity and imagination on the part of the teacher handling the difficulty. To increase equitable and effective access and improve the use of Technology in support of inclusive education, provide digital training for teachers, parents, carers and students, with particular attention to girls and children with disabilities. For teachers, this training should include modules on ICT use and basic settings and maintenance management. Invest in and support innovation, research and the development of accessible and affordable ICT to meet the challenges of inclusive education, including distance and/or online education. Governments, by facilitating dialogue, sharing relevant resources and data on the educational situation of children with disabilities and the potential of ICT, and supporting efforts to move towards more inclusive education systems. It should be remembered that while ICT has great potential to support the educational inclusion of children with disabilities, it cannot replace other face-to-face methods and tools, nor can it replace training teachers in inclusive pedagogy, both face-to-face and online.

**References**

1. Adam T, Tatnall A. Use of ICT to Assist Students with Learning Difficulties: An Actor Network Analysis. *IFIP TC 3 International Conference on Key Competencies in the Knowledge Society (KCKS)/Held as Part of World Computer Congress (WCC)*; 2010 Sep; Brisbane, Australia. p. 1-11. doi: 10.1007/978-3-642-15378-5\_1.
2. Adam T, Tatnall A. Using ICT to Improve the Education of Students with Learning Disabilities. In: Kendall M, Samways B, editors. *Learning to Live in the Knowledge Society*. New York: Springer; 2008. p. 63-70.
3. Adam T, Tatnall A. Building a Virtual Knowledge Community of Schools for Children with Special Needs. In: Abbott C, Lustigova Z, editors. *Information Technologies for Education and Training (iTET)*. Prague: ETIC Prague, Charles University; 2007. p. 185-193.
4. *Information and Communication Technology supporting the inclusion of children with disabilities in education*. Factsheet. 2022 Jan.