



## Need of developing the tool for analysing learning difficulties in normal school going children: Systemic review

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### Abstract

**Background:** Many students, especially in India, have learning difficulties, and the majority of them remain undiagnosed. But realizing the learning issue at a later stage and making efforts to improve it may be proven ineffective. Therefore, to assess and identify the specific learning difficulty at the initial stage, a new tool is required that helps to differentiate the level of learning difficulty and in providing with intervention strategies based on attention, cognition, handwriting skills, psychosocial development, motor skills, organisation and other required education skills to the children as soon as possible. Therefore, a systemic review was done to understand the need of developing the tool for learning difficulties in normal school going children.

**Objectives:** This systematic review aims to know the need of developing a tool to analyse the learning difficulties in normal schools as early as possible.

**Methods:** In compliance with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria, a systematic literature review was carried out. The pertinent articles from 1992 to 2023 were found using a search on Google Scholar and databases (PubMed, Scopus, Research Gate, Web Science, Open-Access). Observational studies, experimental studies, surveys, interventions, difficulty in learning and its types and occupational therapy were among the included papers. Articles that contained insufficient information on these subjects or were written in a language other than English or did not provide access to the entire article were not included.

**Results:** The review study included 250 relevant articles that include 101 articles from databases and 149 from other resources. Out of which 186 studies were excluded as duplicate, 30 studies were excluded as they didn't meet inclusion and exclusion criteria, 24 articles didn't mention the study design, assessment and outcome evaluation so 10 studies were included for review

**Conclusion:** According to the studies, nearly 10% of the childhood population has developmental language disorders of one or the other type and 8-10% of the school population has learning disability of one form or the other. Early intervention presupposes early identification. At present, there is no universally standardized screening procedure to guide referrals from schools especially for Indian population.

**Keywords:** Learning difficulties, developing tool, occupational therapy, learning issues in school children, dyscalculia, dysgraphia, dyslexia

### Introduction

Learning is the process in which the person acquires new knowledge, behaviours, skills, values or understanding <sup>[1]</sup>. The pattern of learning is different and unique in every individual. Some are quick learners when the oral information is provided, and some grasp quickly when the visual input is given. Some learn in calm atmosphere whereas others can learn even in lots of distractions <sup>[2]</sup>. Students who do not make adequate progress within school curriculum, mainly in basic skill areas such as language, literacy and numeracy are considered as the children with learning difficulties <sup>[3]</sup>. An occupational therapist helps the children with learning difficulties by assisting them to participate in their daily living tasks by identifying the difficulties faced by the child. Children with learning difficulties may face difficulty in achieving educational skills, maintain attention, coordinate their movement, remember information or interact appropriately with other <sup>[4]</sup>.

### Education system in India

Education is fundamental for achieving full human potential to develop an equitable society as well as to promote national development <sup>[5]</sup>. In India, the education system is very vast with around 150 million students enrolled in almost 80 million schools with two types of boards, i.e. ICSE board and CBSE board <sup>[2]</sup>.

**New Education Policies:** The 10+2 structure in school education has now been modified with new pedagogical and curricular structure of 5+3+3+4 that covers the age of 3-18 years. This 5+3+3+4 structure is configured depending upon the developmental need and interests of the students, corresponding to age range of 3-8, 8-11, 11-14 & 14-18 years, respectively <sup>[5]</sup>.

More recently, studies have started examining the relationship between deficits in different learning domains i.e. difficulty in reading (dyslexia), difficulty in writing (dysgraphia), and difficulty in mathematics (dyscalculia) <sup>[6]</sup>.

### Dyslexia

Difficulty in reading is typically recognised during the school going age. Children who are normal or have very high level of gifted intelligence show more difficulty in reading. It is because a significant amount of effort is being done on their ability to compensate by using other cognitive skills [6].

### Dysgraphia

The term dysgraphia is reserved to describe illegible handwriting or printing due to weakness in visual motor coordination [6]. The difficulties needs to begin at school-age year with weakness in writing must be present and persistent for a minimum of 6months. Although according to DSM-5 criteria, the symptom and severity is harder to define for writing difficulties as compared to difficulties in reading and mathematics.

### Dyscalculia

According to DSM-V dyscalculia is defined by a pattern of difficulty or impairment in learning (memorization), processing numeric information (mathematical reasoning or number sense), arithmetic facts as well as accurate calculations [6]. The difficulty in mathematics most probably begin during school- age years.

### Learning Difficulties in India

Currently, many children drop out of school due to poor scholastic performance as many children face difficulties in understanding basic skills in their earlier years, which further impacts their education life [4]. Some children are given negative reinforcements by their parents or teachers and some get demotivated due to peer pressure. Currently, LDs are only accepted by a small percentage of people in India, particularly in urban areas. Sadly, there exists a significant gap in India regarding the identification and management of learning disabilities between the responsibilities of the health and education departments. The absence of a substitute educational program that includes career training is another significant barrier to an LD student's education.

### Need of Developing the Tool

To assess and identify the specific learning difficulty at the initial stage, a new tool is required that helps to differentiate the level of learning difficulty and in providing with intervention strategies [7] and other required education skills to the children as soon as possible. As of right now, India lacks standardized guidelines for the diagnosis, severity evaluation, and certification of learning difficulties [2]. As early identification is necessary for early intervention but presently there is no universal standardized scaling available to get the referrals from the schools [7].

Although, earlier many scales were developed for analysis for assessing the learning difficulties, but due to current changes in DSM-V and New Education Policy (NEP) there is no scale developed for the Indian children population that could help in identifying the severity of difficulties that whether the child has mild, moderate or severe difficulties in reading, in writing or in calculation.

Learning Disability Evaluation Scale (LDES), includes thinking, listening, speaking and differentiated spelling and writing but according to the recent DSM-V there are only three types of difficulties that is difficulty in reading,

writing and mathematics. The CLDQ i.e. Colorado Learning Difficulties Questionnaire was based on the DSM-IV and includes other expects such as reading, math, attention/hyperactivity, anxiety, depression, social functioning, spatial ability, and memory. DDS that is Dysgraphia disability scale assess a broad spectrum of handwriting impairments. Its purpose is to evaluate both the ability to write by hand and the fine motor skills that lead to bad handwriting. This scale is only limited to dysgraphia and does not help in diagnosing the severity of other issues of learning. Assessment Tool for Learning Disabilities is a test that covers learning domains such as reading, writing, spelling, attention, gross and fine motor abilities, sensitivity, attention, memory, and behaviour. It is a long form questionnaire which consists of 162 questions along with 5 likert rating scale. These many questions is the main limitation as it increases the assessment time and also it does not identifies the different domain if learning separately.

### Incidence of Learning Difficulties

According to National Health Interview Survey (NHIS) the prevalence of learning difficulties is 5% among 3 to 10 years old children and 9.3% in children from 11 to 17years old [2]. It is generally believed that difficulties in learning occurs before kindergarten and continues till adulthood.<sup>8</sup> Males have more prevalence of learning difficulties than in females. Males ranging from the age of 6-17 years have a chance of 2.8% of difficulties whereas girls of the same age criteria have a 1.6% chance. Studies report comparable prevalence rates of 4–9% of deficits in reading and 3–7% for deficits in mathematic [9].

### Method

#### Eligibility criteria

#### Inclusion criteria

- Articles for which the full texts were available, published between the years 1992 till 2023
- Articles in English language
- Articles that involve basic to advance knowledge of learning difficulties, procedure and use of learning disability tool
- Study involving the diagnosis of learning difficulties, signs and symptoms of learning difficulties, intervention protocol for learning difficulties and the prevalence of the learning difficulties in recent years
- Systemic review, semi-experimental researches, observational study, longitudinal study, case-control design, survey and intervention

#### Exclusion criteria

- Articles that were published before 1992
- Other than English language
- Articles containing incomplete information and require author's permission also.

### Information Source

Electronic databases: Pubmed, Online journals, Access open, Google scholar Research gate

### Search strategy

PubMed, Scopus, Web of Science, Google Scholar, Access Open, Research Gate, and online journals from 1992 to 2023 were all extensively searched. Keywords or search

terms related to learning issues included dyscalculia, dyslexia, dysgraphia, screening tools for learning difficulties, and learning difficulties assessment scales. A personal search was also conducted on all the publications that were chosen for the reference lists in the initial step. Furthermore, every article having the capacity to render this determination was guaranteed to be considered. Results were provided only in English.

### Selection process

All titles and abstracts from electronic databases were included in the search results that were downloaded into Microsoft Excel. We searched electronic databases as well as other sources, screening abstracts and titles. Following the initial screening, duplicate reports and irrelevant reports were eliminated. We finished full-text screening after retrieving the entire text of the records that were determined to be screened. For the purpose of determining eligibility and ultimate inclusion, the full-text screening results were examined.

### Data extraction

Two authors independently screened each of the resulting papers' titles, abstracts, and complete texts to make sure the qualifying requirements were satisfied. Separately, they extracted the data from full-text articles, and a third researcher examined the information. Expert consultation and discussion were used to resolve disagreements. The initial author, the year of publication, the participants' diagnosis, the age range, the sample size, the goal, and the conclusion were taken from each article.

### Study Selection

The review study included 250 relevant articles that include 101 articles from databases and 149 from other resources. Out of which 186 studies were excluded as duplicate, 30 studies were excluded as they didn't meet inclusion and exclusion criteria, 24 articles didn't mention the study design, assessment and outcome evaluation so 10 studies

were included for review. The detail of which is presented through PRISMA chart below.

### Limitation

One of the primary limitations might be the scarcity of high-quality studies specifically investigating the screening tool for assessing learning difficulties in normal school going children especially in early age in India. Another factor that could skew the results overall is publication bias, which occurs when studies that have positive results are more likely to print. A tight design and confounding variable control are lacking in some of the included studies in the review, which jeopardizes the validity and reliability of the results. Furthermore, due to variations in the end measures used to assess changes in attention, it is difficult to compare the results of several studies with confidence. Lastly, because the validity and reliability of the new tool developed is still under process, so the final comment regarding the development of new scale cannot be given

### Conclusion

According to the studies, nearly 10% of the childhood population has developmental language disorders of one or the other type and 8-10% of the school population has learning disability of one form or the other. Early intervention presupposes early identification. At present, there is no universally standardized screening procedure to guide referrals from schools. A large population of students with learning difficulties, specifically in India out of which many of them go undiagnosed. Therefore, the development of tool is important for the in-depth assessment in order to know how exactly the intervention or early intervention can be chosen and implemented. From the above literature findings suggested that there is a need of doing more researches in making standardized screening tool to identify the level of learning difficulties in normal school going children

**Table 1:** Characteristics of the included studies

S. No.	Study/Author	Research design	Number of participants	Sample character	Theme	Sub theme
1	Johny Kutty Joseph et.al	Systemic review	NA	Learning difficulty	According to this review the National Education Policy 2020 should be implemented properly and school teachers and parents must be trained for the same <sup>[10]</sup> .	This systematic review aimed to identify the prevalence and pattern of learning disability among children of India.
2	Pratima Kaushik et.al.	semi- experimental research	100	Learning Difficulty	The advantages of self-regulation skills for school accomplishment have propelled a few school-based mediations focusing on school culture and classroom based educational programs. To generalize PEABLS mediation's efficacy, similar intervention studies on different ages, grades, socio-economic status is recommended <sup>[11]</sup> .	The study aimed to evaluate the efficacy of a cognitive-behavioral intervention (PEABLS), designed for students with learning difficulties. The study's goal was to improve their academic performance by training them with self regulation and cognitive behavioural skills.
3	Abdo Hasan AL-Qadriet et.al.	Observational study	714 students between 6 – 14 years of age	Learning Difficulties	Resource rooms should also be implemented in schools for monitoring the difficulties that pose a veritable challenge to the students, which can help them overcome debilitating obstacles in their academic journey <sup>[12]</sup> .	This study seeks to develop an effective observation tool to determine the prevalence of various academic learning difficulties among school students at the primary level
4	Nurit Viesel-Nordme yer	Longitudinal study	301	Learning Difficulties	According to the article, further research is needed to detect the	The present study sought to clarify the following

	et.al.				influences of such combination programs on grammatical understanding, especially in children with different learning difficulties <sup>[13]</sup> .	interrelated issues under control of background variables: First, it investigate whether mathematical and linguistic development differs between subgroups of children with domain-specific, combined, with and without any learning difficulties as identified in pre- school age.
5	Roshini Rose Philips et.al.	Overvie w	NA	Learning Difficulties	Schools play important role in identifying such children and expose them to early intervention. But presently, there is no universally standardized screening procedure to guide referrals from schools <sup>[14]</sup> .	Mostly a child develops the concept of academics and socialization in early school years depending upon their intellectual, visual and physical abilities. While some of them faces difficulties in acquiring age appropriate language, arithmetic or both even when enough learning opportunities were provided. Those children are termed under learning difficulties.
6	Hala M. Moselhet et.al.	Cross sectional study	273 primary school students	Learning difficulties	Predictive factors of LDs among primary school children were failure in school achievement, noncooperation between home and school, neglect of the student, and increased course content <sup>[15]</sup> .	The aim was to assess frequency, types, and risk factors of LDs among primary school children
7	Varsha Vidyadharan et.al.	Case- control design	365 schoolchildren with poor scholastic performance	Learning Difficulties	The new tool showed promising validation <sup>[16]</sup>	This study aims to validate a screening tool among students with poor scholastic performance.
8	Anil Shetty et.al.	Survey	314 teachers from 32 schools	Elementary School Teachers	The present study reveals that awareness and knowledge among elementary school teachers is poor <sup>[17]</sup> .	The purpose of this study is to assess the knowledge of dyslexia in elementary school teachers and the variables influencing the knowledge.
9	Kristina Moll et.al.	Intervention	1633 children in 3 <sup>rd</sup> and 4 <sup>th</sup> grade	Learning Disorder	The findings suggest that the processes underlying the relationship between arithmetic and reading might differ from those underlying the relationship between arithmetic and spelling. With respect to gender ratios, more boys than girls showed spelling deficits, while more girls were impaired in arithmetic. No gender differences were observed for isolated reading problems and for the combination of all three learning disorders <sup>[18]</sup> .	The current study assessed prevalence rates and gender ratios for isolated as well as comorbid learning disorders
10	Gordana Jovanovic et.al.	Survey	1424 third-grade students (aged 9-10) of all primary schools	Dyscalculia	Further research should also identify possible causes of dyscalculia in order to improve students' mathematical abilities <sup>[19]</sup> .	The study was done to determine the mathematical achievement of students aged 9-10 years.



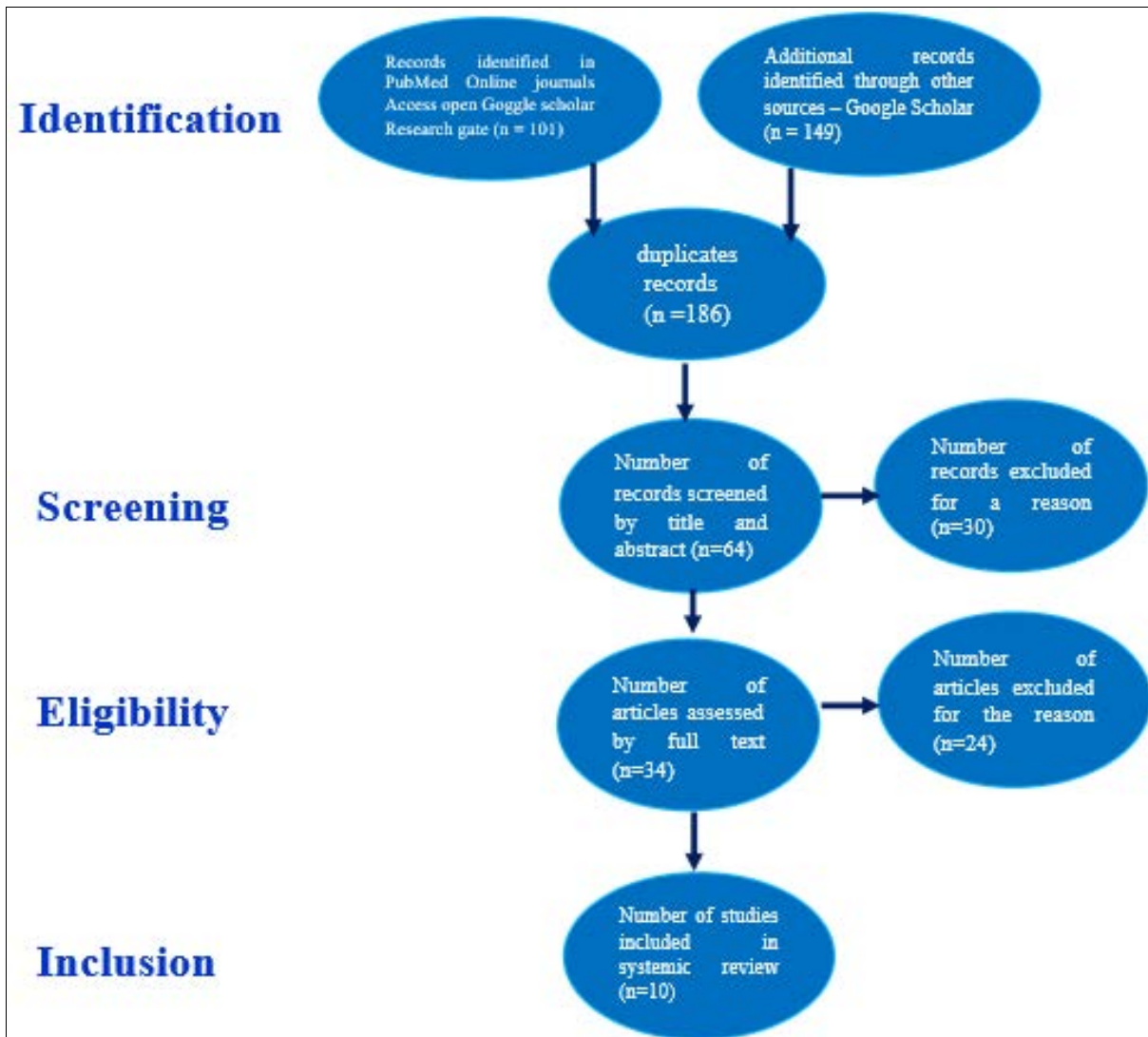


Fig 1: PRISMA Flowchart of the Search Process

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