III. METHODOLOGY

An effectual primary education can fabricate a firm base and open avenues for future success. The primary challenge for teachers is to foster a child's learning, preparing them to navigate life's challenges. Teachers need to understand and acknowledge the individuality of their students, operating from a place of genuine love and empathy. This quality in a teacher fosters a sense of belongingness in their students, which directly impacts their learning, growth, and mental well-being.

Teachers play an indispensable role in children's lives, bearing the responsibility of recognising and addressing their challenges. Among those challenges, learning disabilities stand out as a lifelong condition impacting academic performance and daily activities. Therefore, it is crucial for teachers to have comprehensive knowledge, a positive attitude, and effective practices (KAP) regarding learning disabilities. Having a deep understanding of learning disabilities equips teachers with the ability to create an inclusive and supportive learning environment. A positive attitude towards these students ensures that teachers approach each child with empathy and patience, fostering a classroom atmosphere where all students feel valued and understood.

Despite a teacher's ability to sense that a child requires special attention or a unique approach to support their academic progress and overall development, pinpointing the specific issue and the area where additional input is needed can be a daunting task for a primary school teacher in a normal classroom setting. To address this challenge, teachers need a systematically formulated, expert-approved, and well-structured method to identify invisible disabilities such as learning disabilities. Therefore, the prime objective of this research was to develop an assessment scale for PRTs to identify children with LDs in their classrooms. In addition to creating this assessment scale, the research also aims to study the KAP of teachers regarding LD.

Research Question

The study's goals and the examination of findings from reviewed studies by the researcher have resulted in formulating the following research questions.

1. Does primary school teachers need an assessment scale to identify LD in their classrooms?

2. Will the developed tool be effective for primary school teachers in the classroom setting to identify students with LD?

3. What are the levels of KAP of primary school teachers on LD?

4. Does the KAP of primary school teachers on learning disability interact?

5. What are the socio-demographic markers that influence the KAP of primary school teachers regarding LD?

6. Does the sensitisation programme for teachers transform the levels of KAP towards LD?

Considering the theoretical framework, literature, and studies discussed in the previous chapter, the methodology for the study titled "Development of Assessment Scale for Primary School Teachers to Identify Children with Learning Disabilities" is detailed in the subsequent headings.

A. Study parameters and sampling

B. Development of the study tools

C. Pilot Study

D. Development of scales to assess Knowledge Attitude and Practice (KAP) of primary school teachers regarding learning disability

E. Conduct of the study

F. Sensitisation programme for primary school teachers

G. Computation and statistical analysis

A. Study parameters and sampling `

This section covers the specifics of the study variables, study area and setting, research design, and distribution of sample.

Study variables

The variables chosen for the current study were determined through a survey of the literature and consultations with subject matter experts. The primary objective of this research was to develop and standardise an assessment scale for primary school teachers to identify children with LDs in their classrooms. Independent and dependent variables were pertinent only to the secondary objective, and these variables were identified accordingly.

Independent variables

Personal Profile of the Teachers

- Gender: Male and Female primary school teachers
- Age: 21- 60 years
- Marital Status: Single, Married, Widowed
- No of children: 0 – 3 and more children
- Type of Family: Nuclear and joint family
- Area of Residence: Rural, Urban and Semi-urban

Work Profile of the Teachers

- Educational status: Graduation with a Bachelor of Education, Graduation without a Bachelor of Education and Diploma/Teacher training
- Years of teaching (Teaching Experience): Less than 5 years, 6-10 years, 11-15 years, more than 15 years
- Type of School: Government and private school teachers
- Board of school: State Board, CBSE and ICSE
- Working with a counsellor: working with and without a school counsellor
- Child development/psychology-related course: Whether the curriculum in their studies included courses related to child development or psychology.

Dependent variables

- Knowledge of learning disability
- Attitude towards learning disability
- Practice – classroom teaching practices

Study area and the setting

The city of Coimbatore in the Indian state of Tamil Nadu served as the research site. The GPS coordinates of Coimbatore are 11.0161°N 76.971°E. The city is located 190 kilometres (120 mi) south of Mysore, 330 kilometres (210 mi) south of Bangalore, and 490

kilometres (300 mi) southwest of Chennai. Coimbatore is only 25 km (16 mi) from the Kerala border. Coimbatore is the gateway to the nearby state of Kerala, and it is located 70 miles from Udhagamandalam, popularly known as Ooty, a prominent hill station.

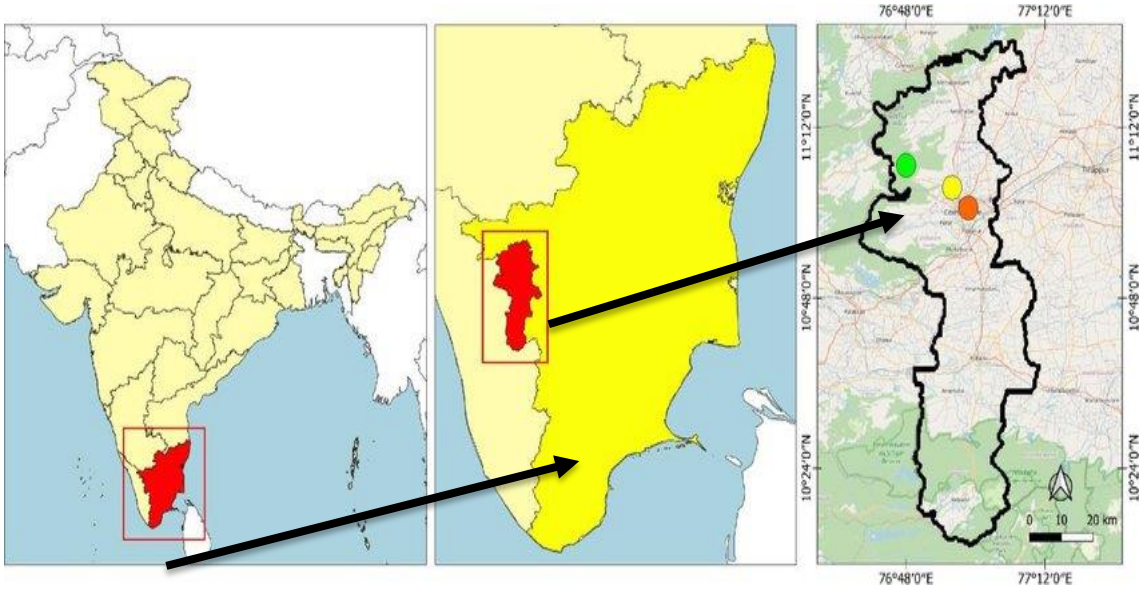
Coimbatore district is one of the most established districts in terms of industry in the Indian state of Tamil Nadu. Tamil Nadu's second-biggest city and known as the "Manchester of South India" and the textile centre of the country. Coimbatore is located on the banks of the Noyyal River and was founded by Karikalan, the first of the early Chola dynasties, in the 2nd century AD. Rashtrakutas, Chalukyas, Pandyas, Hoysalas, and the Vijayanagara kings were a few of its other notable monarchs. Kongunadu's name was changed to Coimbatore after the British conquered it along with the rest of the state. In the native Tamil language, Coimbatore is also known as Kovai.

The earliest textile mill dates back to 1888, and numerous others were established after that. Coimbatore, located in the Western Ghats' rain shadow region, experiences year-round agreeable weather because of the fresh breeze that comes through the 25-kilometer Palakkad gap. The fertile black soil of the area has added to Coimbatore's agricultural sector; in fact, the city's renowned textile industry was founded on the prosperous cultivation of cotton. This not only provided ample employment opportunities for the local district but also extended its impact to neighbouring areas.

The end effect has been a robust economy and standing as one of South India's leading industrial cities. There are textile mills and over 25,000 small, medium, and large companies. In addition, Coimbatore is well-known for its foundry and automotive industries, as well as for manufacturing a broad range of technical goods and services, motor pump sets, textile industry machinery, and grinding machines. When the Pykara Falls started producing hydroelectric power in the 1930s, cotton cultivation in Coimbatore experienced a surge.

Location of Coimbatore district and Coimbatore city (5 Zones)

in Tamil Nadu, India



India **Tamil Nadu** **Coimbatore District**

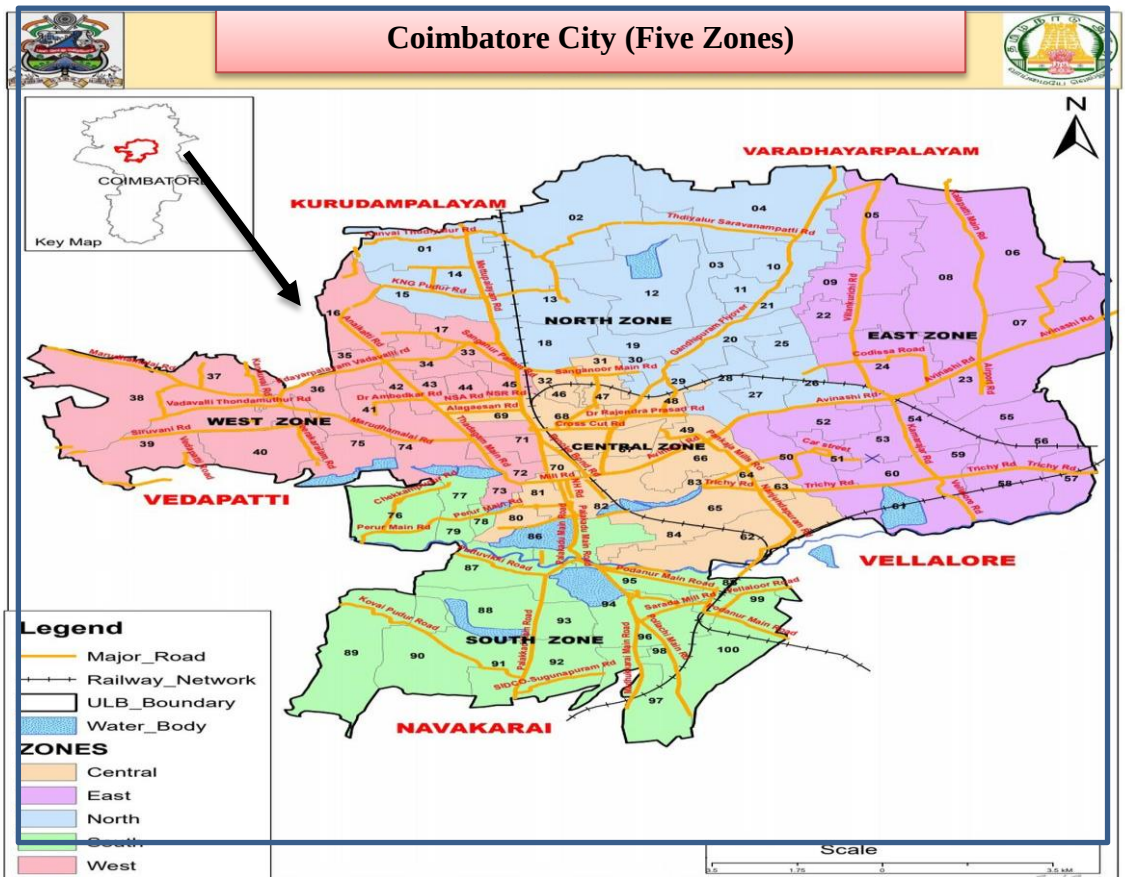


Figure 2

Coimbatore - an Educational Hub

One of the most significant educational cities in South India is Coimbatore. It is the administrative centre of the Coimbatore district and is run by the Coimbatore Municipal Corporation. It is one of the tier-II cities in India with the quickest growth rate and a significant centre for Tamil Nadu's commerce, education, information technology, and healthcare.

Coimbatore was first established as a municipality in 1866, and on January 1, 1981, it became a city municipal corporation. The city is split up into 100 wards, which are then organised into committees known as zonal wards. One hundred ward councillors make up the corporation council, which is led by the mayor, who is chosen by the city's citizens. Among them, the councillors choose a deputy mayor. Ward councillors of the corresponding zonal ward committee elect the ward committee chairman, who leads the zonal ward committees. A group of officials, including the Deputy Commissioner, the City Health Officer, the City Engineer, the Planning Engineer, the Corporation Education Officer, the Assistant Commissioners of Zones, and other officers, support the Commissioner in leading the executive branch. In 2011 (the last census), the Coimbatore district had 34.58 lakh residents. This had a male-to-female ratio of 50.08% to 49.92%. Population Growth: 1.21; Child Population (0–6 Age): 1,54,426; Sex Ratio: 999; Child Sex Ratio: 956. With about 70% of the people residing in urban areas, the Coimbatore district is highly urbanised. (District Human Development Report, State Planning Commission, Tamil Nadu, Coimbatore District, 2017).

According to the data released by the Government of India for the 2011 Census, Coimbatore district is the second most urbanised district in Tamil Nadu after Chennai. 71.37% of the district's population at the 2011 Census was urban, while 29.63% was rural. Coimbatore falls under the category of a Million Plus Urban Agglomeration (UA)/City. As of 2023, the estimated population of Coimbatore city is approximately 2,945,000. The last census was conducted in 2011, and the scheduled census for the Coimbatore Metropolitan region in 2021 was postponed due to Covid 19. The current population estimates are based on past growth rates. The literacy rate in the Coimbatore Agglomeration is 88.87%, surpassing the National Urban average of 85%. The literacy rates for males and females in Coimbatore are 92.77% and 84.96%, respectively. The total literates in Coimbatore UA were 1,713,932, with 895,147 males and 818,785 females (Census, 2011). According to a Tamil Nadu state

government source, there are five zones in the Coimbatore corporation. North, East, South, West, and Central are the zones. There are a total of 84 corporation schools and 129 private schools in the Coimbatore corporation. Coimbatore's district is a perfect blend of urban and rural settings, where high literacy rates are paramount for inclusive education. The district's educational landscape, with its varied student population, demands that teachers possess a thorough understanding of learning disabilities to cater to diverse learning needs. Assessment tools play a crucial role in systematically identifying disabilities, allowing educators to tailor interventions efficiently.

Ethical approval

Based on the need for the study in the Coimbatore district, the study plan was developed and submitted to the Institutional Human Ethical Committee. After obtaining the Institutional Human Ethical Committee's approval the study was performed. (Approval number: AUW/IHEC/HD-19-20/XPD/48) (Annexure: I)

Research design

The architectural framework of this study embraced a cross-sectional research design. The study unfolded in distinct phases, each meticulously designed to contribute to PRTs overarching exploration of LDs among children. Mixed method research was used combining both qualitative and quantitative methods to get a more comprehensive understanding of the research study. Survey and interview methods were adopted to gather the data from the respondents.

Study sample

The present research study's scope included teachers from primary schools located inside the boundaries of Coimbatore, Tamil Nadu, India. These educators from mainstream or regular classrooms entrusted with shaping the educational journey of young minds constituted the heart of the research.

Sampling technique: The process of selecting schools for this study involved a purposive sampling method. For this, a list of primary schools in the Coimbatore jurisdiction was obtained from the District Education Office. The study specifically targeted both male and female primary school teachers instructing students from grade 1 to grade 5 in both government and private schools.

***Inclusion and exclusion criteria*:** In the context of sample selection, distinct inclusion and exclusion criteria were implemented to refine the participant pool. Inclusion criteria

focused on male and female primary school teachers responsible for educating students in the specified grade range (1-5 grades) in both government and private schools. The deliberate selection of this influential cohort aimed to capture the experiences of educators closely involved in the formative years during active learning hours of a child's education. Regardless of gender, teachers serve as key figures, not only imparting academic knowledge but also contributing substantially to students' overall development and well-being throughout their primary education.

To ensure the study's reliability, specific exclusion criteria were applied. Teachers with special needs were excluded, along with educators working exclusively with special needs children or in special schools. Tuition teachers, whose interactions with students might be limited compared to regular school teachers, were also excluded to foster a more comprehensive understanding of the dynamics between teachers and students. These inclusion and exclusion criteria were carefully considered to enhance the relevance and reliability of the study's findings. The study seeks to gain a nuanced understanding of the interactions between educators and students, particularly in the context of early identification and addressing learning disabilities in the early stages of a child's academic journey.

Sample size: The samples for this study were meticulously chosen from a list of schools provided by the District Education Office in Coimbatore. The city has approximately 84 corporation schools and 129 private schools, distributed across five zones: north, south, east, west, and central (Tamil Nadu: https://schools.org.in/coimbatore). To ensure a comprehensive exploration, five schools were randomly selected from each zone, which comprised 20 teachers from each school, totalling 100 teachers in each zone summing up to 500 teachers. Further, 150 primary school teachers from rural areas under Coimbatore jurisdiction were considered. The sample totalled up to 650 teachers overall (figure 3). Securing permission was a crucial step, and it was graciously granted by the district's Chief Education Officer (CEO). This ensured the active participation of teachers in the study. The selected schools, representing various zones in Coimbatore, became the focal points of the research, contributing diverse perspectives. The next step involved was approaching accessible and interested teachers from each selected school for data collection. A total of 650 primary school teachers were initially approached, and 562 teachers consented to participate, finally, 514 teachers' data were thoughtfully considered for analysis based on the clarity and completeness of the given assessment scales.

Distribution of samples - At a glance

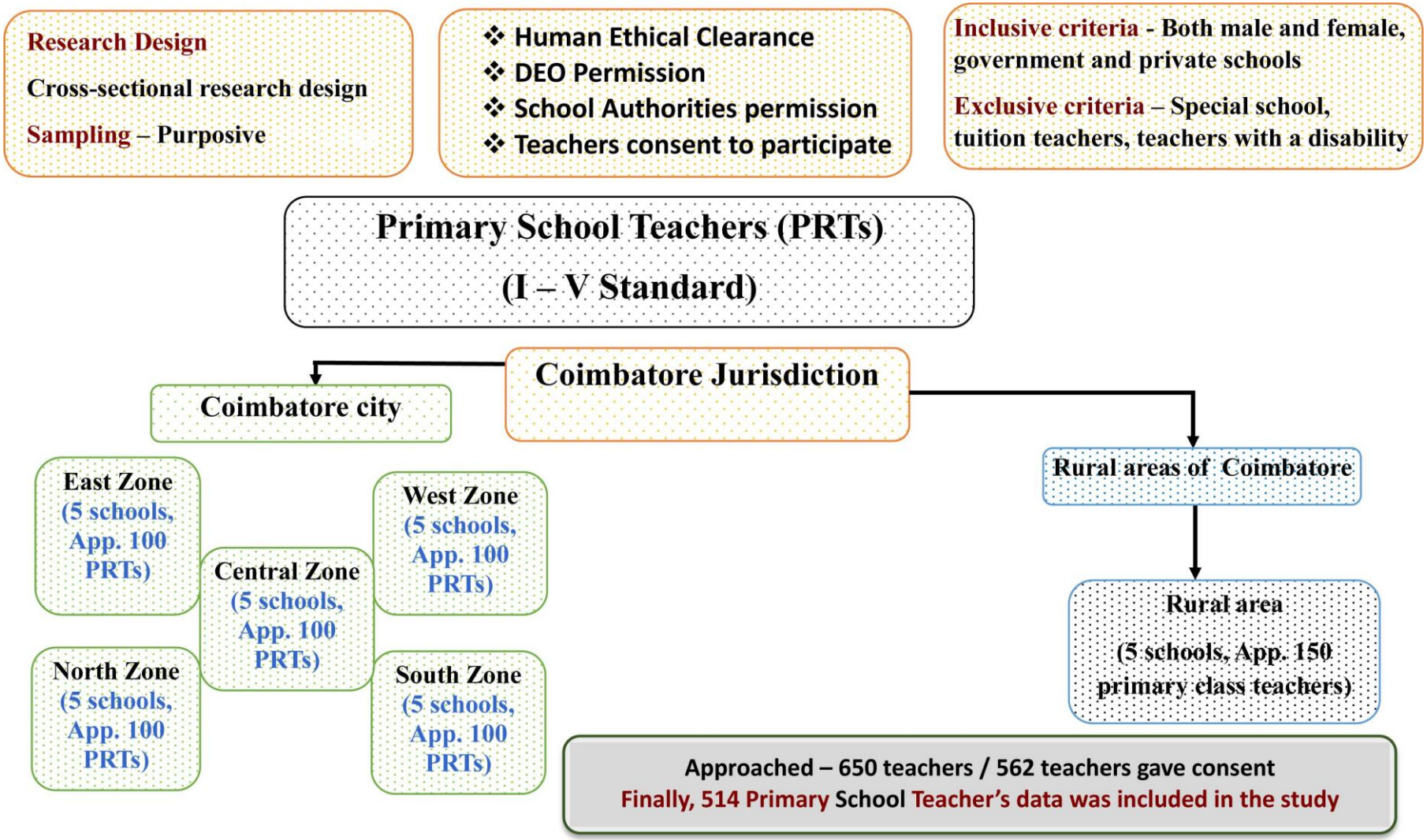


Figure 3

B. Development of the study tools

The process of development of study tools was extended in two phases.

Phase I: Literature Review and Theoretical Orientation

Phase II: Tool Construction

- Formulation of an Assessment scale for primary school teachers to identify learning disabilities
- Face Validity of assessment scale
- Formulation of Knowledge, Attitude, and Practices (KAP) scale for teachers regarding learning disability
- Face Validity of the KAP scale
- Pilot Study

Phase I: Literature Review and Theoretical Orientation

A literature review serves as a comprehensive and organised summary of existing research and scholarly work within a specific field or topic. In the provided passage, the primary purpose of the literature review is highlighted as an effort to gain insight into the current state of the identified research problem. In the present study, an improved comprehension regarding the current state of learning disability among children, teachers' knowledge and awareness, their attitude, practices, and most importantly how teachers identify a child experiencing a learning disability in the classroom was apprehended. This involved systematically gathering and evaluating information from various sources such as books, journals, and web sources.

When conducting a literature review, books provide extensive background information, offering deep dives into theories and concepts, which are crucial for foundational knowledge. They often detail definitions, characteristics, and historical perspectives that establish a broad context. Journals, in contrast, deliver the latest research findings, current statistics, and critical analyses, making them essential for staying updated on recent developments and understanding the current state of research. Web sources contribute timely updates, case studies, and diverse opinions, though they require careful vetting for credibility. Collectively, these resources help pinpoint research gaps, refine the study's focus, and inform the creation of an assessment scale, ensuring the research is well-grounded and addresses unresolved questions.

Following the literature review, a theoretical orientation was mentioned, suggesting a deeper dive into theoretical frameworks relevant to the research topic. The theoretical review explored by Mugesh et al (2023) highlights key psycholinguistic-based theories from the early 1970s, which examined the relationship between speech and reading development, particularly phonology While these theories laid the groundwork, they overlooked other symptoms of reading disorders, such as poor motor skills, slow processing speed, and auditory or visual deficits. The Automatisation Deficit Hypothesis (Nicolson and Fawcett, 1990) suggested that dyslexics struggle with tasks requiring skill automatisation. However, critics like Raberger and Wimmer (2003) found this theory limited, as it didn't fully explain the differences between ADHD and dyslexia. The Double-Deficit Theory (Bowers and Wolf 1993) expanded on phonological deficits, arguing that dyslexics might also suffer from independent processing speed issues. Auditory Processing Deficit Theory highlighted that deficits in auditory processing could lead to phonological problems (Hari and Kiesila, 1996; Stefanics et al., 2011). Lastly, the Magnocellular Deficit Theory linked reading difficulties to sensorimotor dysfunctions in the magnocellular system, affecting visual, auditory, and tactile processing (Stein, 2019). These theories helped to understand the theoretical framework of this neurological condition. This step involved delving into the underlying concepts and principles that guided the study. This tool was designed to aid teachers in identifying children with LD. Here, the connection between the literature review and the practical application of knowledge was evident and was a crucial step in the research process that guided the formulation of tools.

Phase II: Tool construction

Recognising the pivotal role of a tool in any research is imperative for the completion of the research work. This study placed its primary focus on the development and standardisation of the assessment scale, which is the linchpin of this study. The tool not only ensures proper data collection and accurate measuring techniques but also plays a crucial role in the formulation of a comprehensive conclusion for identifying children with learning disabilities. Its significance extends to facilitating effective teacher assessments, providing valuable insights into learning disabilities, and contributing to the overall success of the research endeavour.

As the present study was intended to develop, validate, and standardise an assessment scale for PRTs to identify LD a mixed-method design was adopted to achieve this. A standardised methodology was implemented in two phases:

Inter Phase I – Qualitative phase for development of Tool.

Inter Phase II – Quantitative phase for validation of the Tool.

Inter Phase 1: Qualitative phase of **Tool development *(***Assessment Scale for Primary School Teachers to Identify Learning Disability)

In general, procedures for developing instruments are well-established and involve identifying and defining both conceptually and operationally the concepts to be measured, making decisions about the level of specificity of the items of the instruments, generating an item pool, presenting the item pool to experts for critique and possible revisions and additions, assembling the tool, piloting and field testing the tool, and conducting studies of reliability and validity (Nunnally, 1978; DeVellis, 1991; Gilgun, 1999, 2004).

Qualitative approaches, as highlighted by Gilgun (2004), played a vital role in this process by contributing to the identification of concepts, development of definitions, and generation of items for assessment tools. The importance of qualitative research in refining tools for identifying LD children is is evident. The present study's qualitative phase focused on exploring subjective aspects of learning disabilities, and the development of a practical identification tool by identifying concepts, defining them, and generating concrete indicators. Insights gleaned from sources like literature reviews and theoretical frameworks helped enhance the effectiveness of the tools.

Qualitative methods were employed in crafting the tool during the study. The tool's development followed a systematic methodology, encompassing five key steps: literature review, overall examination, group discussions, expert evaluation, and pre-testing, all of which are elaborated upon in the following discussion.

For the generation of items, an extensive literature review was conducted, utilising secondary sources such as textbooks, peer-reviewed journals, and reputable online databases. The review encompassed a broad spectrum of information, including empirical data, theoretical concepts, and case studies. This review process involved a meticulous screening of text materials and research about learning disabilities, encompassing

definitions, characteristics, symptoms, causes, and types. Relevant full texts were carefully selected and examined to identify key elements. These elements were then organised and categorised into specific domains, forming the foundation for the Assessment Scale. Initially, 104 items were generated from this relevant material, ensuring comprehensive coverage of statements related to all types of learning disabilities. These items were then incorporated into a scale, facilitating the identification of specific learning disabilities.

Every statement was constructed using the word form. In each domain, there were groups of statements. Each domain provided details about a specific type of learning disability. While crafting these statements, guidance from literature from Wang (1932), Thurstone and Chave (1929), Likert (1932), Bird (1940), and Edwards & Kilpatrick (1948) was heeded to. In adherence to Edward's 14 principles, as recommended by Wang (1932), Thurstone (1929), Likert (1932), Bird (1940), and Edwards and Kilpatrick (1948), diverse informal criteria for statement editing in the development of assessment scales were taken into account. The criteria are as follows

i. Avoid statements that refer to the past rather than to the present.

ii. Avoid statements that are factual or capable of being interpreted as factual.

iii. Avoid statements that may be interpreted in more than one way.

iv. Avoid statements that are irrelevant to the psychological object under consideration.

v. Avoid statements that are likely to be endorsed by almost everyone or by almost no one.

vi. Select statements that are believed to cover the entire range of the affective scale of interest

vii. Keep the language of the statements simple, clear, and direct.

viii. Statement should be short, rarely exceeding 20 words.

ix. Each statement should contain only one complete thought.

x. Statements containing universals such as all, always, none and never often introduce ambiguity and should be avoided.

xi. Words such as only, just, merely and others of a similar nature should be used with care and moderation in writing statements

xii. Whenever possible, statements should be in the form of simple sentences rather than in the form of compound or complex sentences.

xiii. Avoid the use of words that may not be understood by those who are to be given the completed scale.

xiv. Avoid the use of double negatives.

Source: Chauhan B.N et al (2017), Scales to measure attitude towards various components of rural & agricultural development, Gujarat Journal of Extension Education, Special issue on measurement of attitude, Society of Extension Education Gujarat, India, Pg 27-28.

Given the above-mentioned criteria, the following were the steps involved in the development of the Assessment Scale for PRTs to identify children with LD. **Step 1:** Following the literature review, an initial pool of one hundred and four statements were generated. The tool, designed for PRTs to identify children with LDs, was constructed using the Likert's Method as a rating scale. This method was chosen for its simplicity and user-friendliness. The frequency scale employed in the tool included options such as always, very often, sometimes, rarely, and never. The statements in the tool prompt teachers to consider a specific child indicating a need for additional support, who the teacher may feel is a slow learner. The teacher may use the tool by herself/himself to identify whether the child is facing the problem of learning disability. The teacher must choose an option corresponding to the frequency of the symptoms/characteristics exhibited by the child. The five probability options assigned weigh always-5, very often-4, sometimes-3, rarely-2, and never-1. The score interpretation follows the principle that a higher score indicates a higher level of learning disability.

Step 2: In the second step, the created items underwent **general scrutiny**. Senior and experienced academicians were involved in this scrutiny process to assess the generated statements for clarity, identify grammatical errors, and eliminate repetition of items.

Step 3: The third step involved a **general group discussion**. A group discussion was held to discuss the scrutinised tool, with the participation of three individuals. The group included two regular primary school teachers and a special educator. The purpose of the discussion was to assess the utility and accuracy of the generated statements.

Step 4: In the fourth step the developed tool was subjected to **expert evaluation**. The developed tool with 104 statements was evaluated by a total of nine experts from diverse fields, including three developmental paediatricians, one neurologist, one professor from the Department of Special Education, two professors from the Department of Human Development, one clinical psychologist, and one special educator (Table I).

Table I

Experts recommendations on the assessment scale

Expert No.	Designation of the experts	Suggestions received
Expert 1	Development Paediatrician	➢ Correct 2nd question (Q2) with a detailed explanation
Expert 2	Development Paediatrician	➢ Reword Q39, Q79, Q84, Q100 ➢ Appreciated the effort taken to construct a tool in a user-friendly version
Expert 3	Development Paediatrician	➢ Reframe questions that are not clear (Q39, 79)
Expert 4	Neurologist	➢ Commented as "Good points - it is very comprehensive and thorough" and "Great work and over time this can be brought to the attention of ministers and Education secretary to get it implemented" ➢ Suggested to reduce the number of questions if possible.
Expert 5	Professor from the Department of Human Development	➢ Remove 4th questions (Q4) ➢ Remove Repeated questions q.no.22 and 28, 52 and 57, 77 and 82 (Q22, Q57, Q82) ➢ Split the double-barrel question. (Q76) ➢ Suggested to include negative questions
Expert 6	Professor from the Department of Human Development	➢ One question was reworded (Q84) ➢ Exclude general information questions ➢ Appreciated as a "Well-made comprehensive tool"
Expert 7	Professors from the Department of Special Education	➢ Remove repeated questions Q77 and Q82 ➢ Remove Q86

Expert No.	Designation of the experts	Suggestions received
Expert 8	Clinical Psychologist	➢ Reduce the tool's size to grab the interest of teachers in filling it out.
Expert 9	Special Educator	➢ Recommended that each component has a sufficient number of statements and that all of the statements are consistent.

Further, the final set of questions was categorised based on the type of learning disability to facilitate easy identification of primary school children. Six domains were categorised and items were organised under the domains of personality/behaviour, reading ability, writing ability, mathematical ability, listening skill/oral, and motor deficiency test (table II).

Table II

Distribution of items as per the domains

Domains	Domain name	Total statements
A	Personality – Behaviour	26
B	Reading ability	18
C	Writing ability	15
D	Mathematical Ability	16
E	Language	9
F	Oral Expression / Listening Skills	4
G	Motor deficiency Test	8
	Total No. of statements	**96**

Statements of each domain were constructed and the allocation of more questions to the personality and behaviour domain reflects its significance in understanding a child's functioning. Domains, such as reading, writing, and mathematical ability, are prioritised due to their direct relevance to academic achievement and cognitive development, which teachers can observe in a general classroom setup. Listening skills are seen as beneficial when the child's issues or problems are addressed otherwise, here the teacher's observation is based on the child's display of certain signs like they may not pay any attention to what is being said in the classroom. Conversely, motor skills may receive fewer questions as they

are considered less central for identification purposes. The discrepancy in the number of questions may also stem from the fact that the predominant manifestation of certain symptoms or behaviours among children in the primary age group. The focus was on framing questions to draw a consensus in understanding the nature of the child's problem and the observable characteristics of the child in the classroom. Hence, each domain has a different characteristic, signs, and symptoms the child may display which a teacher can observe.

The tool not only identifies learning disabilities but also identifies the specific type of learning disability (SLD- Specific Learning Disability). The domain-based segmentation aids teachers in recognising areas where a child may need assistance and making informed class plans. Careful attention was given to framing questions in simple, positive language with no ambiguity. The tool endured further refinement based on expert input, involving removal, addition, rewording, and retaining of items. After expert validation, the final tool comprised ninety-six items. (Table III).

Table III

No. of items in the final questionnaire after expert evaluation

No. of statements retained	**No. of statements removed**	**No. of statements added**	**No. of the statements reworded**
91 (87.5%) out of 104 statements	3 repetition	1 (0.96%) (one question was made into two questions)	4 (4.16%)
	1 wrong (not suitable for primary class children)		
	4 General background information questions were removed		
	Total = 8 (7.69%)		
No. of questions removed – 8 (7.69%) No. of questions retained – 91 (87.5%) No. of questions added – 1 (0.96%) No. of questions reworded – 4 (4.16%)			
Calculation of the number of items No. of questions removed = 8 (104 – 8 = 96) No. of Statements retained + Added + Reworded= 91 + 1 + 4 = 96 items			

This tool relies on the frequency of indications and signs exhibited by children, with a higher frequency signifying a more severe learning disability. The scoring system is designed to be straightforward for teachers to calculate, as there are no negative questions. The primary objective of the tool was to facilitate the easy identification of LD by PRTs.

Inter Phase 2: Quantitative phase for tool validation

The quantitative phase for tool validation involves statistical analyses to assess reliability (internal consistency, test-retest) and validity. Pilot testing and large-scale administration are followed by statistical interpretation to ensure the tool's accuracy and effectiveness in measuring the intended construct. This phase complements earlier qualitative insights, providing empirical evidence for the tool's credibility.

According to George and Mallery (2003), the quantitative evaluation begins with the implementation of a pilot study involving a representative sample. Actively seeking participant feedback during this phase allows for iterative refinement of the instrument. The pilot study produces quantitative data, enabling the assessment of internal consistency using Cronbach's alphas. An acceptable reliability coefficient, as per George and Mallery (2003), is typically 0.70 or higher.

C. Pilot study

A pilot study is defined as "a small-scale test of the methods and procedures to be used on a larger scale" (Porta, Dictionary of Epidemiology, 5th edition, 2008). A pilot study, also referred to as a feasibility study, is a preliminary investigation conducted on a smaller scale before the main research to assess feasibility and refine the research design. It serves as a small-scale exploration aimed at testing various aspects of the methods planned for a larger, more rigorous, or confirmatory investigation, as highlighted by Arain, Campbell, Cooper, and Lancaster (2010). The primary goal of a pilot study is not to answer specific research questions but rather to prevent researchers from launching a large-scale study without sufficient knowledge of the proposed methods. Essentially, a pilot study is conducted to mitigate the risk of encountering a significant flaw in a study, which could be costly in terms of time and resources, as noted by Polit and Beck (2017). Typically, researchers employ pilot studies to assess the appropriateness of their planned methods and procedures (Polit and Beck, 2017)

A thorough pilot study was performed with the participation of 133 PRTs to explore the feasibility, utility, and reliability of the assessment scale. The primary objective of this pilot study was to assess whether the tool was well-suited for its intended purpose and to

evaluate the clarity of the included questions. Beyond mere feasibility, the study aimed to scrutinise the tool's practical utility in real-world scenarios. To ensure the tool's reliability, the data obtained from the pilot study underwent testing, employing Cronbach's alpha test. This multifaceted approach was undertaken to provide a thorough understanding of the tool's effectiveness and applicability in identifying learning disabilities among primary school children.

Reliability test: Reliability refers to the consistency of the self-constructed scale measuring the intended variable. The pilot study, involving 133 participants, aimed to assess the overall reliability and internal consistency of the Assessment scale. Internal consistency, a key aspect of reliability, was evaluated using statistical methods, Cronbach's alpha test. This test provides a numerical measure of how well the items correlate, indicating the extent to which the instrument consistently measures the targeted construct. Cronbach's alpha is calculated using the formula:

$$\alpha = \frac{n\bar{r}}{1 + \ \bar{r}\,(n-1)}$$

Here, "n denotes the number of items in the scale, and r signifies the average correlation among the items".

High Cronbach's alpha values enhance the confidence in the scale's reliability, reinforcing its credibility for subsequent use in the main research study. The interpretation of Cronbach's alpha values is elucidated based on specific ranges which is shown in Table IV.

Table IV

Range of reliability and its coefficient of Cronbach's alpha

Coefficient of Cronbach's alpha	Reliability Level
$\alpha \geq 0.90$	Excellent
$0.80 \leq \alpha \leq 0.89$	Good
$0.70 \leq \alpha \leq 0.79$	Acceptable
$0.60 \leq \alpha \leq 0.69$	Questionable
$0.50 \leq \alpha \leq 0.59$	Poor
$\alpha \leq 0.59$	Unacceptable

Source: George, D., and Mallery, M. (2003). Using SPSS for Windows step by step: a simple guide and reference

The table suggests that a score exceeding 0.7 is considered acceptable. (Lavrakas, 2008; Shrestha, 2021)

Cronbach's alpha test was calculated to test the reliability of the developed assessment scale for PRTs to identify children with LD. This aims to provide an enhanced understanding of the reliability across different domains and scales within the assessment scale.

Reliability of the assessment scale, and item analysis

Reliability of the assessment scale and domain-wise reliability were obtained through "Cronbach's alpha" test.

Table V shows the reliability of the assessment scale. Cronbach's alpha was found to be 0.970, which indicated excellent reliability. A high Cronbach's alpha indicates strong correlations among the items in the test. (Shrestha, 2021)

Table V

Reliability analysis of the assessment scale

N	Number of items in the Assessment Scale	Mean	SD	Reliability Cronbach's Alpha
133	96	296.19	68.204	0.970

i) Reliability of Domain 1- Personality -Behaviour

There was a total of 26 items in the domain of personality/behaviour and Table VI*a* showed its reliability scores. The Cronbach's alpha was 0.915, indicating that there was an excellent level of reliability. Further, item-wise reliability was obtained. Cronbach's alpha values ranged from 0.909 to 0.914, which indicated that the items in the domain of personality/behaviour were in excellent reliability (Table VI *b*).

Table VI *a*

Reliability analysis of Domain 1 -Personality / Behaviour

N	Number of items in Personality Behaviour	Mean	SD	Reliability Cronbach's Alpha
133	26	73.26	20.466	0.915

Table VI *b*

Item analysis of Personality -Behaviour

Personality Behaviour item number	Mean	SD	Reliability Cronbach's Alpha
1	2.50	1.300	.912
2	2.15	1.311	.910
4	1.82	1.330	.911
5	2.68	1.539	.914
6	2.69	1.404	.910
7	2.86	1.424	.909
8	3.29	1.259	.910
9	3.07	1.349	.910
10	2.97	1.562	.912
11	2.48	1.295	.912
12	2.56	1.422	.911
13	2.77	1.346	.913
14	2.81	1.377	.914
15	2.34	1.370	.912
16	2.52	1.335	.910
17	2.94	1.336	.913
18	2.89	1.470	.914
19	3.09	1.395	.912
20	3.08	1.441	.910
21	3.17	1.421	.911
24	3.21	1.291	.912
25	3.26	1.397	.917
26	2.77	1.465	.911

ii) **Reliability of Domain 2- Reading ability**

The domain reading ability had a total of 18 items. The reliability of these items is provided in Table VII*a*. The Cronbach's alpha was 0.908, which indicated excellent reliability. Table VII*b* contained item-wise reliability. The findings demonstrated that the range of Cronbach's alpha values suggested they were in the good to excellent reliability range of 0.898–0.913.

Table VII *a*

Reliability analysis of Domain 2 - Reading ability

N	Number of items in Reading ability	Mean	SD	Reliability Cronbach's Alpha
133	18	54.45	15.368	0.908

Table VII *b*

Item analysis of Reading ability

Reading ability item number	Mean	SD	Reliability Cronbach's Alpha
27	3.02	1.336	.905
28	3.13	1.303	.907
29	3.39	1.292	.913
30	3.20	1.316	.905
31	3.20	1.357	.906
32	2.55	1.446	.900
33	2.65	1.433	.900
34	2.80	1.491	.900
35	2.81	1.361	.899
36	2.83	1.369	.900
37	2.87	1.399	.899
38	2.92	1.360	.898
39	3.01	1.276	.901
40	2.99	1.318	.903
41	3.24	1.252	.900
42	3.35	1.399	.906
43	3.23	1.410	.904
44	3.26	1.470	.904

iii) Reliability of Domain 3- Writing ability

A total of 15 items were in the writing ability. Table VIII*a* gives information on reliability scores. The Cronbach alpha was achieved at 0.855, indicating good reliability. Also shown in Table VIII*b* was item-wise reliability. The findings showed that Cronbach's alpha value varies from 0.837 to 0.854, indicating that they were in the range of good reliability.

Table VIII *a*

Reliability analysis of Domain 3- Writing ability

N	Number of items of Writing ability	Mean	SD	Reliability Cronbach's Alpha
133	15	48.29	12.030	0.855

Table VIII *b*

Item analysis of Writing ability

Writing ability item number	Mean	SD	Reliability Cronbach's Alpha
45	3.60	1.471	.853
46	3.62	1.342	.849
47	3.64	1.205	.856
48	3.67	1.336	.854
49	3.78	1.300	.849
50	3.45	1.305	.850
51	3.64	1.274	.847
52	3.41	1.338	.846
53	2.78	1.489	.842
54	2.68	1.441	.837
55	2.65	1.539	.840
56	2.85	1.495	.841
57	2.79	1.488	.842
58	2.84	1.433	.841
59	2.88	1.440	.842

iv) Reliability of Domain 4 - Mathematical ability

The domain of mathematical ability encompassed a total of sixteen items. Table IX*a* displays the reliability. All the items related to reading were included and Cronbach's alpha was measured at 0.895, which implied that there was good reliability. Additionally, item-wise reliability was obtained as shown in Table IX*b*. The findings demonstrated that Cronbach's alpha values ranged from 0.884-0.907, demonstrating that they were within the good to excellent reliability range.

Table IX *a*

Reliability analysis of Domain 4 - Mathematical ability

N	Number of items of Mathematical ability	Mean	SD	Reliability Cronbach's Alpha
133	16	50.10	15.211	0.895

Table IX *b*

Item analysis of Mathematical ability

Mathematical Ability item number	Mean	SD	Reliability Cronbach's Alpha
60	3.06	1.504	.884
61	3.02	2.475	.907
62	2.98	1.414	.884
63	2.95	1.419	.887
64	3.05	1.413	.885
65	3.00	1.397	.888
66	2.90	1.474	.882
67	2.85	1.386	.886
68	2.96	1.582	.886
69	3.71	1.321	.896
70	3.48	1.424	.892
71	3.07	1.426	.890
72	3.44	1.473	.887
73	3.38	1.480	.889
74	3.08	1.473	.888
75	3.18	1.382	.891

v) Reliability of Domain 5- Language test

The language domain had a total of 9 items. Table X*a* provides the reliability of these items. The Cronbach's alpha was obtained at 0.853 which indicated that there was good reliability with the items. Further, item-wise reliability was obtained in Table X*b*. The results showed that Cronbach's alpha value ranged from 0.826-0.844 which indicated they were in the good reliability range.

Table X *a*

Reliability analysis of Domain 5- Language test

N	Number of items of Language Test	Mean	SD	Reliability Cronbach's Alpha
133	9	28.36	8.193	0.853

Table X *b*

Item analysis of Language test

Language Test item number	Mean	SD	Reliability Cronbach's Alpha
76	3.07	1.371	.843
77	3.03	1.387	.845
78	3.03	1.370	.844
79	2.97	1.381	.838
80	2.98	1.359	.838
81	3.15	1.367	.836
82	3.33	1.287	.826
83	3.42	1.248	.834
84	3.39	1.311	.832

vi) Reliability of Domain 6- Oral Expression / Listening skills

The oral expression/listening skills domain had a total of 4 items. Table XI*a* provides the reliability of these items. The Cronbach's alpha was obtained at 0.752 which indicated that there was acceptable reliability. Further, item-wise reliability was obtained in Table XI*b*. The results showed that Cronbach's alpha value ranged from 0.649-0.742 which indicated they were in the acceptable reliability range.

Table XI *a*

Reliability of Domain 6- Oral Expression / Listening skills

N	Number of items of Oral Expression / Listening Skills	Mean	SD	Reliability Cronbach's Alpha
133	4	13.12	3.746	0.752

Table XI *b*

Item analysis of Oral Expression / Listening skills

Oral Expression / Listening Skills item number	Mean	SD	Reliability Cronbach's Alpha
85	3.38	1.272	.691
86	3.33	1.266	.649
87	3.24	1.250	.686
88	3.17	1.156	.742

vii) Reliability of Domain 7 -Motor deficiency test

The motor deficiency test is composed of eight items, as indicated in Table XII*a*. The Cronbach's alpha value of 0.740 suggested an acceptable level. Table XII*b* revealed the item-wise reliability, which ranged from 0.675 to 0.746, which implied that they were all within the acceptable reliability range.

Table XII *a*

Reliability of Domain 7- Motor deficiency test

N	Number of items of Motor deficiency test	Mean	SD	Reliability Cronbach's Alpha
133	8	24.73	6.273	0.740

Table XII *b*

Item analysis of Motor deficiency test

Motor deficiency test item number	Mean	SD	Reliability Cronbach's Alpha
89	3.46	1.356	.717
90	3.39	1.300	.704
91	3.36	1.377	.675
92	3.40	1.210	.706
93	3.06	1.265	.707
94	2.61	1.374	.721
95	2.73	1.336	.746
96	2.72	1.315	.722

The reliability and item analysis according to Cronbach's alpha test of all 7 domains of the assessment scale was found to be in acceptable, good and excellent reliability levels and the assessment scale retained all the 96 items for the study for standardisation procedures.

D. Development of scales to assess Knowledge Attitude and Practice of primary school teachers regarding learning disability

In India, primary teachers (PRTs) instruct students in grades 1-5, typically aged 6-11 years, across various subjects including languages, mathematics, science, social studies, and environmental studies. Their main goal is to build foundational skills and knowledge for future education. In government schools, PRTs are recruited through a rigorous selection process involving two written exams (Paper I and Paper II) and an interview that assesses communication skills, teaching experience, and personality. Successful candidates are then assigned to primary schools within the state or district. Private schools follow their hiring processes, which generally include resume shortlisting, interviews, and demo classes. Government PRT salaries are regulated and include a pay band, grade pay, and allowances like Dearness Allowance (DA), House Rent Allowance (HRA), and Transport Allowance (TA). In private schools, salaries vary based on qualifications, experience, school reputation, location, and budget, with potential additional benefits like health insurance and housing allowances.

According to Education for All in India (2023), the quality of education continues to be a concern. Both government and private school teachers face distinct challenges and have their positives and negatives. According to a research paper by Jos Mooij in 2008, government school teachers are burdened with various non-academic duties, such as implementing schemes and election duty, which reduces their teaching time and motivation, compounded by an absence of a proper reward structure. Additionally, community support for these teachers is often inadequate. The education bureaucracy in government schools focuses heavily on measurable results, putting immense pressure on teachers to increase enrollment and performance rates. On the other hand, private school teachers are more accountable to school authorities with additional administrative tasks, as noted by Mohan (2023). Despite these challenges, private school teachers can dedicate more time to teaching. Therefore, it is crucial to understand the knowledge, attitude, and classroom practices of teachers in both sectors to address their respective issues and improve the

overall quality of education. Understanding the knowledge, attitude, and classroom practices of teachers in both sectors is essential not only for addressing their specific challenges but also for improving the overall quality of education.

Knowledge encompasses information, facts, and understanding gained through learning, experience, or study. It forms the basis of individuals' perceptions and beliefs. Knowledge is acquired through deliberate efforts to seek and process information. In the context of learning disabilities (LD), knowledge involves understanding LD characteristics, causes, assessment methods, and intervention strategies. Teachers' LD knowledge influences their ability to support students effectively. Adequate knowledge among teachers regarding learning disorders (LDs) can significantly enhance the likelihood of early detection and access to necessary treatment for children with LDs (Jebakumar et al., 2023). The understanding of LDs among school teachers could play a significant role in the early identification and effective management of these disorders (Javaid et al., 2022). Therefore, evaluating teachers' knowledge and perceptions concerning LDs remains pertinent.

Shari and Vranda (2016) highlight that teachers, as the first point of contact for students with learning disabilities, play a crucial role in providing support and necessary interventions. Achieving full educational and social integration for these children can be more easily accomplished if teachers possess the appropriate knowledge, attitudes, and competencies. Such understanding helps teachers develop positive attitudes toward students with learning disabilities, which in turn enhances their ability to acquire and refine the competencies needed to support these students effectively. Luis (2020) asserts that teachers' attitudes are among the most decisive and predictive factors influencing their behaviour. These attitudes shape how teachers interact with their students, as they predispose them to act predictably based on their preconceived ideas and feelings. However, attitudes can vary depending on the context and even the moment, making them complex and challenging to understand. In the same year, Neha and Roopa (2020) emphasised that teachers' attitudes are of utmost importance, as the way they perceive and handle the challenges posed by children with learning disabilities can significantly impact the child's confidence, success, and interest in education. A positive and encouraging teacher fosters a similarly positive attitude and behaviour in students (Lee, 2019). Students take teachers' attitudes toward them seriously.

Teaching practices have a significant role in shaping the learning experiences and eventual outcomes, especially for those with LDs. The strategies and methods teachers employ can significantly influence a child's academic success, social integration, and overall confidence. Classroom teaching practices not only help bridge learning gaps but also create an environment where students feel understood and valued. When teachers adapt their teaching practices to accommodate the diverse needs of LD students, they empower these children to overcome challenges, boost their self-esteem, and enhance their interest in learning, ultimately impacting their long-term academic and personal growth. For instance, teachers may provide extra time for children who write slowly, ensuring that they have the opportunity to complete their work without feeling rushed. By offering additional attention and personalised coaching for students with learning disabilities, teachers can address specific learning needs more effectively. Empathetic rather than merely sympathetic, teachers focus on boosting a child's strengths rather than blaming them for their weaknesses. Tailoring lessons to the level of understanding of each child further ensures that the content is accessible and meaningful. Moreover, by adjusting their teaching styles to make lessons more engaging and relevant for students with LD, teachers create a classroom environment where every child feels motivated to learn and succeed.

Assessing knowledge, attitude, and practice is a technique utilised to gauge individuals' comprehension, attitudes, and actions concerning a particular subject. This approach entails evaluating individuals' level of understanding of the topic, their attitudes or viewpoints toward it, and their practical behaviours or actions in connection with it, as stated by Adeyemi et al (2023), Vijayakrishna et al (2022), Rajabzadeh et al (2023). During the literature review, it was noticed that the knowledge, attitude, and practice of teachers can contribute to the teachers' performance. Consequently, three additional tools were developed for this study to assess knowledge, attitude, and practice along with a socio-demographic questionnaire to collect the teachers' personal and family background information.

i) Teacher’s Knowledge Scale on Learning Disability

ii) Attitude Scale for primary school teachers towards Learning Disability

iii) Checklist on Teaching Practices of primary school teachers

iv) Socio-demographic questionnaire (General background information Questionnaire)

The KAP scales were subjected to face validity to determine their relevance and appropriateness for measuring the intended constructs. This subjective evaluation ensures that the instruments accurately measure their intended targets. Following face validity, the scales along with the socio-demographic questionnaire were exclusively utilised in the pilot study alongside the Assessment scale. The pilot study results of KAP are given below.

i) Teacher's Knowledge Scale on Learning Disability

The "Teacher's Knowledge on Learning Disability" scale assessed educators' understanding of learning disabilities. It included statements on definition, characteristics and identification. Responses help gauge teachers' knowledge, guiding the development of targeted training and support programmes for addressing the needs of students with LDs in the classroom. It comprised 57 items on a three-point Likert scale with Yes, No, and Don't Know options. The scale encompassed both positive and negative items. Both positive and negative items have correct and incorrect responses. Each correct answer was given a score of one, while incorrect answers received a score of zero. If a respondent chose "don't know," they also received a score of zero. A higher score reflects a higher level of knowledge on learning disabilities.

Each correct answer was awarded a score of one, while incorrect answers and "don't know" responses were given a score of zero. A higher total score indicates a greater level of knowledge about LDs. (Annexure: IVa)

ii) Attitude Scale for primary school teachers towards Learning Disability

The "Attitude of Primary School Teachers on Learning Disability" scale is a tool designed to gauge the perceptions and attitudes of PRTs towards learning disability and children with LD. The statements in the scale cover various aspects, including teachers' beliefs, feelings, and opinions about students with LD, their expectations, and their approach towards teaching and accommodating these students in the classroom. Analysing the responses in this scale provides valuable insights into the attitude of PRTs toward LD. This scale consisted of 35 items structured in a three-point Likert scale, offering response options of agree, neutral, and disagree. It included both positive and negative items, with positive items scores as Agree – 3, Neutral – 2, Disagree – 1 and vice-versa for negative items with a higher score indicating a more favourable attitude towards learning disabilities. (Annexure: IVb)

iii) Checklist on Teaching Practices of primary school teachers

The "Checklist on Teaching Practices of Primary School Teachers" was a tool designed to systematically assess the instructional approaches and practices employed by primary school teachers in their classrooms. This checklist typically consisted of specific items or indicators related to teaching methods, classroom management, and pedagogical strategies. This tool was outlined in a checklist format, featuring 'yes' and 'no' options and included 24 items. It involved both positive and negative items, awarding one point for each "yes" response, and a higher score indicating good/satisfactory teaching practices. (Annexure: IVc)

All the above three tools that is teacher's knowledge scale on LD, the attitude scale for PRTs towards learning disability and the checklist on teaching practices of primary school teachers were also subjected to Face validity and Content validity. The suggestions and opinions were incorporated into the KAP Scale. Finally, the Knowledge Scale had 57 items, the Attitude Scale had 35 items and the Practices checklist had 24 items.

Reliability and item statistics of the Knowledge, Attitude, and Practice (KAP) Scale

In validating the appropriateness of the developed Knowledge, Attitude, and Practice (KAP) scale, a reliability assessment was executed, employing Cronbach's alpha test and it is elaborated below.

In the **Teacher's Knowledge Scale on Learning Disability**, 57 items were included. Table XIII*a* shows the reliability of the knowledge scale. Cronbach's alpha was found to be 0.748, which indicated acceptable reliability. In addition, the item-wise reliability was obtained, as shown in Table XIII*b*. The results showed that Cronbach's alpha values vary between 0.738 and 0.754 which indicated they were within the range of acceptable reliability.

Table XIII *a*

Reliability of teacher's knowledge scale on Learning Disability

N	Number of items in Knowledge Scale	Mean	Std. Deviation	Reliability Cronbach's Alpha
133	57	31.89	7.609	0.748

Table XIII *b*

Item analysis of teacher's knowledge scale on Learning Disability

Knowledge scale Item No.	Mean	SD	Reliability Cronbach's Alpha
1	.56	.498	.747
2	.54	.500	.745
3	.42	.496	.743
4	.42	.496	.745
5	.73	.446	.745
6	.71	.457	.747
7	.65	.480	.746
8	.38	.486	.741
9	.69	.464	.747
10	.74	.438	.744
11	.41	.494	.745
12	.37	.484	.748
13	.71	.453	.739
14	.54	.965	.754
15	.77	.934	.745
16	.71	.944	.751
17	.66	.475	.737
18	.34	.475	.740
19	.50	.502	.744
20	.41	.494	.760
21	.49	.502	.736
22	.49	.502	.738
23	.56	.498	.746
24	.44	.498	.747
25	.38	.488	.749
26	.38	.488	.743
27	.53	.501	.743
28	.69	.464	.740
29	.55	.499	.736

Knowledge scale Item No.	Mean	SD	Reliability Cronbach's Alpha
30	.62	.488	.741
31	.61	.490	.744
32	.63	.484	.744
33	.59	.494	.743
34	.61	.490	.735
35	.43	.497	.745
36	.51	.502	.742
37	.63	.484	.737
38	.74	.438	.742
39	.65	.480	.744
40	.60	.491	.743
41	.39	.490	.747
42	.32	.467	.755
43	.63	.484	.748
44	.50	.502	.738
45	.71	.457	.740
46	.48	.502	.747
47	.34	.475	.753
48	.57	.497	.747
49	.56	.499	.749
50	.64	.482	.744
51	.70	.460	.744
52	.67	.472	.739
53	.63	.484	.744
54	.56	.498	.740
55	.53	.501	.746
56	.59	.494	.746
57	.68	.470	.740

Reliability of the Attitude Scale for Primary School Teachers Towards Learning Disability

A total of 35 attitude items were developed for the study. The reliability of the scale is provided in Table XIV*a*. The Cronbach's alpha was obtained at 0.851, which indicated good reliability. Table XIV*b* contained the item analysis, and showed a range of Cronbach's alpha values between 0.845 and 0.854, further confirming the scale's good reliability.

Table XIV *a*

Reliability of Attitude Scale for primary school teachers towards Learning Disability

N	Number of items	Mean	SD	Reliability Cronbach's Alpha
133	35	78.15	11.087	0.851

Table XIV *b*

Item analysis of Attitude Scale for primary school teachers towards Learning Disability

Attitude Scale Item No.	Mean	SD	Reliability Cronbach's Alpha
1	2.65	.665	.845
2	1.81	.845	.852
3	2.08	.884	.847
4	2.68	.622	.843
5	2.04	.856	.843
6	2.13	.802	.850
7	2.00	.870	.842
8	2.60	.674	.844
9	2.28	.792	.845
10	2.68	.658	.846
11	2.73	.605	.845
12	1.88	.844	.846
13	2.08	.876	.849

Attitude Scale Item No.	Mean	SD	Reliability Cronbach's Alpha
14	2.12	.844	.843
15	1.92	.840	.846
16	2.05	.752	.860
17	2.47	.702	.852
18	2.21	.817	.846
19	2.11	.823	.841
20	1.98	.844	.846
21	2.08	.813	.846
22	2.66	.563	.851
23	2.44	.733	.854
24	2.67	.704	.846
25	2.41	.808	.843
26	1.31	.580	.851
27	2.41	.836	.844
28	2.17	.857	.844
29	2.02	.802	.860
30	2.08	.813	.864
31	2.56	.762	.845
32	2.54	.713	.843
33	2.35	.826	.844
34	1.94	.824	.842
35	2.02	.862	.848

Reliability of the Checklist on Teaching Practices of Primary School Teachers

A total of 24 items were devised and subjected to reliability and item analysis tests to assess their suitability. This evaluation aimed to uncover teachers' classroom practices regarding children's activities and determine the statements' applicability in the research context.

Table XV*a* summarises the reliability of the checklist. The Cronbach's alpha was 0.70, indicating acceptable reliability. Table XV*b* included the item analysis, with Cronbach's alpha values ranging from 0.65 to 0.752, which demonstrated acceptable reliability.

Table XV *a*

Reliability of Teaching Practices of Primary School Teachers

N	Number of items	Mean	SD	Reliability Cronbach's Alpha
133	24	18.78	3.750	0.700

Table XV *b*

Item analysis of Teaching Practices of Primary School Teachers

Practice checklist Item No.	Mean	SD	Reliability Cronbach's Alpha
1	0.269	0.445	0.752
2	0.962	0.193	0.695
3	0.969	0.173	0.697
4	0.977	0.151	0.698
5	0.785	0.413	0.674
6	0.592	0.493	0.668
7	0.623	0.486	0.670
8	0.362	0.482	0.727
9	0.600	0.492	0.682
10	0.423	0.496	0.712
11	0.177	0.383	0.713
12	0.823	0.383	0.697
13	0.631	0.484	0.671
14	0.592	0.493	0.675
15	0.769	0.423	0.693
16	0.631	0.484	0.673
17	0.885	0.344	0.695
18	0.662	0.475	0.674
19	0.831	0.376	0.691
20	0.877	0.330	0.709
21	0.715	0.453	0.674
22	0.854	0.355	0.692
23	0.908	0.291	0.692
24	0.554	0.499	0.690

The results of Cronbach's alpha analysis confirmed the reliability of the developed KAP scales. These scales demonstrated strong internal consistency through reliability testing and were subsequently employed in the study. The utilisation of these validated scales enhanced the credibility of the research findings, ensuring a dependable and consistent measurement of assessment and knowledge attitude practice across the study participants.

iv) General Background Questionnaire

The "General Background Questionnaire" encompassed a comprehensive set of investigations aimed at building a personal profile of the participant. It covered aspects such as gender, date of birth (age), marital status, number of children, type of family, area of residence, and work-related details, including educational status, class handled, years of teaching experience, type of school and the school board. Additionally, the questionnaire included information about whether the participants worked with a counsellor and if they had undertaken any child development or psychology-related courses during or before taking the teaching profession. This diverse set of questions facilitates a thorough understanding of the participant's background, contributing valuable insights for research or programme planning purposes (Annexure: IVd).

E. Conduct of the study

The study was conducted in two distinct interphases. The first interphase involved the actual execution of the study, where the researcher established rapport with the selected samples and proceeded with data collection.

Data collection: This phase was crucial for fostering a conducive environment, building trust, and obtaining valuable information from the participants. The study saw active participation from 562 teachers who gave their consent to participate in the study. However, 16 teachers were unable to continue their participation for reasons including long leaves and transfers, and 32 data sets were excluded from the study due to various reasons, such as teachers being unreachable, and incomplete data. After the completion of data collection, responses from 514 teachers were deemed suitable for the study and were subsequently tabulated.

DATA ANALYSIS – At a glance

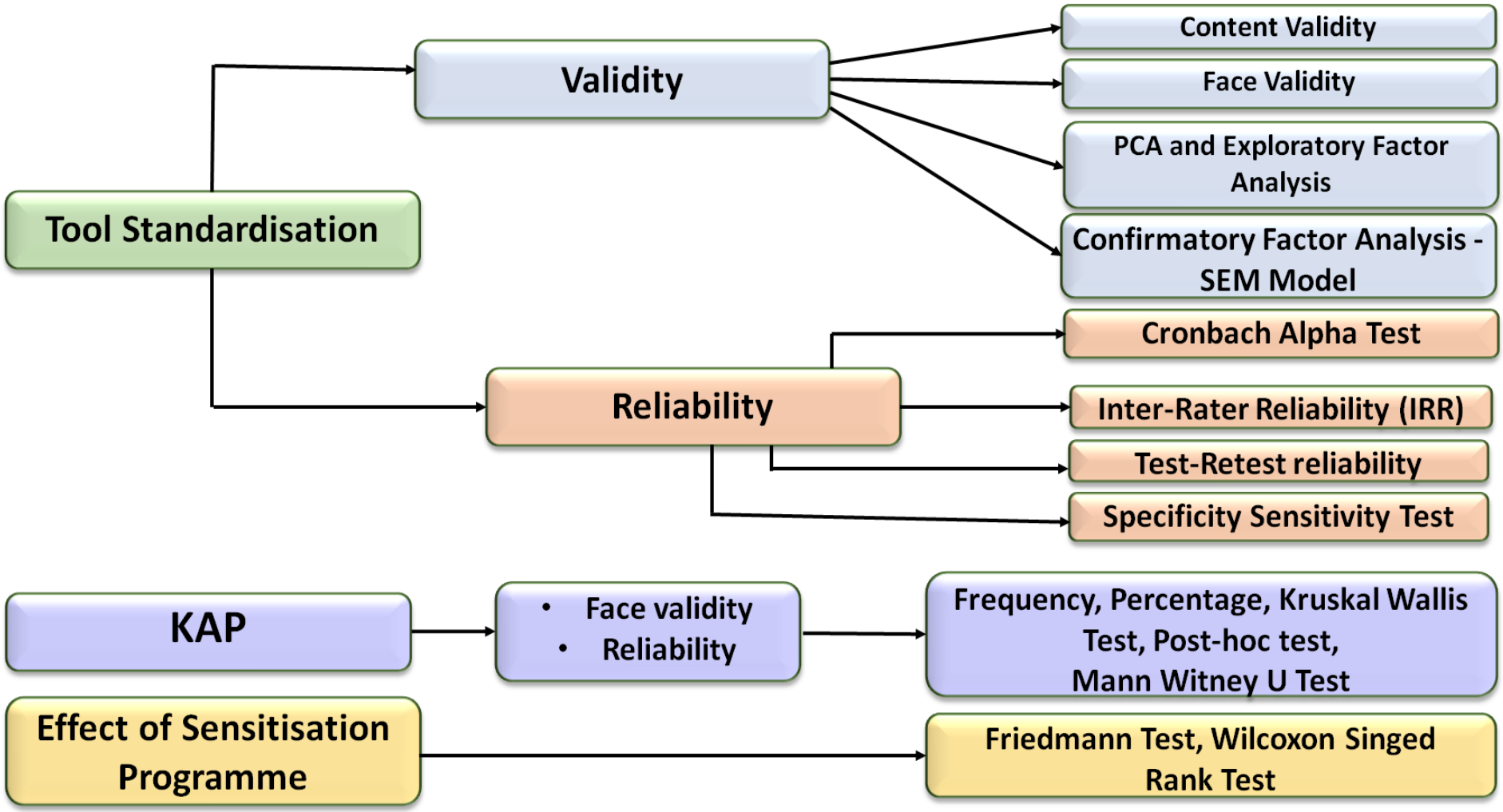


Figure 4

Tool administration: During the data collection, the assessment scale to identify children with learning disability was administered. Before administering the scale, the researcher gave detailed clear instructions about the scale, its purpose, and the procedure to respond to the scale. Subsequently, the KAP scale was administered along with the socio-demographic questionnaire. To respond to the KAP scale clear detailed instructions were given to teachers to respond congruently and the data were collected from the teachers.

Standardising the assessment scale: Upon completion of the data collection, the standardisation procedure was implemented, and this process is expounded upon in the subsequent results and discussion chapter, however, the procedure is depicted in a flow chart (figure 4). This involved a systematic examination of collected data to ensure consistency, reliability, and adherence to standardised protocols, ultimately contributing to the robustness and reliability of the study's findings.

Assessment of KAP: The teachers provided the data for the KAP assessment along with sociodemographic data. The data was consolidated and scored as per the developed scoring norms to assess the KAP and the levels of KAP were categorised by averaging the obtained sum of scores indicating higher the score, the higher the level of KAP.

F. Sensitisation Programme for primary school teachers

The second phase unfolded, focusing on developing content for the sensitisation programme. The researcher engaged in the thoughtful creation of programme materials, ensuring they were tailored to address the specific needs identified during the first phase of the study. Once the content was finalised, the sensitisation programme was conducted.

A sensitisation programme is an organised initiative aimed at increasing awareness, understanding, and responsiveness to a specific issue or subject. It was designed to bring about positive changes in knowledge, attitudes, and practices among PRTs on LD. In this study, the sensitisation programme holds significance as it serves to familiarise and educate the teachers about key aspects related to the identification of learning disability, assessment scale, knowledge and attitude on learning disability, and classroom teaching practices of teachers. By engaging participants in a structured programme, we aimed to enhance their awareness and receptiveness to the subject matter under investigation.

Designing an effective sensitisation programme involves careful planning and structuring of instructional content. The instructional design serves as a blueprint, outlining

the strategies and methodologies that will be employed to ensure the programme's success. It takes into account the diverse needs of the audience, tailoring the approach to maximise engagement and comprehension. By leveraging existing instructional designs formulated by theorists, hence can benefit from established frameworks and methodologies, streamlining the development process. This thoughtful planning not only enhances the overall effectiveness of the sensitisation programme but also contributes to a more impactful and meaningful learning experience for participants.

i) Content Development for the sensitisation programme

Content development for a sensitisation programme for primary school teachers on learning disabilities involved crafting materials to enhance awareness and understanding. This was done by following instructional design principles, which include defining learning disabilities, highlighting common signs, and emphasising inclusive teaching strategies. Also, tailoring content to teachers' needs, using clear language and visuals, and incorporating interactive elements were essential. The goal was to provide educators/ PRTs with the necessary knowledge and skills to support students with LDs effectively in the classroom.

The procedure for using Instructional Design (ID)

An instructional design (ID): Instructional design is the process of creating effective training materials and experiences to facilitate learning and improve performance. This comprehensive process includes analysing learner needs, defining training objectives, selecting instructional strategies and resources, designing and developing materials, implementing and evaluating effectiveness, and revising as needed. In exploring the various perspectives on instructional design, several experts have contributed valuable insights into this field. Briggs (1977) describes instructional design as the entire process of analysing learning needs and goals, developing a delivery system to meet those needs, and creating instructional materials and activities, with ongoing tryouts and revisions of all instructional and learner assessment activities. Similarly, Charles M. Reigeluth (1983) asserts that instructional design involves understanding, improving, and applying methods of instruction. Additionally, Rita Richey (1986) adds that instructional design is the science of creating detailed specifications for developing, evaluating, and maintaining situations that facilitate learning, encompassing both large and small units of the subject matter. Instructional design, as a process, results in a blueprint prescribing methods of instruction for various types of distance learners, contexts, and courses, aiming to address educational or training problems

systematically (Rogoff, 1987). According to the International Encyclopedia of the Social & Behavioural Sciences (2001), instructional design (ID) is defined as the systematic and professional provision for education or training. Moreover, research by Hilgart et al. (2012) indicates that instructional design encompasses three key contexts. Firstly, as a science, ID focuses on enhancing learning effectiveness through research and theory on instructional, motivational, and behavioural strategies, alongside process models for programme design and implementation. Secondly, as a professional field, ID involves collaborative efforts among instructional designers to specify, develop, implement, evaluate, and maintain learning products. Lastly, as a systematic process, ID utilises models to develop instructional specifications methodically, integrating theories to uphold the quality of instructional strategies. Instructional design is a comprehensive and systematic approach that encompasses the analysis of learning needs, the development of instructional materials, and the ongoing evaluation and revision of educational activities, with the ultimate goal of enhancing learning effectiveness and addressing educational challenges.

Employing an instructional design model offers a systematic and structured approach to designing, developing, and delivering training material. According to the Northern Illinois University Centre for Innovative Teaching and Learning (2020), there are several compelling reasons to adopt an instructional design model:

1. **Quality / Effectiveness:** An instructional design model ensures that learning material is purposefully designed with clear outcomes. This systematic approach allows the identification and correction of potential flaws in learning content before implementation.
2. **Saves Time and Resources / Efficiency:** By employing an instructional design model, designers can create a blueprint that includes all necessary components, activities, and assessments, saving time and resources in content creation.
3. **Collaboration / Collaborative Framework:** An instructional design model provides a framework for collaboration among designers, subject matter experts, and stakeholders, fostering the creation of high-quality instruction aligned with learner and organisational needs.
4. **Increases Engagement / Enhanced Involvement:** Instructional design models ensure that learning material is engaging and relevant to learners. By systematically

considering learner needs, preferences, and interests, designers can create instruction that resonates with the audience.

5. **Evaluation and Improvement / Interactive Assessment:** Instructional design models include processes for evaluating the effectiveness of training material and making improvements. Through data collection on learner performance and feedback, designers can refine instruction for future use.

Upon reviewing the instructional designs extensively, among the widely-used instructional design models, **Gagne's Nine Events of Instruction** formulated by educational psychologist Robert Gagne in 1965, was found to be more suitable for the sensitisation programme of the present research study.

The theoretical framework guiding the sensitisation programme.

The sensitisation programme was underpinned by Gagne's Conditions of Learning Theory, providing a theoretical framework for its design. Gagne's model, rooted in an understanding of how humans process information, outlines specific conditions crucial to effective learning. These principles encompass the actions of both educators and learners throughout the teaching process. Gagne identified nine instructional events aimed at optimising student learning: capturing attention, communicating objectives, recalling prior learning, presenting stimuli, offering learner guidance, eliciting performance, providing feedback, assessing performance, and enhancing retention and transfer. These events formed the guiding structure for the sensitisation programme, aiming to foster teacher engagement and subsequently improve their learning experience, contributing to an enhanced overall understanding of the sensitisation content.

The nine steps of Gagne's Instructional Model are:

1. Gaining the attention of the participants
2. Informing the learner of the objective
3. Stimulating recall of prior learning
4. Presenting the content
5. Providing learning guidance
6. Eliciting the performance
7. Providing feedback
8. Assessing the performance
9. Enhancing retention and transfer

Following these nine steps and based on the designed modules, the sensitisation programme was formulated and implemented. The Consolidated Instructional Model for the Sensitisation Programme, incorporating Gagne's Nine Events of Instruction, is outlined below.

1. Gaining Attention (Reception): The sensitisation programme for primary school teachers on learning disabilities commenced with attention-grabbing techniques. Strategies included:

- Asking questions related to experiences with learning disabilities in the classroom.
- Presenting a thought-provoking scenario related to primary education and learning challenges.
- Utilising real-life anecdotes or scenarios of students with learning disabilities.
- Incorporating an engaging video introduction highlighting the importance of the programme.

  Objective Link: Ensured teachers were mentally prepared to delve into understanding learning disabilities in primary school students.

2. Informing the learner of the objective (Expectancy): After capturing attention, teachers were promptly informed about the programme's objectives using various approaches such as:

- Explaining tasks teachers were asked to perform, such as participating in case studies and discussions.
- Establishing clear connections between module objectives and their relevance to classroom practice.
- Involving teachers in determining ways to apply the knowledge gained in real-world teaching scenarios.

Objective Link: Enabling the teachers to predict and comprehend the knowledge and skills needed to support students with learning disabilities effectively.

3. Stimulating Recall of Prior Learning (Retrieval): Teachers were prompted to recall their prior experiences and knowledge of learning disabilities. Techniques included were

- Conducting a quick review of common challenges faced in teaching students with learning disabilities.
- Engaging teachers in discussions about their past encounters with students requiring additional support.

- Encouraging teachers to share their thoughts and experiences related to diverse learning needs in the classroom.
- Using engaging audiovisual presentations featuring real-life classroom scenarios.

Objective Link: Provided a refresher, preparing teachers to connect their experiences with the upcoming modules on intervention strategies.

4. Presenting the Content (Selective Perception): Intervention modules on understanding learning disabilities were introduced through multimedia presentations, lectures, and group discussions. Careful planning allowed for spontaneous discourse. Modules included:

- Introduction (lecture and discussion).
- Defining concepts and types of learning disabilities.
- Understanding the needs of students with LDs.
- Diagnosis and assessment of children with LDs.
- Identification methods.
- Bases for intervention, including multiple intelligences, learning styles, and the Visual Auditory Kinesthetic approach.
- Specific strategies for supporting children with reading, writing, mathematics, and oral language disabilities.
- Discussions with case studies.
- Overview of governmental policies and national and international organisations addressing learning disabilities.

Objective Link: Facilitated effective content delivery while addressing specific challenges faced by PRTs in supporting students with LDs

5. Providing Learning Guidance (Semantic Encoding): Guidance was offered to teachers on applying intervention strategies through examples, stories, and discussions. This included:

- Real-life case studies demonstrating successful interventions.
- Discussions on governmental policies and support available from national and international organisations.
- Application exercises such as developing individualised support plans based on multiple intelligences and learning styles.

- Engaging in group activities to enhance understanding and retention of key concepts.

  Objective Link: Supported teachers in internalising the information and prepared them to apply intervention strategies in their classrooms.

6. Eliciting the Performance (Responding): Teachers were provided the opportunity to practice and demonstrate their understanding of intervention strategies. This included:

- Participating in group discussions on the application of intervention techniques.
- Engaging in case study analyses to identify appropriate support measures.
- Creating sample support plans for students with specific learning disabilities.
- Applying diagnostic tools discussed in the assessment scale module.

  Objective Link: Gauged teachers' ability to apply intervention strategies and reinforced their confidence through practical exercises.

7. Providing Feedback (Reinforcement): Real-time, personalised, and constructive feedback was offered to teachers based on their performance. This included:

- Recognising effective application of intervention strategies with positive feedback.
- Encouraging teachers to critique their approaches and identify areas for improvement.
- Facilitating group feedback sessions to share insights and learn from each other's experiences.

  Objective Link: Completed the teaching-learning cycle, guiding teachers toward continuous improvement in their support for students with learning disabilities.

8. Assessing the Performance (Retrieval): A comprehensive assessment was administered at the end of the programme to gauge teachers' overall understanding and ability to apply intervention strategies.

Objective Link: Gathered insights into teachers' readiness to implement management strategies effectively in their classrooms and informed future professional development needs.

9. Enhancing Retention and Transfer (Generalisation): The programme concluded by building upon assessed effectiveness to increase retention and transfer. Modules included:

- Understanding or Discussion on Assessment scale for PRTs to identify children with LDs.

- After and Follow-up test were conducted at 30-day intervals to evaluate retention and practical application of knowledge in classroom teaching.
- Discussions on the use of learned skills in their classrooms and with their class children, fostering sustaining ongoing support and collaboration among teachers for continuous improvement.

Objective Link: Reinforced internalisation of learning and promoting the application of acquired knowledge and skills in real-world teaching scenarios.

This consolidated instructional model integrated Gagne's Nine Events of Instruction with specific strategies applied in the sensitisation programme for primary school teachers, creating a cohesive and effective framework for enhancing support for students with LDs.

The below table (Table XVI) provides a quick overview of Gagne's instructional design in alignment with the key stages of the sensitisation programme for primary school teachers on learning disabilities.

Table XVI

Gagne's instructional events align with the key stages of the sensitisation programme for primary school teachers on learning disabilities.

Gagne's Nine Events	Terminology	Sensitisation Programme for Primary School Teachers on Learning Disabilities
1. Gaining Attention	Reception	Commenced programme with attention-grabbing techniques, e.g., real-life anecdotes.
2. Informing the Learner of the Objective	Expectancy	Communicated programme objectives; involved teachers in goal-setting.
3. Stimulating Recall of Prior Learning	Retrieval	Prompted teachers to recall experiences with learning disabilities; connected to prior knowledge.
4. Presenting the Content	Selective Perception	Introduced modules on learning disabilities through multimedia, lectures, and discussions.
5. Providing Learning Guidance	Semantic Encoding	Offered guidance using real-life case studies, discussions, and application exercises.
6. Eliciting the Performance	Responding	Engaged teachers in practical exercises, case study analyses, and application of support plans.

Gagne's Nine Events	Terminology	Sensitisation Programme for Primary School Teachers on Learning Disabilities
7. Providing Feedback	Reinforcement	Offered real-time, constructive feedback; encouraged self-critique and group discussions.
8. Assessing the Performance	Retrieval	Administered comprehensive assessments to gauge teachers' understanding and application.
9. Enhancing Retention and Transfer	Generalisation	Concluded with discussions on assessment scales, post-tests, and the practical application of learned skills in their classroom and with their class children.

Gagne Instructional model

Figure 5

Source : Damian Hehir (2022), Understanding the Gagne Instructional Design Model,E-learning

Table XVII

Sensitisation Modules for Primary School Teachers on Learning Disability

Module No	Description	Sessions	Teaching method	Teaching aids
Module 1	Understanding Learning Disabilities – videos • Introduction (lecture or discussion)	Session 1	Lecture	PPT Video
Module 2	• Definition, concept, Types • Needs of Students with LDs • Needs for diagnosis or assessment of children with LDs	Session 2&3	Lecture	PPT Video
Module 3	• Identification • Bases for Intervention – Multiple intelligence, Learning Style, VAK approach	Session 4&5	Lecture	PPT Video
Module 4	Supporting children with Reading Disabilities	Session 6	Lecture, Discussion, and Q& A	PPT
Module 5	Supporting children with Writing Disabilities	Session 7	Lecture, Discussion, and Q& A	PPT
Module 6	Supporting children with Mathematics Disabilities	Session 8	Lecture, Discussion, and Q& A	PPT
Module 7	Supporting children with Oral Language Disorder	Session 9	Lecture, Discussion, and Q& A	PPT
Module 8	Supporting children with Nonverbal Learning Disabilities	Session 10	Lecture, Discussion, and Q& A	PPT
Module 9	1. Discussion on Case studies. 2. Governmental policies and National and International organisations for learning disabilities.	Session 11	Lecture, Discussion, and Q& A	PPT
Module 10	Discussion on Assessment scale for PRTs to identify children with LDs	Session 12	Lecture, Discussion, and Q& A	PPT

ii) Conduct of sensitisation programme

The sensitisation programme was conducted using a within-subjects design and teachers were not grouped as an experimental group or control group. The objective was to provide awareness/sensitisation for all the teachers in the study. For the conduct of the Sensitisation programme, all teachers were approached to be participants and sixty teachers gave consent to participate in the programme. This number was a controllable number for a couple of online mode lecture sessions as well. A set of KAP data was collected before the conduct of the sensitisation programme and two sets of data were collected after the sensitisation programme, which was collected 7 days after the programme, and as a follow-up data after 30 days of the programme. Finally, out of 60 teachers, the complete data were obtained from 53 teachers who completed the sensitisation programme. Subsequently, data obtained were statistically analysed for the effectiveness of the Sensitisation Programme.

The sensitisation programme was conducted for over five weeks and consisted of ten sessions with each session lasting for one hour. Each module's content was created and substantiated with the subject experts' consultation. Table XXVII contains information about modules of the sensitisation programme.

G. Computation and statistical analysis

In essence, this study focuses on developing and standardising an assessment scale for PRTs to identify children with LD. The methodically developed assessment tool underwent systematic testing and application across the dominions of human development, education, and social sciences. The standardisation procedures of validity and reliability such as content validity, principal component analysis, exploratory factor analysis, confirmatory factor analysis (structural equation modelling), and reliability tests such as Cronbach's alpha, test-retest, inter-rater reliability, and sensitivity and specificity tests were conducted. (Detailed in results and discussion chapter)

The data collected on the Knowledge, Attitude, and Practices (KAP) of teachers, along with their socio-demographic markers, were consolidated and subjected to computation. The data were subjected to statistical analysis to achieve the research objectives. Frequency and percentages were calculated, and statistical tests like the Mann-Whitney U test, Kruskal-Wallis test, and post-hoc tests were applied to examine the significant associations and influences between the study variables.

Whereas Mann-Whitney U test (also known as the Wilcoxon rank-sum test) is a common non-parametric test used to compare the medians of two independent groups that are not normally distributed. This test evaluates whether there is a significant difference in the distributions of the two groups. (Sundjaja et al, 2023). In this study, the Mann-Whitney U test is used to analyse the differences between the knowledge, attitude, and practices of two groups, including gender (male, female), type of school (government, private), family type (nuclear, joint), experience with a counsellor, and whether teachers have studied child development or psychology.

The Kruskal-Wallis test is a non-parametric statistical test used to compare three or more independent groups of sampled data. It's an extension of the Mann-Whitney U test for multiple groups and serves as a non-parametric alternative to one-way ANOVA. (Ostertagova et al, 2014). When the Kruskal-Wallis test indicates a significant difference, a post hoc analysis is necessary to identify which specific groups differ. Dunn-Bonferroni method is used for this purpose as it adjusts for multiple comparisons to control the Type I error rate. The Kruskal-Wallis test is applied in this study to assess variables such as age (20 to 60 years), marital status (married, single, widowed), number of children (0, 1, 2, or more), years of teaching experience (less than 5 years to more than 5 years), and school board (state, CBSE, ICSE), which have more than two groups. For those factors showing significant differences in the Kruskal-Wallis test, the adjusted significance levels in post hoc tests using the Dunn-Bonferroni method were discussed to ensure accurate identification of the groups that differ (Metzler, 2023)

Friedmann Test was administered to check the sample's response at various points in time after the sensitisation programme. Wilcoxon Signed Ranks Test was done to analyse the before and after sensitisation data and follow-up data pairwise to see the effect of the sensitisation programme.

Definitions of the terms used in the present study

Learning Disability: A heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities (NJCLD) (1980*)*

Primary School Teachers/Primary Teachers (PRTs): Teachers in primary school work with students of classes 1 to 5, ranging from 6 to 12 years. It is the responsibility of primary school teachers to nurture life skills as well as basic age-appropriate educational concepts in

the children. They build lasting impressions that will stay with the child for the rest of their lives. (Hussain, 2022)

Assessment: According to "American Psychological Association research (2018), a systematic process of obtaining information from participants and using it to make inferences or judgments about them. In a clinical context, this process is known as a psychological assessment".

Assessment Scale: Assessment scales are typically questionnaires or scales where the challenge is how to provide overall assessments given particular information in these areas, and finally, to provide decision-making on care levels and interventions based on these assessments. Encyclopedia of E-Health and Telemedicine (2016)

According to the American Psychological Association (2018), Psychological scale is defined as "a system of measurement for a cognitive, social, emotional, or behavioural variable or function, such as personality, intelligence, attitudes, or beliefs.

Psychological assessment is a testing method that uses a number of techniques to find hypotheses about individuals and their behaviour, abilities, and personality (Framingham 2016, Shofia 2021)

Knowledge: According to Webster's Dictionary, knowledge is "the fact or condition of knowing something with familiarity gained through experience or association".

According to Gregg Henriques's (2013) Theory of Knowledge, "knowledge refers to awareness of or familiarity with various objects, events, ideas, or ways of doing things"

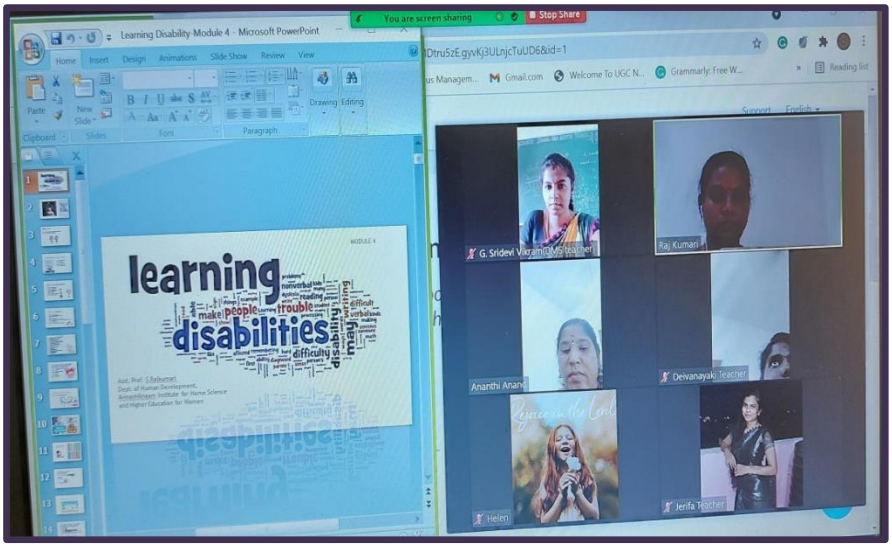
Attitude: In psychology, an attitude refers to a set of emotions, beliefs, and behaviours toward a particular object, person, thing, or event. Cherry (2023)

Practice: Practice may mean (1) phenomena or processes which occur in the individual when an act is repeated; (2) it may refer to a certain kind of consciousness; (3) it may mean the act of repeating when repetition is accompanied by a gain in efficiency, or (4) it may mean mere repetition whether or not accompanied by improvement." Gates (1922)

Sensitisation Programme: Sensitisation (to something) is the process of making somebody/something more aware of something, especially a problem. Oxford Learner's Dictionaries

Sensitisation is defined as a non-associative learning process occurring when repeated administrations of a stimulus result in a progressive amplification of a response (Shettleworth, 2010, Ursin 2014)

Glimpses of the Sensitisation Programme



Offline and Online Sensitisation Programme