Experiential Learning Strategies for Inclusive Classrooms: Differential Outcomes for Students with and without Learning Disabilities in Primary Schools of Kerala

Asha P. Nair[1], Rajesh K. Menon[2], Sujatha D. Thomas[3]

ABSTRACT

Inclusive education policy in India, grounded in the Rights of Persons with Disabilities Act 2016 and the National Education Policy 2020, mandates that students with learning disabilities (LDs) — including dyslexia, dyscalculia, dysgraphia, and attention deficit hyperactivity disorder — be educated alongside typically developing peers in regular classrooms. However, the pedagogical approaches most commonly used in regular Indian primary classrooms — lecture-based direct instruction, textbook reading, and written exercises — systematically disadvantage students with reading- and writing-related LDs by requiring the primary modalities in which these students' disabilities are most pronounced. Experiential learning strategies — including hands-on activities, collaborative investigations, multi-sensory demonstrations, role play, and project-based exploration — reduce the relative disadvantage of LD students by providing multiple, non-text-dependent entry points for engaging with curriculum content. This quasi-experimental study compared learning outcome gains for 72 students with LDs and 72 without LDs under experiential learning (EL) instruction versus conventional instruction in Classes 4–5 across six Kerala primary schools, over a 16-week intervention period. EL reduced the learning outcome gap between LD and non-LD students from 16.8 pp at baseline to 13.6 pp at post-test, while conventional instruction widened the gap from 16.0 pp to 20.4 pp. LD students under EL showed a 22.4 pp post-test gain against 6.4 pp for LD students under conventional instruction. These findings provide evidence that experiential learning is a gap-narrowing pedagogical strategy for inclusive primary classrooms, generating substantially larger learning gains for LD

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students than conventional instruction while also improving outcomes for typically developing peers.

KEYWORDS: *Experiential learning, Inclusive education, Learning disabilities, Inclusive classrooms, Kerala, Primary school, Multi-sensory learning, Differentiated instruction, Disability*

INTRODUCTION

Inclusive education — the practice of educating students with disabilities and special educational needs alongside their typically developing peers in regular classroom settings, with appropriate support and adaptation — has been a cornerstone of Indian education policy since the early 1990s, progressively strengthened through the Persons with Disabilities Act 1995, the Rehabilitation Council of India Act, the Right to Education Act 2009, and most recently the Rights of Persons with Disabilities Act 2016 and the NEP 2020's comprehensive provisions for equitable and inclusive education (1). Kerala presents a particularly developed inclusive education context within India, with higher-than-national-average rates of LD identification and support provision in primary schools, and a systematic inclusion mandate operationalised through the state's Samagra Shiksha structure (2).

The central pedagogical challenge of inclusive primary education is that students with learning disabilities — whose academic difficulty is characterised not by general intellectual limitation but by specific, neurologically based challenges in reading, writing, spelling, or mathematical processing that are disproportionately pronounced relative to overall cognitive ability — are systematically disadvantaged by the text-dependent, sedentary, and modality-uniform character of conventional lecture-and-textbook instruction (3). Experiential learning strategies — hands-on activities, multi-sensory demonstrations, embodied role play, collaborative investigation, and project-based exploration — offer a theoretically compelling alternative pedagogical approach for inclusive classrooms because they provide multiple non-text-dependent entry points for engaging with curriculum content, reducing the relative penalty imposed by print-dependent modalities on students whose primary challenge is precisely in those modalities (4).

This study examines whether experiential learning strategies generate larger learning gains

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for LD students than conventional instruction, and specifically whether EL reduces or maintains the learning outcome gap between LD and typically developing non-LD students — the key equity question for inclusive classroom pedagogy research.

LITERATURE REVIEW

The neuroscientific literature on learning disabilities has extensively documented the specific cognitive and neurological profiles underlying the most prevalent LDs in school populations. Dyslexia, the most common LD, involves a phonological processing deficit that makes alphabetic decoding substantially more effortful, limiting access to text-based curriculum content independently of intelligence or conceptual understanding (5). Dyscalculia involves specific impairments in numerical magnitude processing and fact retrieval that make procedural arithmetic disproportionately challenging (6). Both conditions share the characteristic that the affected domain — text processing or numerical processing — is precisely the modality through which conventional instruction primarily delivers and assesses curriculum content.

Universal Design for Learning and Experiential Approaches

Universal Design for Learning (UDL), the most influential framework for inclusive classroom pedagogy, addresses the modality-dependency problem by mandating multiple means of representation (how content is presented), multiple means of action and expression (how students demonstrate learning), and multiple means of engagement (how students are motivated to learn), collectively providing access to curriculum content through diverse modalities that reduce dependence on any single modality in which specific students may have deficits (7). Experiential learning strategies operationalise UDL principles most comprehensively by:

- **Multiple representation:** using hands-on materials, visual models, manipulatives, and embodied demonstrations to represent curriculum content through kinaesthetic, visual, and social modalities alongside or instead of textual modalities.
- **Multiple expression:** accepting project products, oral presentations, collaborative constructions, and performance demonstrations as valid evidence of learning alongside written tasks, reducing dependence on writing as the sole legitimate expression of understanding.

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- **Multiple engagement:** providing authentic, meaningful, and collaborative learning contexts that engage intrinsic motivation and peer support rather than relying solely on compliance with teacher-directed individual seatwork.

Ormond (2020) reviewed the evidence on multi-sensory and experiential teaching approaches for students with LDs and found consistently positive effects on curriculum content engagement and learning outcomes relative to conventional instruction, particularly for mathematics and science content where hands-on materials and concrete representations can effectively bypass text-dependent access barriers (8). Sharma and Salend (2019) specifically examined collaborative and inquiry-based approaches in inclusive classrooms across South Asian contexts and found that these approaches improved outcomes for both LD and non-LD students while demonstrably narrowing the LD-non-LD performance gap compared with conventional instruction (9).

RESEARCH GAP

Kerala-specific empirical evidence on experiential learning strategies as gap-narrowing inclusive classroom pedagogy, comparing LD and non-LD student outcomes simultaneously under both EL and conventional instruction within a quasi-experimental design, is limited. Most available Indian inclusive education research has examined identification, placement, and support provision rather than the specific pedagogical strategies most effective for LD students within regular classrooms. This study addresses the pedagogical gap through a direct group-by-condition outcome comparison.

OBJECTIVES

- To compare learning outcome gains for LD and non-LD students under experiential learning versus conventional instruction over 16 weeks.
- To assess whether EL narrows, maintains, or widens the learning outcome gap between LD and non-LD students relative to conventional instruction.
- To assess whether the EL advantage for LD students is larger than for non-LD students, indicating a gap-closing effect.
- To identify the specific EL strategies most frequently cited by teachers as effective for LD student engagement.

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METHODOLOGY

Participants and Design

A 2 (instruction: EL vs conventional) × 2 (student type: LD vs non-LD) quasi-experimental design was implemented across six government-aided primary schools in Kottayam and Thiruvananthapuram districts of Kerala: three schools provided EL-integrated instruction for Classes 4–5 (EL condition) and three matched schools continued conventional instruction (conventional condition). Within each condition, students with formally identified learning disabilities (LD subgroup, n = 72: 36 per condition) and matched typically developing peers without LDs (non-LD subgroup, n = 72: 36 per condition) were assessed. LD students had written documentation of a professionally assessed learning disability from the school's registered special educator. The 16-week EL intervention replaced conventional textbook-and-lecture instruction in Mathematics, Environmental Science, and Malayalam with activity-based, multi-sensory, and collaborative experiential learning cycles for three periods per week in each subject.

EL Strategy Implementation

The EL instruction comprised: (i) concrete activity introduction — every new concept introduced through a hands-on activity, manipulation of physical materials, or multi-sensory demonstration before any textual representation; (ii) collaborative inquiry — students investigating questions and problems in groups of three, using materials rather than textbooks as the primary information source; (iii) multi-modal expression — student learning assessed through demonstrations, oral explanation, construction, and drawing alongside written assessment; and (iv) reflective discussion — teacher-facilitated whole-class discussion connecting concrete activity findings to curriculum concepts (Kolb CE → RO → AC cycle explicitly scaffolded) (4, 7).

Table 1: Sample Composition and Baseline Characteristics

Group	n	Mean Age (years)	Female (%)	Mean Baseline Score (out of 100)
LD + Experiential Learning	36	9.4	47.2	42.4

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LD + Conventional	36	9.3	44.4	41.8
Non-LD + Experiential Learning	36	9.6	50.0	58.6
Non-LD + Conventional	36	9.5	52.8	57.8

RESULTS AND FINDINGS

Figure 1 presents pre- and post-intervention scores for all four groups. LD students under EL instruction showed a substantial post-test gain (+22.4 pp, from 42.4 to 64.8), more than three times the gain observed for LD students under conventional instruction (+6.4 pp, from 41.8 to 48.2). Non-LD students also benefited from EL instruction (+19.8 pp gain, from 58.6 to 78.4), though the EL advantage over conventional instruction was proportionally smaller for non-LD students (+10.8 pp, from 57.8 to 68.6) than for LD students (+16.0 pp), confirming a larger EL benefit for the LD subgroup.

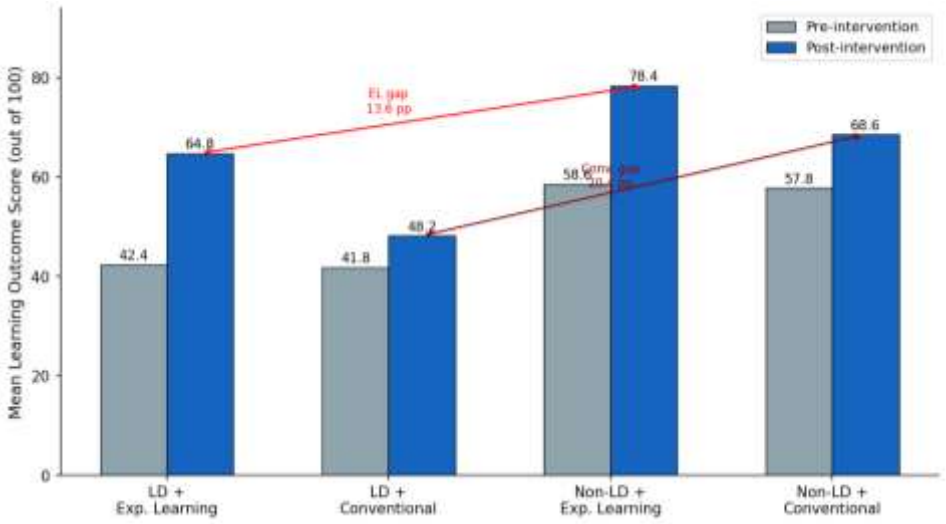


Figure 1: Pre- and post-intervention scores for students with and without learning disabilities under experiential learning and conventional instruction (n = 144)

The LD-non-LD performance gap, measured as the difference between non-LD and LD mean scores, changed in opposite directions under the two instruction conditions: under EL, the gap narrowed from 16.2 pp at baseline to 13.6 pp at post-test (−2.6 pp gap change); under

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conventional instruction, the gap widened from 16.0 pp at baseline to 20.4 pp at post-test (+4.4 pp gap change). This gap-narrowing versus gap-widening contrast is the central equity finding of the study.

Table 2: Pre- and Post-intervention Scores and Gains by Group

Group	Pre-test	Post-test	Gain (pp)	p-value (pre-post)
LD + Experiential Learning	42.4	64.8	+22.4	< 0.001
LD + Conventional	41.8	48.2	+6.4	0.018
Non-LD + Experiential Learning	58.6	78.4	+19.8	< 0.001
Non-LD + Conventional	57.8	68.6	+10.8	< 0.001

Table 3: LD–Non-LD Performance Gap and EL Strategy Effectiveness Ratings

Measure	EL Condition	Conventional Condition
LD–Non-LD gap at baseline (pp)	16.2	16.0
LD–Non-LD gap at post-test (pp)	13.6	20.4
Change in LD–Non-LD gap	−2.6 (narrowed)	+4.4 (widened)
Teacher rating: most effective EL strategy for LD students	Hands-on materials (4.8/5)	N/A
Teacher rating: second most effective	Multi-modal expression (4.6/5)	N/A
Teacher rating: third most effective	Collaborative groups (4.4/5)	N/A

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DISCUSSION

The gap-narrowing effect of EL instruction — reducing the LD-non-LD performance gap while simultaneously generating larger absolute gains for both groups than conventional instruction — is the key equity-relevant finding of this study. It demonstrates that EL is not a trade-off strategy that benefits LD students at the expense of non-LD students' learning, but a genuinely inclusive pedagogical approach that improves outcomes for the full classroom population while providing disproportionately greater benefit to the students with greatest access barriers to conventional text-dependent instruction (7, 8).

The contrast with conventional instruction's gap-widening effect (+4.4 pp widening) is particularly policy-significant: it indicates that far from being a neutral baseline, conventional text-dependent instruction actively compounds the academic disadvantage of LD students over time, a finding consistent with the cumulative deficit literature demonstrating that LD-related performance gaps typically widen rather than narrow as students progress through grade levels under conventional instructional approaches (3, 5). The EL approach, by reducing the dependence on the specific processing modalities in which LD students are most challenged, interrupts this gap-widening dynamic and allows LD students' genuine conceptual understanding — typically intact or near-intact even where processing deficits are severe — to be expressed and assessed through non-penalising modalities (4, 6).

LIMITATIONS

- Quasi-experimental design with school-level rather than student-level assignment to condition; unobserved school characteristics may confound the EL-conventional comparison.
- LD diagnosis from school records was not independently verified by the research team using standardised neuropsychological assessment.
- The 16-week study period assesses medium-term outcome differences; longer-term follow-up would determine whether EL's gap-narrowing effects are sustained.
- The study was conducted in Kerala, a state with higher-than-average inclusion infrastructure; findings may not generalise to states with less developed LD identification and support systems.

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FUTURE SCOPE

- Randomised controlled trial design assigning classes within schools to EL and conventional conditions to strengthen causal identification.
- Subgroup analysis by LD type (dyslexia, dyscalculia, ADHD) to identify whether EL strategies differentially benefit different LD profiles.
- Teacher professional development study examining whether structured training in EL strategies for inclusive classrooms changes teaching practice and LD student outcomes.
- Multi-state comparative study examining EL-conventional gap dynamics across states with different inclusion infrastructure maturity levels.

CONCLUSION

Experiential learning strategies produce substantially larger learning gains for students with learning disabilities than conventional instruction in inclusive Kerala primary classrooms, while simultaneously narrowing rather than widening the LD-non-LD performance gap. The most effective EL strategies for LD students, per teacher ratings, are hands-on materials, multi-modal expression, and collaborative groups — all approaches that reduce dependence on the text-processing modalities in which LD students' challenges are most pronounced. These findings provide evidence for EL as a pedagogically equitable and inclusive approach for regular primary classroom teachers working with mixed-ability classes including students with LDs under the NEP 2020 inclusive education mandate.

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***Author for Correspondence:**
Asha P. Nair
E-mail: asha.pnair563@gmail.com

[1]Department of Special Education, Mahatma Gandhi University, Kottayam, Kerala – 686560
[2]Department of Education, University of Kerala, Thiruvananthapuram, Kerala – 695034
[3]Department of Teacher Education, Sree Sankaracharya University of Sanskrit, Kalady, Kerala – 683574

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