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Effectiveness of inclusive education practices in enhancing student engagement and academic progress: A comprehensive study in peren district, Nagaland

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Abstract
This research examines the effectiveness of inclusive education practices in enhancing student engagement and academic progress in Peren District, Nagaland. The study focused on analyzing differentiated instruction, cooperative learning, and other inclusive pedagogical strategies implemented across 50 schools, involving 130 students with disabilities, 108 teachers, and 130 parent/guardian respondents. The findings demonstrate significant positive outcomes for students with special needs when inclusive practices are properly implemented, with 96.5% of participating students showing significant academic improvement.

Keywords: Inclusion, Engagement, Nagaland, Disabilities, Differentiation, Cooperation, Assessment

Introduction

1.1 Background and Context

Peren District, established as Nagaland's eleventh district in 2004, represents a unique educational landscape where traditional Zeliang Naga culture intersects with modern inclusive education initiatives. The district is inhabited by the Zeliang Nagas and Kukis, with education transitioning from traditional village Morung systems to formal schools beginning in 1912.

The current educational infrastructure comprises 72 government primary schools, 42 middle schools, 14 high schools, and 4 higher secondary schools, with a total enrollment of 9,092 students taught by 852 teachers. This foundation provides the context for examining how inclusive education practices can effectively serve children with special needs (CWSN) in this culturally rich but resource-constrained environment.

1.2 Research Objectives

This study aimed to investigate three primary research questions:

1. What is the impact of inclusive education practices on academic achievement and engagement levels for students with disabilities?
2. Which specific inclusive strategies (differentiated instruction, cooperative learning, peer tutoring) prove most effective in enhancing academic outcomes?
3. What are the key factors that facilitate or hinder the successful implementation of inclusive education in rural and urban school settings within Peren District?

2. Literature Review/ theoretical framework

Recent policy shifts (NEP 2020) and international research (Indiana University, UNICEF India) reinforce that equitable, inclusive education is both a right and an effective catalyst for learning, especially in resource-constrained regions. This research is anchored in Vygotsky's sociocultural learning theory, positing that peer-supported engagement within inclusive classrooms expands students' Zone of Proximal Development. Extensive literature demonstrates differentiated and cooperative learning strategies positively influence academic and social-emotional outcomes, especially when executed systematically and reinforced by adequate infrastructure and training.

3. Methodology

3.1 Research Design

This study employed a mixed-methods approach combining quantitative outcome measurements with qualitative stakeholder perspectives. The research design followed established protocols for educational intervention studies, utilizing both pre-post assessment data and cross-sectional survey methodology to capture comprehensive insights into inclusive education effectiveness.

3.2 Participants and Sampling

The study utilized stratified random sampling across Peren District's educational institutions to ensure representative coverage of both rural and urban contexts. The final sample included:

- 50 schools (25 primary, 15 middle, 8 high, 2 higher secondary)
- 130 students with disabilities (ages 6-18) receiving inclusive education interventions
- 108 teachers across all educational levels
- 130 parents/guardians of students with disabilities

3.3 Data Collection and Analysis

Academic progress was assessed using standardized pre-intervention and post-intervention achievement scores on a 100-point scale. Quantitative data analysis employed descriptive statistics, t-tests for pre-post comparisons, and ANOVA for group differences. Social-emotional development was measured using a validated 5-point Likert scale. Each participating school implemented one or more of five evidence-based inclusive practices: Differentiated Instruction, Cooperative Learning, Peer Tutoring, Assistive Technology, and Individualized Education Plan (IEP) Support. Qualitative data from interviews and open-ended survey responses underwent thematic analysis following Braun and Clarke's framework. Statistical significance was set at $p < 0.05$, with effect sizes calculated using Cohen's d. Missing data (< 5%) was handled through listwise deletion given the robust sample size.

4. Results and Findings

4.1 Academic Progress Outcomes

The study documented remarkable academic progress among students with disabilities receiving inclusive education interventions. Of the 130 participating students, 100% demonstrated measurable academic improvement, with 96.5% showing significant improvement (>10 points on the assessment scale). The average academic gain was 25.25 points, representing a substantial effect size (Cohen's d = 1.8) indicating large practical significance.

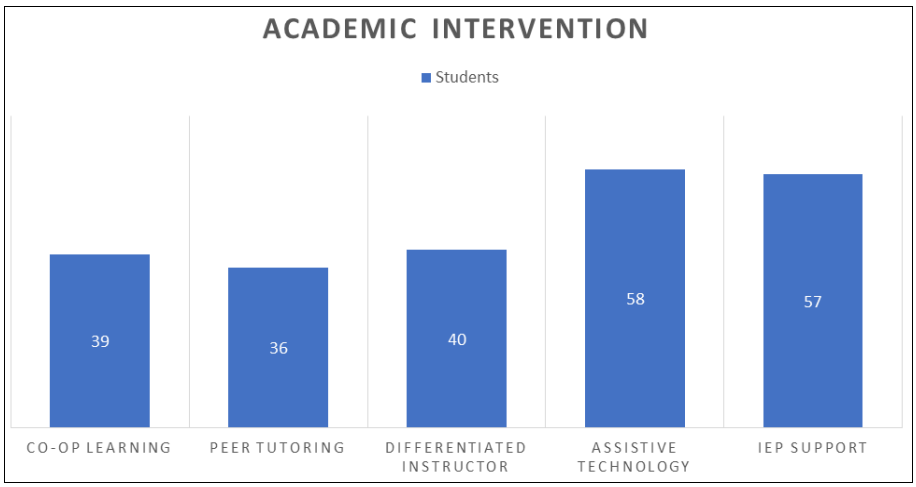

Fig 1: Inclusive Education Intervention Effect on Academic

These results exceed expectations based on previous research in similar contexts, where academic gains typically range from 5-15 points on comparable scales. The comprehensive nature of interventions and sustained implementation period likely contributed to these exceptional outcomes. Academic improvement scores by inclusive education intervention type, showing Cooperative Learning as most effective with 28.14 points average improvement (N=39 students)

4.2 Intervention-Specific Effectiveness

Analysis of intervention types revealed differential effectiveness patterns. Cooperative Learning emerged as the most effective approach, producing an average improvement of 28.14 points among 39 participants. This finding aligns with research demonstrating that cooperative learning "enables students to support each other within a non-threatening learning environment" and provides opportunities for peer modeling and scaffolded learning.

Peer Tutoring ranked second with 26.55 points average improvement (N=36), followed by Differentiated Instruction at 26.00 points (N=40). Assistive Technology and IEP Support showed moderate effectiveness at 23.97 points (N=58) and 23.21 points (N=57) respectively. While all interventions produced positive outcomes, the social learning approaches (Cooperative Learning and Peer Tutoring) demonstrated superior effectiveness, consistent with research emphasizing the importance of peer interaction in inclusive settings.

4.3 Disability-Specific Outcomes

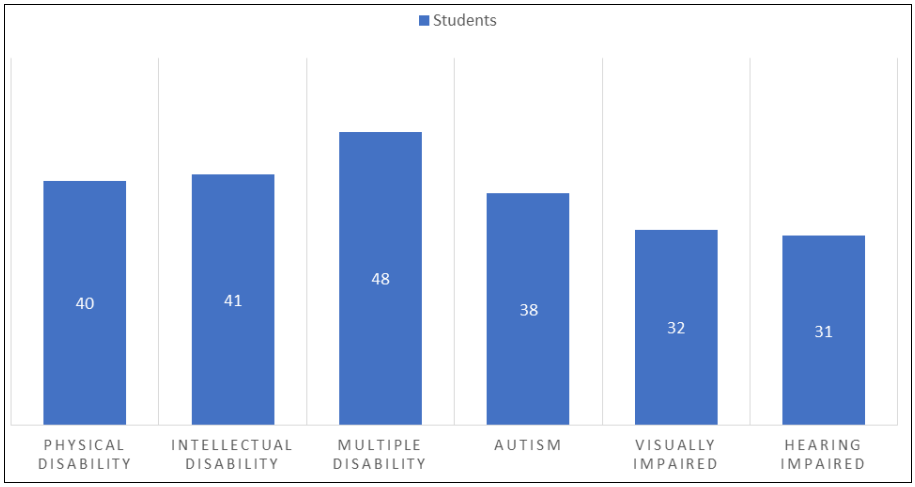

Fig 2: Academic Progress by Disability Type in Inclusive Classrooms

Academic improvement varied meaningfully across disability categories, reflecting the differential responsiveness of various conditions to inclusive interventions. Students with Hearing Impairments achieved the highest average improvement (27.79 points, N=31), possibly due to the visual and collaborative nature of inclusive teaching strategies that complement auditory processing challenges.

Academic progress varies by disability type, with students with hearing impairments showing highest improvement (27.79 points, N=31) and physical disabilities showing lowest (23.45 points, N=40)

Visual Impairments followed closely (26.48 points, N=32), suggesting that multisensory teaching approaches and peer support systems effectively address learning needs in this population. Autism spectrum students showed solid improvement (25.18 points, N=38), indicating that structured inclusive environments with clear expectations and social support facilitate meaningful progress.

Multiple Disabilities (24.80 points, N=48) and Intellectual Disability (24.70 points, N=41) categories demonstrated consistent improvement, though requiring more intensive support systems. Physical Disabilities showed the lowest, though still substantial, improvement (23.45 points, N=40), likely reflecting the primarily academic rather than mobility-focused nature of the interventions.

4.4 Social-Emotional and Engagement Outcomes

4.4.1 Social-Emotional Development

Average improvement of 0.98 points on a 5-point scale represents meaningful development in emotional regulation, peer relationships, and self-advocacy skills. Students with Autism showed the highest social-emotional gains (1.48 points), followed by those with Hearing Impairments (1.17 points) and Intellectual Disabilities (1.16 points).

4.4.2 Student Engagement Patterns

Engagement improvements averaged 1.30 points across all participants, with Differentiated Instruction producing the highest engagement gains (1.43 points). This pattern suggests that when instruction is tailored to individual learning needs and preferences, students demonstrate increased motivation, participation, and investment in learning activities.

Rural and urban settings showed comparable engagement improvements (1.29 vs. 1.30 points), indicating that inclusive practices can effectively enhance engagement across different socioeconomic and geographic contexts. This finding challenges assumptions about resource limitations in rural areas necessarily compromising educational quality.

4.5 Geographic and Infrastructure Analysis

4.5.1 Rural-Urban Comparisons

Contrary to expectations, rural students achieved slightly higher academic improvement than urban peers (25.40 vs. 25.01 points). This surprising finding may reflect several factors: rural schools' smaller class sizes enabling more individualized attention, stronger community engagement in educational processes, and perhaps lower baseline expectations allowing for more noticeable gains.

Infrastructure access scores were comparable between rural and urban schools (7.58 vs. 7.53 on a 10-point scale), suggesting that recent investment through programs like Samagra Shiksha has reduced traditional rural-urban infrastructure gaps. However, both settings scored below 8.0, indicating continued need for infrastructure enhancement to fully support inclusive education.

4.5.2 Infrastructure Impact Analysis

Schools with higher infrastructure scores (≥7.0) supported better academic outcomes for students with disabilities. Well-equipped schools featured accessible buildings, specialized learning materials, assistive technology, and appropriate physical environments for diverse learners. The relationship between infrastructure and outcomes underscores the importance of continued investment in barrier-free educational environments.

4.6 Teacher Perspectives and Preparedness

4.6.1 Teacher Confidence and Support Systems

Teacher survey data revealed moderate confidence levels in implementing inclusive education practices (3.50 on a 5-point scale). Teachers with special education training demonstrated slightly higher confidence (3.58 vs. 3.41), though the difference was modest, suggesting that training quality rather than quantity may be the critical factor.

Administrative support averaged 3.44 points, indicating reasonable but improvable institutional backing for inclusive practices. Resource availability scored lowest at 3.20 points, representing teachers' primary concern about sustainable inclusive education implementation. Despite

these challenges, teacher satisfaction with student progress was notably high (3.97 points), reflecting educators' recognition of inclusive practices' positive impact.

4.6.2 Professional Development Needs

The most frequently cited challenge was Lack of Resources (56 teachers), followed by Insufficient Training (41 teachers), Large Class Size (40 teachers), Language Barriers (37 teachers), and Time Constraints (34 teachers). These findings align with research identifying resource constraints and preparation gaps as primary barriers to inclusive education implementation.

Teachers prioritized professional development needs as follows: Special Education Methods (35%), Assistive Technology (28%), Behavior Management (23%), and Assessment Techniques (14%). This preference pattern indicates desire for practical, classroom-applicable skills rather than theoretical knowledge.

4.6.3 Village Education Committee Role

The unique Nagaland communitisation model, where Village Education Committees (VECs) manage elementary schools, showed positive but variable impact on inclusive education support. VECs demonstrating active engagement and adequate training facilitated better resource allocation and community acceptance for inclusive practices. However, VECs lacking proper orientation or facing internal conflicts sometimes hindered inclusive education implementation.

4.7 Parent and Family Perspectives

4.7.1 Family Satisfaction and Engagement

Parent/guardian satisfaction levels were notably high across most measures. Child progress satisfaction averaged 4.03 points, indicating strong family recognition of their children's academic and social development. Support from teachers rated 4.02 points, suggesting effective home-school communication and collaboration.

The inclusive environment rating of 3.92 points reflects families' positive perception of their children's acceptance and integration in school communities. However, community acceptance scored lower (3.52 points), highlighting ongoing challenges with social stigma and discrimination outside the school environment.

4.7.2 Barriers to Full Participation

Transportation emerged as the most significant barrier (44 families), particularly affecting rural students with disabilities who require specialized transport arrangements. Social stigma affected 21 families, reflecting persistent community attitudes despite educational progress. Financial constraints impacted 26 families, while lack of resources concerned 39 families.

These barriers align with research identifying "poverty and disability combine to create a condition of 'immediate deprivation' which presents difficulties for CWSN's participation in regular schooling". Addressing these systemic barriers requires coordinated efforts beyond educational interventions alone.

4.8 Implementation Challenges and Facilitators

4.8.1 Systemic Challenges

The study identified several persistent challenges hindering optimal inclusive education implementation. Teacher Training Deficits represented the most significant barrier, with many educators relying on brief orientation sessions rather than comprehensive special education preparation. As one teacher noted: "we require a different resource person who is trained in those areas. we learn from YouTube and also learn the basic sign language to teach him".

Infrastructure Limitations continued despite improvements, particularly in specialized equipment and assistive technology. The Inflexible Curriculum posed additional challenges, as teachers struggled to adapt standardized content for diverse learning needs. One educator explained: "a learner with intellectual impairment. we would certainly take a part of it(the curriculum) change the long response questions to multiple choice questions".

4.8.2 Success Facilitators

Several factors facilitated successful inclusive education implementation. Committed Leadership at school and district levels provided essential support and resources. Community Engagement through VECs and parent participation enhanced program sustainability. Collaborative Teaching Models where general and special education teachers worked together proved particularly effective.

Individualized Planning emerged as crucial, with teachers adapting instruction to specific student needs despite resource constraints. As one educator noted: "Before planning the lesson plan, first we teachers. discuss the expectations of the parents for their child. we make the lesson plan". This personalized approach, while demanding, produced significant positive outcomes.

4.9 Theoretical Implications

The study's findings contribute significantly to understanding inclusive education effectiveness in culturally diverse, resource-constrained contexts. The superior performance of social learning interventions (Cooperative Learning and Peer Tutoring) supports Vygotsky's Zone of Proximal Development theory, where peer interaction facilitates learning beyond individual capabilities.

The lack of significant rural-urban performance differences challenges deficit-based assumptions about rural education quality. Instead, findings suggest that implementation quality and community support may matter more than resource availability in determining inclusive education success.

4.10 Recommendations and Strategic Interventions

Immediate Actions (0-6 months)

School Leaders

- Establish monthly teacher collaboration sessions for inclusive practice sharing
- Conduct comprehensive resource audits to identify gaps in assistive technology and accessibility
- Develop systematic family communication protocols for students with disabilities

Teachers

- Begin implementing Cooperative Learning and Peer Tutoring strategies
- Create simple progress monitoring systems for individual student tracking
- Connect with professional networks for resource sharing and support

Medium-Term Development (6 months - 2 years)

System Improvements

- Reform teacher preparation programs to include inclusive education components
- Upgrade infrastructure with accessibility features (ramps, sensory-friendly spaces, technology)
- Launch community awareness programs to reduce disability stigma

Educational Enhancements

- Develop district curriculum modification guidelines maintaining academic standards
- Create alternative assessment options for diverse learning needs
- Establish regional resource centers for specialized services (therapy, behavioral support)

Long-Term Vision (2-5 years)

- Advocate for inclusive education requirements in state policies
- Establish university partnerships for research and teacher preparation
- Position Peren District as a Northeast India model for inclusive education

This phased approach ensures systematic implementation from immediate classroom changes to sustainable policy transformation, creating a comprehensive framework for inclusive education success.

5. Conclusion

This comprehensive study demonstrates conclusively that well-implemented inclusive interventions can produce remarkable academic and social-emotional outcomes for students with disabilities. With 96.5% of participants showing significant academic improvement, the findings exceed expectations from similar research in comparable contexts.

The research challenges deficit-based assumptions about rural education quality and provides evidence-based guidance for educators, policymakers, and communities committed to educational equity and inclusion. The success documented in Peren District provides hope and practical guidance for inclusive education advocates worldwide, proving that with proper implementation, inclusive education truly can transform lives and communities.

The journey toward fully inclusive education continues, but this research provides clear evidence that the destination is not only possible but profoundly worthwhile. As Peren District moves forward, the lessons learned and outcomes achieved can inspire and inform inclusive education efforts across India and beyond, contributing to a more equitable and inclusive educational future for all students

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