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Enhancing Teacher Competence in Inclusive Early Childhood Education: An Action Research Study on Project-Based Teaching Implementation

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Abstract
Inclusive early childhood education faces significant challenges in effectively managing classrooms where children with diverse abilities and developmental needs learn together. Traditional teacher training approaches remain predominantly theoretical, creating substantial gaps between policy mandates and practical implementation. This study investigated how project-based teaching implementation enhances kindergarten teachers' competence in inclusive classroom management through systematic professional development intervention. A qualitative action research design was employed across three kindergarten institutions in Kongbeng District, East Kutai Regency, Indonesia, from March to June 2025. The study utilized a cyclical approach involving planning, implementation, observation, and reflection phases. Data collection employed structured interviews, passive participant observation using five-point Likert scale instruments, and documentary analysis. Twelve indicators assessed project-based teaching implementation, teacher competence (pedagogical, professional, social, and personality dimensions), and inclusive classroom management capabilities. Data validity was ensured through source and technique triangulation. Substantial improvements in teacher competence were observed across all institutions, with performance increases ranging from 30% to 33.34% compared to baseline measurements. Pre-intervention scores of 60-63.33% (moderate competence) improved to 90-96.67% (very high competence) by Cycle II. Teachers demonstrated enhanced abilities in project planning, facilitating collaborative learning, adapting materials for special needs children, and implementing inclusive evaluation strategies. Qualitative feedback revealed increased confidence and pedagogical effectiveness. Project-based teaching significantly enhances teacher competence in inclusive classroom management through structured professional development combining theoretical learning with practical implementation. The cyclical intervention approach proves effective in bridging theory-practice gaps, offering a practical framework for inclusive education implementation in early childhood settings.

INTRODUCTION

In contemporary educational landscapes, the imperative to create inclusive learning environments that accommodate diverse student needs has become increasingly paramount. Classrooms today are fundamentally different from those of previous decades, as the increasing cultural, linguistic, and developmental diversity demands more inclusive approaches to schooling (Florian, 2012). Inclusive education, as articulated in the Salamanca Statement and reinforced through Sustainable Development Goal 4, operates on the fundamental principle that schools and teachers should cater to the needs of all students, encompassing those with special educational needs alongside their typically developing peers (Ainscow, 2020; Ardenlid et al., 2025). At a time when inclusion is valued as a sustainable development goal to achieve by 2030, knowledge on how to foster inclusive classrooms for all students is critically needed, as teachers face the challenge of addressing diverse abilities, strengths, learning preferences and interests in inclusive classrooms where student abilities often span multiple grade levels (Dixon et al., 2014; Peters et al., 2017; Tomlinson, 2014).

This paradigm shift necessitates that early childhood educators develop sophisticated competencies to effectively manage classrooms where children with varying abilities, developmental trajectories, and learning requirements coexist and thrive together.

However, substantial challenges persist in translating inclusive education principles into effective classroom practice, particularly at the early childhood level. While inclusive education is, in many cases, positively related to the academic performance of students with and without disabilities (Kocaj et al., 2014; Schuck, Rauer, & Prinz, 2018), many studies indicate neutral to negative consequences in the area of social participation of children and young people with special educational needs. Research consistently demonstrates that students with special educational needs in inclusive settings face heightened risks of social exclusion, reduced peer acceptance, and limited positive classroom interactions compared to their typically developing classmates (Bossaert et al., 2015; Krull, Wilbert, & Hennemann, 2018; Kulawiak & Wilbert, 2015). The fundamental goal of inclusive education is to create equal learning opportunities for all children and enable their participation in society, regardless of their social or ethnic background or individual learning capacities (UNESCO, 1994), yet empirical work has documented that inclusive classrooms do not automatically guarantee that students with learning difficulties can equally participate in social and academic interactions with their classmates (Grütter et al., 2015; Juvonen et al., 2019). These challenges are particularly pronounced in kindergarten settings, where foundational social and academic skills are being established, and where students with learning difficulties are less socially accepted, have a greater risk of being victimized, and tend to have lower social positions within their peer groups (Estell et al., 2009; Grütter et al., 2015).

The complexity of managing inclusive classrooms demands that educators possess multifaceted competencies extending beyond traditional pedagogical knowledge. Traditional indicators of teacher competence explain only limited variance in actual performance outcomes (Duckworth et al., 2009), suggesting that organizational and contextual factors play crucial roles in determining teacher effectiveness. Although some teachers are demonstrably more effective than others (Rivkin et al., 2005), conventional competence indicators provide limited explanatory power for performance variations, with prior research attempts yielding equivocal results (Klassen & Tze, 2014). Good teachers can make a significant difference in their students' progress, with meta-analytic results showing that teachers are an important source of variance in students' development in schools (Hattie, 2009; Rivkin et al., 2005). The multidimensional nature of teacher competence encompasses cognitive variables such as pedagogical content knowledge and motivational factors including enthusiasm for teaching, which collectively influence classroom management effectiveness, supportive climate creation, and cognitive activation potential (Baumert & Kunter, 2013). Recent theoretical frameworks have identified three basic dimensions of teaching quality crucial for student learning and motivation: cognitive activation, supportive climate, and classroom management (Fauth et al., 2014; Klieme et al., 2009). The teacher's careful perception and attunement to respective social dynamics within a class is seen as crucial, particularly when teachers use this insight to plan and design pedagogical measures in a targeted methodological-didactic way to create social experiential spaces that support students with different needs (Farmer et al., 2019; Hamm et al., 2011; Mamas et al., 2019).

Current teacher training approaches for inclusive education remain predominantly theoretical, emphasizing conceptual frameworks and policy understanding rather than practical implementation strategies. This disconnect between theoretical knowledge and classroom application creates substantial gaps in teacher preparedness, particularly evident in Kongbeng District, East Kutai Regency, where educators report significant difficulties in managing inclusive kindergarten classrooms. Local educational authorities indicate that among twelve kindergartens in the district, three institutions serve children with special needs, yet teachers lack adequate training in inclusive classroom management strategies and evidence-based instructional approaches suitable for diverse learners.

Project-based teaching (PjBT) emerges as a promising pedagogical approach to address these challenges by providing structured, collaborative learning experiences that can accommodate diverse student needs within inclusive settings. Project-based teaching represents an alternative to traditional teacher-led education, demonstrating medium to large positive effects on students' academic achievement compared to conventional instructional methods (Chen & Yong, 2019). It is characterized by students' autonomy, cooperation, communication and reflection in real life practices, allowing students to learn by searching solutions, asking questions, debating ideas, designing plans and communicating with others (Choi et al., 2019; Kokotsaki et al., 2016). This constructivist approach emphasizes knowledge construction through problem-solving activities, social interaction, and real-world application, aligning with principles that learning is both active and social (Bender, 2012). The Project-based learning instructional process is fundamentally rooted in developing problems and training students on problem-solving strategies, with curriculum development based on constructivist theory values that emphasize acquiring new knowledge while building upon established knowledge structures (Dewey, 1938). Project-based learning promotes cooperation between students while the teacher acts only as a guide during the project, emphasizing social constructivism which prioritizes the collaborative process of learning where learners interact and gain appreciation for differences within the group (Greenier, 2020; Vygotsky, 1978).

The theoretical foundation supporting project-based teaching in inclusive settings draws from multiple educational frameworks. Vygotsky's Zone of Proximal Development theory suggests that collaborative learning experiences, facilitated through scaffolding and peer interaction, can optimize learning outcomes for children with diverse abilities. Gardner's Multiple Intelligence Theory provides additional support by recognizing that children possess varying strengths and learning preferences, which project-based approaches can effectively accommodate through diverse activity formats and assessment methods. Furthermore, inclusive pedagogy seeks to challenge normative classroom structures, practices, and curricula that disempower marginalized student populations, enabling instructors and students to co-create supportive classroom environments where every student has equal access to knowledge (Atay & Pensoneau-Conway, 2019; Fassett & Golsan, 2017). For over two decades, researchers have argued that twenty-first century learners need to experience real problems and use inquiry to guide solutions in order to maintain motivation in educational settings, with these learning processes aligning with students' internal basic instincts (Bell, 2010; Duch et al., 1998). Recent evidence demonstrates that project-based learning enhances student learning compared to traditional teaching styles, improves attitudes towards learning, and fosters student collaboration, relevance, and motivation (Thomas, 2000; Younker & Bracken, 2015).

Despite growing recognition of project-based teaching benefits, significant implementation gaps persist in early childhood inclusive education settings. Traditionally, inclusive education has focused on compensatory efforts related to students with various disabilities and special educational needs rather than on gifted students, though today a broader perspective recognizing all students, including gifted ones, is called for (Borders et al., 2014; Göransson & Nilholm, 2014; Ninkov, 2020). Teachers require comprehensive professional development that combines theoretical understanding with practical application strategies, ongoing mentoring support, and evidence-based resources specifically designed for diverse learner populations. Understanding the factors that contribute to effective teacher instruction has the potential to influence selection and preparation of pre-service teachers and may significantly influence student outcomes (Corcoran, 2017; Darling-Hammond & Youngs, 2002). Teacher and principal effectiveness can be evaluated through student achievement scores or assessment of teacher performance, which requires pre-service teachers to demonstrate effective teacher behaviors in applied settings (APA, 2014; Darling-Hammond, 2010; Goodman et al., 2008). More specifically, the effect of teachers' personal characteristics on student outcomes might be mediated by teachers' classroom behaviors and teacher-student interactions, with teacher competence serving as an important lever for improving teaching quality (Rimm-Kaufman & Hamre, 2010).

This research addresses the critical need for evidence-based approaches to enhance teacher competence in inclusive classroom management through project-based teaching implementation. The study examines how structured professional development in project-based teaching methodologies can improve kindergarten teachers' pedagogical competencies, classroom management effectiveness, and ability to create inclusive learning environments that support all children's development. By focusing on practical implementation strategies rather than theoretical frameworks alone, this research contributes to the growing body of knowledge regarding effective professional development approaches for inclusive education.

The significance of this investigation extends beyond immediate classroom applications to broader educational policy and practice implications. Teacher competence serves as an important lever that can be used to improve teaching quality and student outcomes, particularly through targeted professional development programs (Kleickmann et al., 2016). Successful implementation of project-based teaching in inclusive kindergarten settings has the potential to inform teacher preparation programs, professional development initiatives, and educational policy decisions affecting early childhood inclusive education practices. Furthermore, the research provides a foundation for developing replicable professional development models that can be adapted for diverse educational contexts while maintaining focus on evidence-based inclusive pedagogy principles.

The primary objective of this study is to investigate how project-based teaching implementation can enhance kindergarten teachers' competencies in managing inclusive classrooms through systematic professional development, mentoring support, and evidence-based evaluation procedures. This investigation seeks to contribute meaningful insights to the intersection of inclusive education, teacher professional development, and innovative pedagogical approaches in early childhood settings.

METHODS

This study employed a qualitative action research design, specifically School Action Research, to investigate the implementation of project-based teaching in enhancing teacher competence through inclusive classroom management in kindergarten settings. The cyclical nature of action research allowed for iterative improvements through systematic planning, implementation, observation, and reflection phases (Kemmis & McTaggart, 1988; Stringer, 2014). This collaborative and participatory approach involved all school components in identifying problems, planning interventions, and evaluating outcomes to develop practical solutions for inclusive classroom management challenges.

The research was conducted across three kindergarten institutions in Kongbeng District, East Kutai Regency, Indonesia, from March to June 2025. These institutions were purposively selected from twelve kindergartens in the district based on their inclusive education practices, serving children with special educational needs including speech delays, socialization difficulties, and communication challenges alongside typically developing children. The participant sample comprised kindergarten teachers from the three selected institutions: TK Negeri 1 Kongbeng (4 children with special needs), TK Ya Bunayya Kongbeng (10 children with special needs), and TK Tunas Harapan I Kongbeng (5 children with special needs). This purposive sampling strategy ensured that participants had direct experience with inclusive classroom management and could provide rich, contextual data regarding project-based teaching implementation.

Data collection employed multiple methods to ensure comprehensive understanding of the phenomenon under investigation. Structured interviews were conducted with teachers using a seven-item interview guide focusing on understanding of project-based teaching, implementation frequency, challenges, effectiveness assessment, support needs, children's responses, and coping strategies. Passive participant observation was utilized to examine teachers' experiences, challenges, and needs during project-based teaching implementation without interfering with natural classroom dynamics. A structured observation instrument assessed three main variables: project-based teaching implementation (including teacher understanding, project planning, execution, and evaluation), teacher competence (encompassing pedagogical, professional, social, and personality competencies),

and inclusive classroom management (covering inclusive learning planning, environmental adaptation, individual approach strategies, and inclusive evaluation). Each variable was measured using a five-point Likert scale ranging from "strongly inappropriate" (1) to "strongly appropriate" (5), with score interpretations categorized as very high suitability (4.21-5.00), high suitability (3.41-4.20), moderate suitability (2.61-3.40), low suitability (1.81-2.60), and very low suitability (1.00-1.80). Documentary analysis supplemented primary data collection by examining institutional records, curriculum documents, lesson plans, educational infrastructure information, and other relevant materials supporting the research context.

Data validity was ensured through triangulation methods, specifically source triangulation and technique triangulation. Source triangulation involved collecting information from multiple participants including teachers and school principals to verify data consistency across different perspectives. Technique triangulation utilized multiple data collection methods (interviews, observations, and documentation) to gather the same information, thereby enhancing data reliability and comprehensiveness.

Data analysis followed the interactive model proposed by Miles and Huberman (1984), involving three concurrent processes: data reduction, data display, and conclusion drawing/verification. Data reduction involved summarizing, selecting significant elements, focusing on key themes, and identifying patterns from collected information. Data display organized information through narrative descriptions, charts, and matrices to facilitate understanding and further analysis planning. Conclusion drawing and verification involved developing tentative findings that were continuously refined through additional data collection and analysis until credible, consistent conclusions emerged. The cyclical action research process continued through multiple iterations, with each cycle incorporating improvements based on reflective analysis of previous implementations, until research objectives were satisfactorily achieved and teacher competence in inclusive classroom management through project-based teaching demonstrated measurable improvement.

RESULTS AND DISCUSSION

Results

Baseline Teacher Competence Assessment

The initial assessment revealed substantial gaps in teacher competence across all three participating kindergarten institutions. Table 1 presents the comprehensive baseline scores for project-based teaching implementation, teacher competence, and inclusive classroom management prior to any intervention.

Table 1. Pre-action scores for project-based teaching understanding and teacher competence in inclusive classroom management

Variables	Indicators	TKN 1	TK Ya Bunayya	TK Tunas Harapan 1
Project-Based Teaching (Independent Variable)	Understanding PBT stages	3	3	3
	Planning theme-based projects	3	3	3
	Facilitating exploration/collaboration	3	3	3
	Conducting reflection/assessment	3	3	3
Teacher Competence (Dependent Variable)	Pedagogical competence	3	3	3
	Professional competence	3	3	3
	Social competence	4	3	4
	Personality competence	4	4	4
Inclusive Classroom Management (Mediator/Context)	Preparing adaptive materials	3	3	3
	Environmental adaptation	3	2	3
	Individual strategies	3	2	2
	Inclusive evaluation	3	3	3
Total Score		63.33%	61.67%	60%
Criteria		Moderate	Moderate	Moderate

The baseline data demonstrates uniformly moderate competence levels across all institutions, with scores ranging from 60% to 63.33%. Teachers exhibited particular weaknesses in understanding project-based teaching methodologies and implementing inclusive strategies tailored to children with special educational needs. These findings confirmed the necessity for systematic professional development intervention.

Cycle I Implementation Results

Following the initial training workshop on project-based teaching, significant improvements were observed across all measured variables. Table 2 illustrates the enhanced performance levels achieved during the first intervention cycle.

Table 2. Cycle I action scores for project-based teaching understanding and teacher competence in inclusive classroom management

Variables	Indicators	TKN 1	TK Ya Bunayya	TK Tunas Harapan 1
Project-Based Teaching (Independent Variable)	Understanding PBT stages	4	4	4
	Planning theme-based projects	5	4	4
	Facilitating exploration/collaboration	4	4	3
	Conducting reflection/assessment	4	4	4
Teacher Competence (Dependent Variable)	Pedagogical competence	4	4	4
	Professional competence	4	4	3
	Social competence	4	4	3
	Personality competence	5	5	4
Inclusive Classroom Management (Mediator/Context)	Preparing adaptive materials	4	4	3
	Environmental adaptation	4	3	3
	Individual strategies	4	4	2
	Inclusive evaluation	4	4	3
Total Score		86.67%	81.67%	80%
Criteria		Very High	High	High

The Cycle I results demonstrate substantial improvement, with TKN 1 achieving the highest performance level (86.67%), followed by TK Ya Bunayya (81.67%) and TK Tunas Harapan 1 (80%). However, some indicators, particularly individual strategy implementation at TK Tunas Harapan 1, remained below optimal levels, necessitating additional intervention.

Cycle II Implementation Results

Table 3. Cycle II action scores for project-based teaching understanding and teacher competence in inclusive classroom management

Variables	Indicators	TKN 1	TK Ya Bunayya	TK Tunas Harapan 1
Project-Based Teaching (Independent Variable)	Understanding PBT stages	5	5	5
	Planning theme-based projects	5	5	5
	Facilitating exploration/collaboration	4	4	4
	Conducting reflection/assessment	4	4	4
Teacher Competence (Dependent Variable)	Pedagogical competence	5	5	5
	Professional competence	5	5	5
	Social competence	5	5	5
	Personality competence	5	5	5
Inclusive Classroom Management (Mediator/Context)	Preparing adaptive materials	5	4	4
	Environmental adaptation	5	5	4
	Individual strategies	5	5	4
	Inclusive evaluation	4	4	4
Total Score		96.67%	93.33%	90%
Criteria		Very High	Very High	Very High

The second intervention cycle, incorporating refined strategies based on Cycle I reflections, yielded even more impressive outcomes. Table 3 presents the final assessment scores following comprehensive professional development implementation.

By Cycle II, all three institutions achieved very high competence levels, with improvements ranging from 30% to 33.34% compared to baseline measurements. TKN 1 maintained its leadership position with 96.67%, while TK Ya Bunayya and TK Tunas Harapan 1 achieved 93.33% and 90% respectively.

Comprehensive Progress Analysis

Table 4 provides a comprehensive overview of the progressive improvements achieved throughout the action research cycles, highlighting the cumulative effectiveness of the intervention strategy.

Table 4. Comparative analysis of pre-action, Cycle I, and Cycle II performance

Institution	Pre-action	Cycle I	Cycle II	Total Improvement
TKN 1	63.33%	86.67%	96.67%	33.34%
TK Ya Bunayya	61.67%	81.67%	93.33%	31.66%
TK Tunas Harapan 1	60%	80%	90%	30%

The progressive improvement pattern demonstrates consistent enhancement across all institutions, with each cycle building upon previous achievements to reach optimal performance levels.

Qualitative Evidence from Teacher Interviews

The quantitative improvements were substantiated by qualitative feedback from participating teachers, revealing profound changes in confidence and pedagogical approach:

> *"After participating in the project-based teaching workshop and mentoring, I feel more confident in designing different learning plans for each child. I am also more accustomed to conducting observations and reflections after activities, which I rarely did before."* (Interview with Mrs. Yenny, TKN 1 Kongbeng Teacher, May 5, 2025)

> *"Children with special needs interact more easily when there are project activities; they have roles, and their friends also learn to understand differences. From there I learned that inclusive classroom management is not just about spatial arrangement, but also about learning approaches."* (Interview with Mrs. Siti Mutmainah, TK Ya Bunayya Teacher, May 6, 2025)

> *"Since implementing project-based teaching in inclusive classrooms, I have become more skilled at understanding the needs of each child, including children with developmental disabilities. Simple projects like creating mini gardens together help me learn to manage differences in children's abilities realistically in the classroom."* (Interview with Mrs. Fitri, TK Tunas Harapan I Teacher, May 7, 2025)

DISCUSSION

This action research study demonstrates that systematic implementation of project-based teaching significantly enhances kindergarten teachers' competence in managing inclusive classrooms. The substantial improvements observed across all participating institutions—ranging from 30% to 33.34%—provide compelling evidence for the effectiveness of this pedagogical approach in addressing the complex challenges of inclusive early childhood education.

The findings align with previous research highlighting the multidimensional nature of teacher competence. As established by Baumert and Kunter (2013), effective teaching requires both cognitive variables such as pedagogical content knowledge and motivational factors including enthusiasm for teaching. Our results demonstrate that project-based teaching implementation successfully enhanced both dimensions, with teachers showing improved understanding of inclusive pedagogical strategies and increased confidence in their professional capabilities.

The observed improvements in teacher competence corroborate the theoretical framework proposed by Klieme et al. (2009), which identifies three fundamental dimensions of teaching quality: cognitive activation, supportive climate, and classroom management. Project-based teaching implementation enhanced all three dimensions simultaneously, enabling teachers to create cognitively stimulating activities while maintaining supportive environments that accommodate diverse learner needs.

Furthermore, our findings support Chen and Yong's (2019) assertion that project-based learning demonstrates medium to large positive effects compared to traditional instructional methods. The progressive improvements observed through our cyclical intervention approach suggest that structured professional development in project-based methodologies can effectively bridge the gap between theoretical knowledge and practical implementation, addressing the disconnect identified in current teacher training approaches.

The study's success in enhancing inclusive classroom management competencies directly addresses the persistent challenges identified in contemporary inclusive education research. While previous studies have documented that students with special educational needs in inclusive settings face heightened risks of social exclusion and reduced peer acceptance (Krull, Wilbert, & Hennemann, 2018), our intervention demonstrated how project-based teaching can create collaborative learning environments that naturally facilitate social integration.

The qualitative feedback from participating teachers reveals that project-based activities inherently provide meaningful roles for all children, promoting peer understanding and acceptance. This finding supports Vygotsky's social constructivist principles, suggesting that collaborative project work creates optimal zones of proximal development where children with diverse abilities can learn from and with each other.

The cyclical action research approach proved particularly effective in addressing the limitations of traditional teacher training programs. Unlike predominantly theoretical professional development initiatives, our intervention combined workshop-based learning with practical implementation, ongoing mentoring, and reflective evaluation. This comprehensive approach aligns with Kleickmann et al.'s (2016) recommendation that teacher competence serves as an important lever for improving teaching quality through targeted professional development programs.

The progressive improvement pattern observed across intervention cycles demonstrates the importance of iterative professional development approaches. Each cycle built upon previous learning, allowing teachers to refine their understanding and implementation of project-based teaching strategies in response to real classroom challenges and successes.

Our findings complement and extend previous research on project-based learning in early childhood settings. Harris and Gleim's (2008) research found that children engaged in project-based learning showed improvements in exploration, cooperation, and creativity skills. Our study demonstrates that these benefits extend beyond child outcomes to encompass significant improvements in teacher competence and professional confidence.

The substantial competence improvements observed (30-33.34%) exceed typical professional development outcomes reported in education literature, suggesting that the combination of project-based teaching with inclusive classroom management creates particularly powerful learning opportunities for educators. This finding supports Larmer and Mergendoller's (2015) assertion that well-designed project-based education provides more authentic and applicable learning experiences.

The study's success in enhancing teachers' ability to create inclusive learning environments has important implications for broader inclusive pedagogy implementation. The research demonstrates that inclusive pedagogy, which seeks to challenge normative classroom structures and enable co-creation of supportive environments (Atay & Pensoneau-Conway, 2019), can be effectively operationalized through project-based teaching methodologies.

Teachers' enhanced competence in adapting materials, implementing individual strategies, and conducting inclusive evaluations suggests that project-based teaching provides a practical framework

for implementing inclusive education principles. This finding addresses the gap between inclusive education policy mandates and classroom implementation realities that has challenged educators worldwide.

While the study demonstrates significant positive outcomes, several limitations must be acknowledged. The research was conducted in a specific geographical and cultural context with a limited number of participants, potentially limiting generalizability. Additionally, the relatively short intervention period prevented assessment of long-term sustainability and impact.

Future research should investigate the long-term effects of project-based teaching implementation on both teacher competence and student outcomes in inclusive settings. Comparative studies across different cultural contexts and educational systems would enhance understanding of the approach's universal applicability. Furthermore, research examining the specific mechanisms through which project-based teaching enhances inclusive classroom management would provide valuable insights for professional development program design.

The study's success suggests that project-based teaching represents a promising avenue for addressing the persistent challenges of inclusive education implementation, offering a practical and effective approach for enhancing teacher competence in creating truly inclusive learning environments for all children.

CONCLUSION

This action research study demonstrates that systematic implementation of project-based teaching significantly enhances kindergarten teachers' competence in inclusive classroom management, with improvements ranging from 30% to 33.34% across all participating institutions. The cyclical intervention approach, combining structured professional development workshops with practical implementation and reflective mentoring, proved highly effective in bridging the gap between theoretical knowledge and classroom practice. Teachers exhibited substantial improvements across all measured dimensions, including pedagogical competence, professional knowledge, social skills, and inclusive classroom management strategies, progressing from moderate competence levels (60-63.33%) to very high performance standards (90-96.67%).

The research contributes to the field of inclusive early childhood education by providing empirical evidence for project-based teaching as an effective pedagogical framework for managing diverse learner needs. This study extends existing literature by demonstrating how collaborative project work naturally facilitates social integration while enhancing teacher professional competence simultaneously. The findings support theoretical frameworks emphasizing social constructivist learning principles and multidimensional teaching quality dimensions, offering practical validation of inclusive pedagogy implementation strategies.

The implications for educational practice are substantial, suggesting that project-based teaching can serve as a comprehensive solution for inclusive education challenges. Professional development programs should adopt iterative, hands-on approaches that combine theoretical understanding with practical application and ongoing mentorship. Educational policymakers should consider project-based methodologies as core components of inclusive education implementation strategies, particularly in early childhood settings where foundational social and academic skills are established.

However, this study's limitations include its specific geographical context, limited participant sample, and relatively short intervention period, which may restrict generalizability and long-term impact assessment. Future research should investigate the sustainability of these improvements over extended periods, examine cross-cultural applicability, and explore the specific mechanisms through which project-based teaching enhances inclusive classroom management. Additionally, comparative studies examining different professional development models and their effectiveness in diverse educational contexts would provide valuable insights for scaling up successful inclusive education interventions.

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