



Differentiated Play-Based Learning to Strengthen Inclusive Early Childhood Education in Kepulauan Seribu

Endah Windiastuti^{1*}, Fatimah Noor Isnaini², Ajeng Fitri Untariana³,
Rahmah Novianti⁴

^{1,2,3,4}Early Childhood Education Teacher Program Department, Universitas Negeri Jakarta, Jakarta, Indonesia

*Corresponding author: endah.windiastuti@unj.ac.id

Abstract. This study aims to develop a differentiated play-based learning model to strengthen inclusive early childhood education in Kepulauan Seribu. The initiative emerged from challenges identified in implementing inclusive practices, where teachers often struggle to accommodate diverse developmental needs, interests, and learning profiles. Using a qualitative descriptive approach, the research integrates theoretical analysis, contextual exploration, and principles of instructional design. Findings reveal gaps in teacher competence, limited inclusive learning resources, and the absence of structured play-based models that support differentiation. The proposed differentiated play-based learning design emphasizes integrating children's readiness, interests, and learning profiles into joyful and developmentally appropriate learning experiences. This model is expected to help teachers create flexible and inclusive learning environments that honor the diversity of children in early childhood settings in Kepulauan Seribu. The outcomes contribute to strengthening inclusive learning practices and improving teachers' professional capacity in designing adaptive and child-centered instruction.

Keywords: Differentiated play-based learning, inclusive early childhood education, differentiated instruction

1. INTRODUCTION

Inclusive education has become a central focus in global efforts to improve education quality, particularly within the framework of Sustainable Development Goal 4 on Quality Education and SDG 15 on Life on Land, which encourages environmental awareness (Molina et al., 2021). Inclusive education seeks to ensure that all children, regardless of background or special needs, have equal opportunities to learn and develop within supportive environments. However, significant challenges remain, especially in areas with limited access to educational facilities such as the Kepulauan Seribu Regency.

Inclusive education refers not only to serving children with special needs. It is an approach that embraces all learners and avoids exclusion based on differences. Differentiated instruction supports this approach by adapting teaching to students' varied needs, interests, and learning abilities. The principles of inclusion and differentiation work together to support optimal child development (Deiner, 2013).

Play is central to meaningful learning in early childhood. Play supports social interaction, physical development, language use, and emotional expression. Taylor Jayne et al. (2013) explain that play emerges even before language and is evident in children's enjoyment of wordplay, humor, and imaginative stories. Given that inclusive instruction requires differentiated approaches, play naturally provides a flexible and supportive environment where individual needs can be addressed. By integrating differentiated instruction within play, teachers can respond to diverse developmental stages and learning profiles, thereby supporting inclusive education effectively (Taylor Jayne et al., 2013). According to Taylor, play is evident before speech and language; it is apparent that children enjoy the ludic nature of words from the start. It refers to classic studies on children's delight at word play and the strange, incongruous worlds of stories and nursery rhymes, humor, and teasing.

Since inclusive instruction inherently requires differentiation, the adaptation of teaching to meet varied needs, interests, and abilities play naturally provides the necessary flexible and supportive environment where this can occur. Play is the core of meaningful learning, fostering social interaction, physical movement, and verbal expression, all of which are essential for holistic development. As play is fundamental to a child's early engagement with the world, even preceding complex speech and language as Taylor notes, integrating differentiated instruction within this familiar play context allows educators to seamlessly meet the diverse learning profiles and developmental stages of all students, including those with special needs, thereby establishing play as the optimal pedagogical approach for achieving quality inclusive education.

Kepulauan Seribu Regency currently has a total of 60 students with special needs, with 41 students in South Kepulauan Seribu Sub-district and 19 students in North Kepulauan Seribu Sub-district. This data was obtained from

the Ministry of Education, Culture, Research, and Technology in November 2024. Furthermore, the Kepulauan Seribu Education Sub-Agency conducted an assessment activity for SSN from October 17–19, 2023. The assessment targeted students at the primary (SD) and lower secondary (SMP) levels on Untung Jawa Island. Information regarding learning provisions for SSN at the Early Childhood Education (PAUD) level in this area remains limited. This highlights the necessity for capacity building among teachers to implement teaching strategies that are appropriate for students' needs (i.e., inclusive).

To improve education that is both equitable and high-quality, attention must be paid to the learning process for students in accordance with their individual requirements. Teachers, as a cornerstone of quality education in Indonesia, must possess the pedagogical competence to deliver instruction to young children. This pedagogical competence will enable teachers to provide meaningful and directed learning that is aligned with the children's characteristics. Examples of this pedagogical competence include the ability to understand student characteristics, to plan instruction, and to maximize the development of students' potential (Mukminin et al., 2019).

Maria Montessori developed instruction for students with special needs. For Montessori, all children have the right to receive a proper education and the freedom to develop themselves (Lillard, 2020). Montessori developed a teaching method that can be implemented equitably for all children. Both those with and without special needs through enjoyable activities. Nevertheless, the implementation of differentiated instruction through play-based activities has not been extensively studied, particularly within the context of inclusive education in island regions. Therefore, this research is proposed to analyze the application of this method at SPS (School for Early Childhood Education) in Kepulauan Seribu to enhance the quality of inclusive education.

Previous research indicates that differentiated instruction has significant potential for improving student learning outcomes. However, studies that integrate differentiated instruction with play activities are still very limited, especially in the context of inclusive education in island regions. This research focused on play-based differentiated instruction based on the needs of children at SPS Kepulauan Seribu. This study also offers a contextual approach that considers the local geographical and socio-cultural conditions, making its results expected to be more applicable. With this comprehensive approach, the research is anticipated to make a tangible contribution to improving the quality of inclusive education, particularly in island areas. This research will be a continuity research project with next research will be focused on another areas.

2. RESEARCH METHOD

This study employed a qualitative descriptive approach to explore how differentiated play-based learning can strengthen inclusive early childhood education in Kepulauan Seribu. Data were collected through in-depth interviews with teachers, parents, and school administrators; classroom observations focusing on instructional practices and the organization of play-based activities. The data were analyzed thematically following Creswell's stages of organizing, coding, categorizing, and interpreting meaning units to identify recurring patterns related to teachers' conceptual understanding, procedural challenges, and contextual barriers in implementing differentiated instruction through play (Creswell John and Creswell David, 2023).

To ensure trustworthiness, data credibility was strengthened through prolonged engagement in the field, triangulation of techniques and sources, and member checking with participants. Ethical principles were upheld by obtaining informed consent, guaranteeing confidentiality, and ensuring voluntary participation. This design aligns with the Year-1 focus of the multi-year research roadmap, which centers on identifying baseline conditions, mapping teacher needs, and generating foundational evidence for developing a contextualized differentiated play-based learning model suitable for inclusive SPS settings in Kepulauan Seribu.

3. RESULT AND DISCUSSION

The study identified a gap between teachers' conceptual understanding of inclusive education and the difficulties they face in implementing it within daily play-based activities. This analysis illuminates how the practical constraints encountered by teachers conflict with the core principles of early childhood pedagogy. Findings indicate that teachers at SPS Kepulauan Seribu explicitly understand that instruction must be based on the Readiness, Interests, and Learning Profile of each child. This principle is highly aligned with the core of pedagogy, including the views of Maria Montessori theory, who emphasized the importance of providing a proper education and the freedom to develop oneself through enjoyable activities for all children, including those with special needs (Lillard, 2020). The concept that teaching must be tailored to individual child needs represents a professional responsibility to ensure every child receives equal access.

This research commenced with the execution of in-depth interviews with the participating teachers. The teachers first detailed their identities and educational backgrounds. This information regarding their educational background is anticipated to contribute to an understanding of the teachers' comprehension of their teaching practices. Of the 25 teachers interviewed, 90% held a bachelor's degree in education. Subsequently, the researchers conducted interviews concerning the teachers' understanding of inclusive education. The teachers uniformly stated that they comprehended the definition of inclusive education (Wickenden, 2024). They elaborated that inclusive education is a pedagogical approach that accommodates the needs and conditions of all students. Furthermore, they added that inclusive education represents a form of educational equity for all children.

However, in practice, this ideal principle is hampered by practical issues. The most fundamental challenge facing teachers is the inability to effectively conduct Needs Mapping at the beginning of instruction. Teachers struggle to use assessment data to accurately identify a child's Readiness, Interests, or learning styles (Visual, Auditory, Kinesthetic). Because this foundational mapping is weak, teachers ultimately find it difficult to design play activities that are genuinely appropriate for each child. Consequently, instead of providing personalized instruction, teachers are forced to revert to a 'one-size-fits-all' teaching method for ease of management.

Teachers reported difficulty implementing Process Differentiation, which relates to how students process or understand material, such as through flexible grouping and the adjustment of aids. This difficulty directly touches upon Lev Vygotsky's Zone of Proximal Development (ZPD) Theory. The ZPD theory demands that teachers provide gradual assistance (scaffolding) so that a child can move from what they already know to what they do not yet know. This scaffolding must be provided in varying degrees according to each child's needs. Teachers at SPS reported high technical difficulty in managing multiple play groups with different levels of complexity simultaneously. They are confused about how to divide their attention and ensure the appropriate scaffolding is given to Students with Special Needs without causing social jealousy among students. The difficulty of managing these diverse processes, compounded by time management limitations, ultimately leads teachers to choose classical instruction because it is easier to control, even though it sacrifices the child's opportunity to learn within their ZPD. Implementation issues also occur with Product Differentiation, which is the way a child demonstrates understanding and learning outcomes.

Teachers are comfortable with standardized assessments and find it difficult to design fair and objective assessment criteria for diverse products, such as block creations, oral stories, or drawings. This limitation indirectly prevents students from utilizing Howard Gardner's Multiple Intelligences Theory. Gardner's theory asserts that every child possesses various types of intelligences—such as logical-mathematical, kinesthetic, or linguistic intelligence—and should be given the opportunity to demonstrate mastery of the material through their dominant intelligence. When teachers are only comfortable with a single form of assessment, they limit children from expressing understanding in the way that best suits their strongest potential.

Broadly, this review concludes that efforts to improve the quality of inclusive education at SPS Kepulauan Seribu are hindered not by teachers' unwillingness or refusal, but by a lack of procedural capacity and implementational knowledge. Teachers have reached the "concept awareness" stage but fail at the "practical execution" stage. This indicates that the urgent need for teachers is an intervention focused on technical training and the provision of highly practical tools. This finding strongly supports the development of a Play-Based Differentiated Learning Module that must be designed step-by-step to address this knowledge gap, so that teachers' theoretical understanding can be transformed into tangible and sustainable pedagogical actions.

This research was conducted with the aim of analyzing teachers' conceptual understanding and detecting specific challenges in the implementation of differentiated instruction through enjoyable play activities at SPS (Satuan Pendidikan Sejenis) Kepulauan Seribu, Jakarta, as an effort to improve the quality of inclusive education. The results of in-depth interviews conducted with teachers at SPS Kepulauan Seribu show an adequate awareness and understanding of the basic concepts of differentiated instruction. The teachers stated that they understand the importance of differentiated instruction as fulfilling the children's right to learn. This conceptual understanding can be seen from several indicators.

First, the teachers explained differentiated instruction as teaching centered on the individual needs of students, not merely distinguishing tasks based on intelligence levels (smart or less smart). They realize that every child has a unique Learning Profile (learning style, multiple intelligences), Learning Readiness (prior knowledge and skills), and Interests, and that teaching must accommodate all three. This understanding aligns with Carol Ann Tomlinson's view that differentiated instruction is a series of reasonable decisions made by teachers with an orientation toward the learner (Barenthien et al., 2020).

Second, the teachers explained differentiated learning in relation to the principles of fairness and equity in inclusive education. The teachers realize that the learning goals in the classroom are not different for all students, but the methods for achieving those goals must be differentiated. This is supported by the philosophical foundation of Ki Hajar Dewantara's education, which emphasizes the importance of respecting the nature of every child, as well as Urie

Bronfenbrenner's Ecological Systems Theory, which shows that every child's environment and background influence the way they learn. Conceptually, teachers have internalized that differentiated instruction is a form of their professional responsibility to ensure every child, including SSN, receives equal access to quality learning opportunities (Chanda et al., 2024).

However, the acknowledgment of this conceptual understanding is immediately followed by the recognition of significant implementational challenges. Teachers openly stated that they feel uninformed and are still confused about how to translate this theoretical understanding into real practice in the classroom. The dichotomy between what they know (concept) and what they can do (implementation) is a critical finding that must be immediately addressed. This gap indicates that the training or socialization previously received by teachers tended to be theoretical-declarative, rather than procedural-practical (Strohmer & Mischo, 2016).

This gap between understanding and implementation manifests in a series of practical challenges that hinder efforts to improve the quality of inclusive education at SPS Kepulauan Seribu. These challenges are closely related to the four main components of differentiation: Content, Process, Product, and Learning Environment. The first and most fundamental challenge is the teachers' inability to effectively carry out the mapping of students' learning needs. Teachers struggle to use diagnostic assessment data to identify the Readiness, Interests, and Learning Profile (especially learning styles such as Visual, Auditory, and Kinesthetic) of each child. This mapping, which should be a crucial first step, is often skipped or done superficially. Consequently, when teachers plan play activities, they lack strong data to justify differences in treatment or tasks (Jiang, 2022).

In the context of SPS, where the focus of instruction is enjoyable play activities, teachers find it difficult to design activities that are genuinely appropriate for the children's condition and needs. For example, without knowing the child's learning style, it is difficult for teachers to ensure whether the block activity designed (kinesthetic/visual) sufficiently accommodates a child with a dominant auditory learning style who might learn more effectively through verbal instructions or singing. This inability ultimately leads to implementation confusion, as there is no clear data foundation to guide their differentiation decisions (Brown & Englehardt, 2016).

A teacher recounted her experience with the practice of differentiated instruction in her class. There was one student who presented with a concentration deficit, exhibiting frequent movement and high activity levels within the classroom. Unfortunately, there was only one teacher available in the class, which made it challenging for her to divide her attention between the regularly developing students and the student with special needs. Her current approach has been to prioritize accompanying the regularly developing students first, allowing the student with special needs to play freely within the classroom during that time. Once she completes assisting the mainstream students, she then shifts her focus to support the student with special needs. Crucially, the material provided has consistently been the same for both groups. For example, if that day's activity was cutting out a picture of an apple, all students would be expected to perform the identical task. This scenario highlights the gap between the teacher's knowledge and her ability to implement the practice. The teacher failed to modify the learning activity for the students with regular development and the student with special needs.

Upon further investigation, it was discovered that since the beginning of the academic year, no assessment of the needs of each student had been conducted. Students who registered were immediately accepted, with no initial screening of the parents, either through interviews or observation. This situation is attributed to the limited number of early childhood education institutions available on the island. Furthermore, the geographical reality necessitates that inter-island transportation requires boat travel, as the locations of students' residences and the school may be on different islands. This geographical and infrastructural limitation compounds the challenge, making it difficult for schools to adhere to standard enrollment and assessment protocols necessary for effective inclusive practices.

Teachers' confusion when applying differentiation is most evident in the aspect of Process Differentiation. Process refers to how students process or understand the subject matter. In the context of enjoyable learning through play, process differentiation should be realized through: flexible grouping, the use of different aids, and the adjustment of time and level of assistance (scaffolding). Teachers admit how technically difficult it is to manage the class when several groups are working simultaneously with different levels of difficulty or types of play. They are confused about how to divide attention among these groups, how to integrate Students with Special Needs without causing social jealousy or feelings of unfairness from other students, and how to provide the right scaffolding for each child according to their Zone of Proximal Development (ZPD). Lev Vygotsky's ZPD theory demands that teachers provide instruction that is between what the child already knows and what they have not yet mastered. If teachers are unable to manage this process, they tend to revert to classical instruction, which is easier for controlling the class, even if it sacrifices the fulfillment of individual learning needs (Nagase et al., 2021).

The most practical and urgent challenge faced is time management. The implementation of differentiated instruction requires significantly more preparation time, both for compiling lesson plans, preparing diverse materials (Content), and designing flexible assessment instruments (Product). Teachers feel pressured by time constraints,

especially if they teach in a class with a large number of students and a high level of diversity. This condition is exacerbated by limited resources, such as the scarcity of ready-to-differentiate teaching materials and inadequate aids. In conditions of limited time, teachers often sacrifice differentiation, which once again strengthens the findings of this research (Sahan, 2021).

In addition to process, teachers also show confusion in Product Differentiation. Product is the final result that demonstrates student understanding, and it must allow students to demonstrate mastery of the material in a way that suits their interests and strengths. In play activities, the product can be a block creation, an oral story, a drawing, or a dance. Teachers find it difficult to design fair and objective assessment criteria for these highly diverse products. They tend to feel more comfortable with standardized assessments or written tests, which actually contradict the principle of differentiation. This limitation prevents students from using their different Multiple Intelligences (Howard Gardner) to demonstrate their competence (Bjorklund, 2012).

In summary, the results of this study conclude that efforts to improve the quality of inclusive education through differentiated instruction at SPS Kepulauan Seribu are hindered not by unwillingness, but because teachers lack mastery of the implementation methods (procedural competence) and implementational knowledge. Teachers have passed the "concept awareness" stage but failed at the "practical execution" stage. This indicates that the urgent need for teachers is an intervention focused on technical training and the provision of highly practical tools.

Therefore, this finding strongly supports the continuation of the research to the next stage, which is the development of a Play-Based Differentiated Learning Module. This module must be explicitly designed to overcome this gap in implementational knowledge, by providing step-by-step guidance on how to map needs, design time-efficient differentiated play activities (Content and Process), and construct flexible and fair assessments (Product). Through this practice-based intervention, it is hoped that teachers can transform their conceptual understanding into tangible and sustainable pedagogical actions in the classroom, thereby ultimately improving the quality of inclusive education services significantly.

4. CONCLUSION

This study concludes that differentiated play-based learning offers a conceptually robust and contextually appropriate framework for strengthening inclusive early childhood education in Kepulauan Seribu. By integrating children's developmental readiness, interests, and learning profiles into structured yet flexible play activities, the model supports instructional responsiveness while preserving the joyful essence of early childhood learning. The conceptual framework developed in this study provides practical guidance for teachers seeking to improve inclusive practices, especially in settings with limited instructional resources.

In conclusion, teachers conceptually understand that inclusive instruction must indeed be implemented from an early age. This inclusive approach centers instruction on the needs and conditions of the students. Several students in Kepulauan Seribu have various types of learning barriers. The teachers also understand that play-based activity is a frequently implemented activity in schools, recognizing that the world of a child is the world of play. However, the constraint lies in the teachers' ability to design play activities that fully accommodate all student needs and conditions. One of the primary causes of this difficulty is the lack of training attended by teachers in Kepulauan Seribu related to differentiated instruction. Consequently, one method currently used by teachers to provide educational services to students with special needs is through private activities, administered either simultaneously with regular students or after the teacher has finished explaining the activity to the regular students.

Future research should include implementation trials, teacher training modules, and classroom-based evaluations to assess the effectiveness of the model in practice. These steps will be essential in transforming the conceptual model into an operational tool capable of improving learning outcomes and supporting equitable educational opportunities for all young children.

5. ACKNOWLEDGMENTS

The author extend sincere gratitude to all parties who provided invaluable support throughout this research. Particularly thanks for the teachers at SPS Kepulauan Seribu, with the cooperation in providing data, and willingness to share their experiences were crucial to the findings on inclusive education practices in the region. Author also acknowledge the research funding provided by the Faculty of Education at Universitas Negeri Jakarta with contract number of 143/PPK-FIP/KONTRAK-P2M/III/2025.

REFERENCES

- [1] Barentien, J., Oppermann, E., Anders, Y., & Steffensky, M. (2020). Preschool teachers' learning opportunities in their initial teacher education and in-service professional development—do they have an influence on preschool teachers' science-specific professional knowledge and motivation? *International Journal of Science Education*, 42(5), 744–763. <https://doi.org/10.1080/09500693.2020.1727586>
- [2] Bjorklund, D. F. (2012). Children 's Thinking Cognitive Development and Individual Differences. *Wadsworth Cengage Learning*, 669.
- [3] Brown, C. P., & Englehardt, J. (2016). Conceptions of and early childhood educators' experiences in early childhood professional development programs: A qualitative metasynthesis. *Journal of Early Childhood Teacher Education*, 37(3), 216–244. <https://doi.org/10.1080/10901027.2016.1204574>
- [4] Chanda, P., Chirwa, M., Mwale, A. T., Nakazwe, K. C., Kabembo, I. M., & Nkole, B. (2024). Perceived Social Support and Health Care Spending as Moderators in the Association of Traditional Bullying Perpetration with Traditional Bullying and Cyberbullying Victimization among Adolescents in 27 European Countries: A Multilevel Cross-National Study. *International Journal of Environmental Research and Public Health*, 21(7). <https://doi.org/10.3390/ijerph21070863>
- [5] Creswell John and Creswell David. (2023). Research Design, Qualitative, Quantitative and Mixed Methods Approaches. In *SAGE Publications, Inc.: Vol. Sixth Edit* (Issue 1). <https://medium.com/@arifwicaksanaa/pengertian-use-case-a7e576e1b6bf>
- [6] Deiner, P. Low. (2013). *Inclusive early childhood education : development, resources, practice*. Wadsworth Cengage Learning.
- [7] Jiang, L. (2022). Development and Implementation Path of Kindergarten Stem Educational Activities Based on Data Mining. *Computational Intelligence and Neuroscience*, 2022. <https://doi.org/10.1155/2022/2700674>
- [8] Lillard, A. S. (2020). Montessori as an alternative early childhood education. *Early Child Development and Care*. <https://doi.org/10.1080/03004430.2020.1832998>
- [9] Molina, J., Hai, N. V., Cheng, P. H., & Chang, C. Y. (2021). Sdg's quality education approach: Comparative analysis of natural sciences curriculum guidelines between taiwan and colombia. *Sustainability (Switzerland)*, 13(6). <https://doi.org/10.3390/su13063352>
- [10] Mukminin, A., Habibi, A., Prasajo, L. D., Idi, A., & Hamidah, A. (2019). Curriculum reform in indonesia: Moving from an exclusive to inclusive curriculum. *Center for Educational Policy Studies Journal*, 9(2), 53–72. <https://doi.org/10.26529/cepsj.543>
- [11] Nagase, K., Tsunoda, K., & Fujita, K. (2021). Effects of teacher efficacy and attitudes toward inclusive education for children with disabilities on the emotional distress of middle school teachers in Japan. *Cogent Education*, 8(1), 1–15. <https://doi.org/10.1080/2331186X.2021.2007572>
- [12] Şahan, G. (2021). An Evaluation of Pre-Service Teachers' Competences and Views Regarding Inclusive Education. *International Journal of Education and Literacy Studies*, 9(1), 150. <https://doi.org/10.7575/aiac.ijels.v.9n.1p.150>
- [13] Strohmer, J., & Mischo, C. (2016). Does early childhood teacher education foster professional competencies? Professional competencies of beginners and graduates in different education tracks in Germany. *Early Child Development and Care*, 186(1), 42–60. <https://doi.org/10.1080/03004430.2014.985217>

- [14] Taylor Jayne, ., Bond, Emma., & Woods, Margaret. (2013). *Early childhood studies : a multidisciplinary an holistic introduction*. Hodder Education.
- [15] Wickenden, M. (2024). Using participatory and inclusive methodologies to explore inclusive education in Africa. *African Journal of Disability*, 13(Un 2006), 1–10. <https://doi.org/10.4102/AJOD.V13I0.1486>

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

