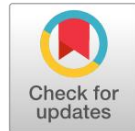


<https://research.adra.ac.id/index.php/ijen/>

P - ISSN: 2988-1579

E - ISSN: 2988-0092



Innovative Learning Design Using the Traditional *Bakiak* Game to Optimize Interpersonal Intelligence in Early Childhood: A Pre-Experimental Study

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ABSTRACT

Background. Interpersonal intelligence is a critical yet often overlooked dimension of early childhood development, as many early childhood education practices continue to emphasize academic readiness over social and interpersonal skills. Traditional games such as *bakiak*, which require coordination and communication among children, offer a culturally grounded medium for fostering this intelligence, yet their use in early childhood education remains limited.

Purpose. This study aims to assess how an innovative learning design based on the traditional *bakiak* game influences children's interpersonal intelligence.

Method. This research employed a quantitative approach using a one-group pretest-posttest design, conducted at TK Khairani Aceh Besar in Lubok Batee Village, Ingin Jaya District, Aceh Besar Regency, from January 15 to April 15, 2026. The participants were 44 children from Group B, selected through purposive sampling. Data were collected using a structured observation checklist and a Likert-scale rating instrument covering cooperation, communication, and empathy, and analyzed using descriptive statistics and a paired sample t-test.

Results. The mean interpersonal intelligence score increased from 56.0 (pretest) to 82.7 (posttest), a gain of 26.7 points, with a moderate-to-high normalized gain score ($g = 0.61$) and an average improvement of 47.6%.

Conclusion. The traditional *bakiak* game positively and significantly enhances the interpersonal intelligence of early childhood learners, particularly in cooperation, communication, and empathy, supporting its integration as a culturally relevant learning strategy in early childhood education.

KEYWORDS

Bakiak, Early Childhood Education, Interpersonal Intelligence, Pre-Experimental, Traditional Game

INTRODUCTION

Early childhood education (ECE) is a critical period for laying the foundation of children's holistic development, encompassing cognitive, social, emotional, and behavioral domains (Grady dkk., 2024). During these formative years, children experience rapid brain development and acquire essential life skills that influence their future learning

Citation: Oktariana, R., Helnita, Meutia, R., Hayati, F., Salsabila, N., Yasira, A., & Putri, A. (2026). Innovative Learning Design Using the Traditional *Bakiak* Game to Optimize Interpersonal Intelligence in Early Childhood: A Pre-Experimental Study. *International Journal of Educational Narrative*, 4(4), 1534-1544.
<https://doi.org/10.70177/ijen.v4i4.4149>

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Received: February 12, 2026

Accepted: July 15, 2026

Published: August 30, 2026



and social functioning. Among these competencies, interpersonal intelligence, defined as the ability to understand others' emotions, intentions, perspectives, and behaviors, and to interact effectively in social contexts, plays a fundamental role in shaping children's capacity to build relationships, collaborate, and adapt within diverse social environments (Dussault & Thompson, 2024). Children who develop strong interpersonal intelligence early in life tend to demonstrate better peer relationships, higher levels of empathy, improved emotional regulation, and greater success in both academic and real-world settings (Denham & Ferrier, 2024).

In the context of 21st-century education, the significance of interpersonal intelligence has become increasingly prominent. Contemporary educational paradigms emphasize not only academic achievement but also a broader set of competencies, including communication skills, collaboration, critical thinking, and social awareness. These competencies are essential for preparing individuals to navigate complex, dynamic, and socially interconnected environments. However, despite this growing emphasis, many early childhood education practices continue to prioritize academic readiness, particularly literacy and numeracy, over the development of social and interpersonal skills. As a result, children may exhibit strong cognitive abilities while experiencing difficulties in cooperation, conflict resolution, and effective communication with peers.

To address this imbalance, play-based learning has been increasingly recognized as an effective and developmentally appropriate approach in early childhood education. Through play-based activities, children can actively engage in learning, explore their environment, and develop social and emotional skills through meaningful interactions with others ("Playfulness and the quality of classroom interactions in preschool," 2024). Through play, children have opportunities to develop social competence through interaction with peers, including cooperation, communication, and the regulation of social behavior. Play also provides engaging and meaningful experiences that can support children's active participation in learning (Smits-van der Nat dkk., 2024).

Within this framework, traditional games offer distinctive pedagogical advantages. Rooted in cultural heritage, traditional games inherently incorporate social values, cooperation, and collective participation. Unlike many modern digital games, which often emphasize individual engagement and screen interaction, traditional games typically require direct physical interaction and real-time communication among participants. One notable example is the traditional Indonesian game *bakiak*, which involves a group of children walking together using shared wooden clogs. This activity demands high levels of coordination, synchronization, communication, mutual understanding, and teamwork. Consequently, *bakiak* serves as a powerful medium for fostering interpersonal intelligence in a culturally meaningful way.

Recent studies have highlighted the effectiveness of culturally based play in enhancing children's social competence. Traditional games have been found to improve cooperation, empathy, leadership, and group awareness, while also strengthening children's cultural identity and sense of belonging (Rahmawati dkk., 2023). More recent evidence corroborates these findings: a cooperative constructive play intervention among children aged 5–6 years produced significant gains in cooperation relative to a control group (Lin dkk., 2024), and traditional *bakiak* play has been shown to improve social-emotional competencies among kindergarten-aged children in an Indonesian classroom setting (Delpiyani dkk., 2025). Traditional games are further recognized as vehicles for transmitting philosophical and cultural values that support holistic problem-solving and character development in early childhood education (Utama dkk., 2025). Despite these benefits, the presence of traditional games in formal educational settings has significantly declined, particularly in the era of rapid digitalization. Educational institutions are increasingly adopting digital tools and

technologies, which, although beneficial in certain aspects, may reduce opportunities for direct social interaction and collaborative learning experiences (Sitanggang dkk., 2025).

This shift has generated ongoing debate among educators and researchers. Some argue that digital learning environments can enhance the development of modern competencies and digital literacy, preparing learners to respond to the technological demands of contemporary society and the workplace (Farias-Gaytan dkk., 2023). In contrast, others emphasize that authentic, face-to-face interactions (Smits-van der Nat dkk., 2024), such as those found in traditional games are irreplaceable in nurturing interpersonal intelligence and social-emotional development (Widodo dkk., 2024). These differing viewpoints underscore a critical gap in empirical research, particularly regarding the effectiveness of traditional game-based learning in early childhood education (Rozana dkk., 2025).

This research is situated within the context of TK Khairani, an early childhood education institution located in Aceh Besar Regency, Indonesia. TK Khairani serves as a representative example of many ECE institutions in developing regions, where educational practices often emphasize academic preparation over holistic child development. Based on preliminary observations, learning activities at TK Khairani tend to be teacher-centered, with limited opportunities for children to engage in interactive, collaborative, and socially rich experiences. Classroom activities are frequently structured around worksheets and individual tasks, which may not sufficiently support the development of interpersonal intelligence.

Furthermore, although the local cultural environment in Aceh Besar is rich with traditional games and communal values, these cultural resources have not been optimally utilized within the classroom setting. Traditional games such as *bakiak*, which have strong potential to promote cooperation and social interaction, are rarely integrated into daily learning activities. This gap between cultural potential and educational practice highlights the need for innovative learning designs that are both contextually relevant and pedagogically effective.

In addition, several contextual factors at TK Khairani further reinforce the importance of this study. These include varying levels of teacher familiarity with play-based learning approaches, limited instructional media that support interactive learning, and the need to align teaching practices with the developmental characteristics of young children. As such, introducing a structured, traditional game-based learning model could provide a practical and impactful solution for enhancing children's interpersonal intelligence in this specific educational setting.

From a theoretical perspective, this study is grounded in social constructivist theory, particularly the work of Vygotsky, which emphasizes that learning occurs through social interaction and collaborative engagement. Within this perspective, the Zone of Proximal Development (ZPD) highlights the importance of interaction with peers and guidance from more knowledgeable others in supporting learners' cognitive and social development (Zhang, 2023). In this context, the *bakiak* game functions as an experiential learning tool that facilitates communication, cooperation, negotiation, and shared problem-solving. This approach is consistent with experiential learning principles, in which children actively engage in concrete experiences, participate in meaningful activities, and reflect on those experiences to construct knowledge (Ranken, 2025).

This study is motivated by the need to strengthen interpersonal intelligence among young children, the limited integration of traditional games into contemporary educational practice, and the need for further empirical evidence on the effectiveness of game-based learning for promoting children's social and emotional development in early childhood education (Masudah & Sudaryanti, 2024). Specifically, this research seeks to explore how a culturally grounded learning model can be implemented and evaluated within the real-world context of TK Khairani in Aceh Besar Regency.

The structure of this paper is as follows: the first section presents the introduction and research background; the second section describes the pre-experimental methodology; the third section presents and discusses the findings; and the final section concludes with key implications for practice and future research, consistent with the common IMRAD structure used in empirical research articles (Moskovitz dkk., 2024).

The main hypothesis of this study is that an innovative learning design based on the traditional bakiak game significantly enhances young children's interpersonal intelligence compared to conventional teaching methods. In addition to this central hypothesis, the magnitude of this effect is also expected to be shaped by contextual moderating factors, such as teacher facilitation, classroom environment, and individual differences among children (Nores dkk., 2023).

Overall, this study aims to evaluate the effectiveness of a traditional game-based innovative learning design in improving interpersonal intelligence among preschool children. It is expected that integrating traditional games into early childhood education can provide developmentally appropriate and socially meaningful learning experiences while preserving cultural relevance. Such an approach is supported by evidence that game-based learning can promote children's social, emotional, motivational, and engagement outcomes in early childhood education (Alotaibi, 2024), while traditional games can contribute to social skills, emotional development, cultural identity, and problem-solving abilities (Ashar dkk., 2024). In this context, the integration of the traditional bakiak game is expected to be both culturally relevant and pedagogically effective, particularly within the institutional context of TK Khairani, Aceh Besar Regency. Therefore, this research contributes to the development of innovative, context-based, and culturally grounded teaching models that support the holistic development of young children and the acquisition of 21st-century competencies (Nesbitt dkk., 2023).

METHOD

This study employed a quantitative approach using a pre-experimental design. Specifically, a one-group pretest-posttest design was applied, in which the same group of children was measured before and after the treatment without a comparison group. Consistent with current methodological guidance, this design is classified as pre-experimental rather than quasi-experimental, since it lacks a control or comparison group (Bierer dkk., 2025). This design is used in educational research when random assignment or the inclusion of a separate control group is not feasible, particularly in natural educational settings where researchers work with existing groups (Gurel & others, 2024).

Research Design

The independent variable in this study is an innovative learning design based on the traditional bakiak game, while the dependent variable is children's interpersonal intelligence. The design used both a pre-test and a post-test administered to the same group of children before and after they received the bakiak game-based learning treatment.

Population and Sample

The population of this study consisted of early childhood students aged 5–6 years enrolled in early childhood education institutions (ECE centers) in TK Khairani Aceh Besar. This age group was selected due to its critical stage in social-emotional development, particularly in interpersonal interaction and cooperation skills. The sample was determined using purposive sampling, with criteria including children aged 5–6 years, actively enrolled in an ECE institution, possessing basic communication skills, and having no significant developmental disorders. The total sample consisted

of 44 children from Group B, all of whom received the bakiak game-based learning treatment and were measured before and after the intervention. This sampling technique is appropriate for educational research requiring specific participant characteristics (Ames dkk., 2023).

Researcher's Role

He researcher acted as the instructional designer, facilitator, and observer throughout the study. The researcher's presence was maintained in a non-intrusive manner to preserve the natural learning environment and minimize potential researcher influence on participants' behavior. Conducting the intervention within the participants' regular educational setting was intended to enhance the ecological validity of the findings by allowing the observed learning activities to reflect authentic classroom experiences (Hartelt & Martens, 2024).

Research Setting and Duration

The study was conducted at TK Khairani Aceh Besar, located in Lubok Batee Village, Ingin Jaya District, Aceh Besar Regency, from January 15 to April 15, 2026, over a 12-week period. Week 1 was allocated for the pre-test, Weeks 2–11 for the treatment phase consisting of 20 sessions conducted twice weekly, and Week 12 for the post-test. Each session lasted approximately 30–45 minutes, with the duration and learning activities adjusted to the developmental characteristics and learning needs of preschool children, consistent with developmentally appropriate and play-based learning principles (Cade, 2023).

Data Collection Techniques

Data were collected through structured observation, used to assess children's interpersonal behaviors during learning activities, focusing on indicators such as cooperation, empathy, and communication (Denham & Ferrier, 2024); a Likert-scale rating instrument with 15 (5 items per aspect $\times$ 3 aspects – cooperation, communication, empathy) items and a 1–4 response scale, measuring cooperation skills, empathy, social communication, and group interaction, consistent with current practices in assessing social-emotional development in early childhood (Mtati & Munnik, 2023) and documentation, including photographs, videos, and field notes to support the observational data.

Instrument Development and Validation

The research instruments were developed through several stages, including the construction of an instrument blueprint based on interpersonal intelligence theory, content validation through expert judgment, pilot testing with a small sample outside the study group, and reliability assessment. Content validity was assessed by three experts in early childhood education and developmental psychology: one ECE lecturer, one developmental psychologist, and one senior kindergarten teacher. Each expert rated the relevance of each item on a four-point scale (1–4), and the Aiken's V coefficient was used to quantify the content validity of the items (Mokhtar dkk., 2023). The instrument was then pilot-tested with participants outside the main study group, and its internal consistency was assessed using Cronbach's alpha. The resulting coefficient was 0.82, indicating good internal consistency (Zhang, 2023), consistent with recommended practices for developing interpersonal-intelligence assessment instruments in early childhood populations (Ismawati dkk., 2023).

Tools and Materials

Tools consisted of observation sheets for interpersonal behavior, rating scale instruments, a digital camera/smartphone for documentation, and a stopwatch to measure activity duration. Materials consisted of traditional bakiak game equipment, namely a wooden board approximately 100–125 cm in length, equipped with 3–5 rubber straps, designed for 3–5 children to play simultaneously. The use of traditional play-based learning tools has been shown to enhance children's social interaction and collaborative skills (Burns dkk., 2024).

Research Procedure

The research procedure consisted of three phases. The preparation phase involved developing learning instruments, validating research tools, and coordinating with the school. The implementation phase involved conducting a pre-test, applying the bakiak game-based learning treatment to the group of children, and observing the sessions. The evaluation phase involved conducting a post-test to measure improvements in interpersonal intelligence.

Data Analysis Techniques

Data analysis was conducted in two stages: descriptive statistics (mean, standard deviation, and percentage), and inferential statistics (normality test using Kolmogorov-Smirnov, homogeneity test using Levene's Test, and hypothesis testing using a paired sample t-test). These analyses were conducted to determine whether the improvement between pretest and posttest scores was statistically significant, following standard procedures for paired-sample comparisons in educational pretest-posttest research (Dammang dkk., 2024).

RESULTS AND DISCUSSION

This study employed a pre-experimental design using a one-group pretest–posttest approach to examine the effectiveness of the traditional bakiak game in enhancing young children's interpersonal intelligence. The results indicate a substantial improvement across all measured aspects after the intervention, as summarized in Table 1.

Table 1. The Result of Pretest–Posttest

No	Aspect	Pretest	Posttest	SD (Pretest)	SD (Posttest)
1	Cooperation	55	83	7.2	6.1
2	Communication	57	84	6.8	5.9
3	Empathy	56	81	7.5	6.4
	Mean	56.0	82.7	—	—

The overall mean score increased by 26.7 points, suggesting a strong positive effect of the intervention.

A normalized gain score was calculated for each aspect: cooperation = 0.62 (moderate-to-high category), communication = 0.63 (moderate-to-high category), and empathy = 0.57 (moderate category). The average gain score is 0.61, indicating a moderate-to-high level of effectiveness, consistent with standard practice for interpreting normalized gain scores in educational intervention research (Christman dkk., 2024).

The percentage improvement for each aspect was cooperation = 50.9%, communication = 47.4%, and empathy = 44.6%. The average increase reached 47.6%, demonstrating a considerable enhancement in children's interpersonal abilities.

A paired sample t-test was conducted to examine the statistical significance of the difference between pretest and posttest scores, obtaining $t = 8.45$, $df = 43$ ($n - 1 = 44 - 1$), $p = 0.000$ ($p < 0.05$).

The result indicates that, along with the substantial mean difference (26.7 points) and consistent improvement across all aspects, the intervention had a statistically significant effect on interpersonal intelligence.

The findings indicate that participation in the traditional bakiak game contributes significantly to the development of children's interpersonal intelligence. The observed improvement in cooperation, communication, and empathy highlights the effectiveness of interactive play in promoting social development. Through collaborative activities, children are encouraged to work together, communicate their ideas and needs, and understand the feelings of their peers. Such experiences create meaningful opportunities for children to practice and strengthen essential social skills in a natural and enjoyable environment. Therefore, traditional bakiak games can serve as an effective learning strategy for fostering interpersonal competence while simultaneously preserving local cultural values and encouraging active participation among young learners.

Interpersonal intelligence refers to the ability to understand and interact effectively with others. In early childhood, this intelligence is reflected in children's ability to establish positive social relationships and interact appropriately with their environment (Fauziaturromah & Listiana, 2023). Within the framework of educational psychology, interpersonal intelligence develops optimally through active social engagement and experiential learning environments.

Play-based learning prioritizes children's active involvement, meaningful interaction, and direct participation in learning experiences. Traditional games, such as bakiak, provide valuable pedagogical benefits by encouraging teamwork, combining physical movement with social interaction, and creating culturally meaningful learning environments. Through collaborative gameplay, children have opportunities to communicate, negotiate roles, coordinate actions, and respond appropriately to their peers. Previous research in early childhood education indicates that group-oriented play can contribute to the development of communication abilities, emotional regulation, social problem-solving skills, and empathy. Furthermore, the level of empathy demonstrated by preschool children is strongly associated with the quality and frequency of their interactions with peers during play. Therefore, traditional games can support holistic social and emotional development (Ersal & Alabay, 2023).

The observed improvements in cooperation, communication, and empathy align with the core components of interpersonal intelligence proposed by Fauziaturromah (Fauziaturromah & Listiana, 2023). The results confirm that social interaction plays a critical role in developing these competencies. The findings are also consistent with social learning principles, where children acquire skills through interaction, imitation, and shared experiences; the bakiak game creates a natural environment for these processes to occur.

Communication showed the highest gain (0.63), likely due to the need for continuous verbal coordination during gameplay, such as giving instructions and synchronizing movements. Cooperation (0.62) and empathy (0.57) developed simultaneously, as children were required to work together while being attentive to their peers' difficulties and needs. With an average gain score of 0.61 and nearly 50% improvement, the intervention can be considered effective both statistically and pedagogically.

Theoretically, this study supports the growing body of literature indicating that interpersonal intelligence can be enhanced through structured play, traditional games have significant educational value, and experiential learning is more effective than passive instruction. Practically, educators are encouraged to integrate traditional games into early childhood curricula, emphasize collaborative learning activities, and use observational assessments to evaluate social development.

CONCLUSION

This study provides robust empirical evidence that the integration of the traditional bakiak game into early childhood learning significantly enhances interpersonal intelligence among young learners. Conducted with Group B children at TK Khairani Aceh Besar, the findings demonstrate consistent and meaningful improvements across the core dimensions of interpersonal intelligence, namely cooperation, communication, and empathy. The quantitative results revealed a substantial increase in the mean score from 56.0 (pretest) to 82.7 (posttest), supported by a moderate-to-high average gain score (0.61). These findings confirm that structured, interactive, and culturally grounded play activities can serve as effective pedagogical tools in early childhood education. The improvement across all measured aspects suggests that the intervention did not only affect a single domain but contributed holistically to children's social competence.

From a theoretical standpoint, the findings reinforce the framework proposed by Fauziaturromah (Fauziaturromah & Listiana, 2023), which emphasizes that interpersonal intelligence develops through active social interaction. The bakiak game, as a collaborative and physically engaging activity, provides a natural context for such interaction, enabling children to practice communication, negotiate roles, and demonstrate empathy in real-time situations. Moreover, this study highlights the importance of incorporating local cultural resources into educational practices. The use of a traditional Indonesian game not only supports cognitive and social development but also fosters cultural awareness and identity among young learners. This dual benefit positions traditional games as valuable assets in contemporary early childhood pedagogy.

Practically, the results suggest that educators, particularly in early childhood settings, should consider integrating cooperative and play-based learning strategies into their daily instruction, as game-based learning has been associated with improvements in children's social and emotional development, motivation, and engagement (Salsabila & Wahyudi, 2024). The success observed in Group B at TK Khairani indicates that even simple, low-cost interventions can yield significant developmental outcomes when implemented systematically. However, while the findings are promising, they are limited to a specific context and sample. Future research is recommended to involve larger and more diverse populations, extend the duration of intervention, and incorporate control groups for stronger causal inference.

In conclusion, the traditional bakiak game is not merely a recreational activity but an effective, evidence-based instructional medium that significantly contributes to the development of interpersonal intelligence in early childhood. Its application in educational settings offers a practical, culturally relevant, and pedagogically sound approach to fostering essential social skills in young learners.

DECLARATION OF AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this manuscript, the author(s) used Grammarly solely to check grammar, spelling, punctuation, and language clarity. Grammarly was not used to generate the research content, data, analysis, interpretation, or conclusions. The author(s) take full responsibility for the accuracy, originality, and integrity of the manuscript.

ACKNOWLEDGMENTS

The authors would like to thank TK Khairani Aceh Besar for its cooperation and support throughout the implementation of this research.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

Author 4: Formal analysis; Methodology; Writing - original draft.

Author 5: Supervision; Validation.

Author 6: Other contribution; Resources; Visuali-zation; Writing - original draft.

Author 7: Other contribution; Visuali-zation; Writing - original draft.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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