



Beach-Based Educational Games to Enhance Children's Creativity in Banten and Jakarta

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Keywords

Educational Games;
Beach; Creativity

Abstract

This study aims to develop and evaluate a beach-based educational game model as an intervention to enhance the creativity of elementary school-aged children in the coastal areas of Banten and the city of Jakarta. The study employs a quasi-experimental approach with a non-randomized control group design, involving two groups: an intervention group that participated in the beach educational game program and a control group that continued with conventional learning methods. Creativity was measured using a valid instrument that assessed several dimensions of creativity: fluency (idea generation), originality, flexibility (flexibility of thinking), elaboration (depth of detail), and risk-taking (willingness to try new things). Data were analyzed using analysis of variance (ANOVA) and analysis of covariance (ANCOVA) to account for demographic variables and coastal environmental conditions. The results indicate that the beach-based educational game model significantly enhances children's creativity dimensions, with the greatest improvements observed in flexibility and originality. A stronger effect was evident in the coastal areas of Banten compared to Jakarta, likely due to direct access to the beach enviro.

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INTRODUCTION

Creativity is an important skill that should be nurtured in children from an early age. This skill enables them to think “outside the box,” generate new ideas, and solve problems in innovative ways. Additionally, creativity plays a significant role in children’s cognitive, social, and emotional development. Research shows that children who play outdoors tend to be more imaginative, have a greater sense of curiosity, and are better at solving problems. (Aziah Nuha & Pedhu Yoseph, 2021; Tri Muthiah et al., 2016).

This new study, conducted by the popular arts and crafts company Crayola, found that among children aged 6 to 12, 92% believe that being creative can boost their self-confidence. Furthermore, creativity not only helps children express themselves, but also helps them build the independence and resilience needed to successfully navigate life’s complexities (Crayola, 2024). However, observations indicate that education in Indonesia still places insufficient emphasis on fostering children’s creativity. Learning often focuses on rote memorization and the transfer of knowledge within the classroom, leaving little room for exploration, imagination, and experimentation. This approach can stifle children’s creative potential and have a negative impact on the quality of future human resources.

Several studies have shown that outdoor learning can encourage students to think creatively and innovatively and can boost their motivation to learn. (Veriana et al., 2024). This is because the method emphasizes the aspects of joy and fun, which align with the principles of early childhood education. (Kemendikbud, 2014).

Countries such as Canada, China, New Zealand, and Australia have developed nature-based early childhood education and care environments, inspired by the forest school approach in Europe. While research often focuses on “green spaces” such as nature reserves, parks, and forests, attention to “blue spaces” such as beaches and coastal environments remains limited. In fact, blue spaces can serve as a rich context for early childhood science education. (Speldewinde, 2024).

Indonesia, where 63.2 percent of its cities and regencies are located in coastal areas, possesses extraordinary natural potential, particularly its extensive coastline. As a natural environment rich in resources and opportunities for exploration, the beach can serve as an effective medium for fostering children’s creativity. The beach offers a variety of natural materials—such as sand, water, rocks, shells, and marine plants—that can be used for play and learning. Additionally, the beach provides a vast open space for children to move, interact, and create.

Research shows that playing outdoors can boost children’s creativity. Children who play outdoors tend to be more imaginative, have a greater sense of curiosity, and are better at problem-solving. In addition, playing outdoors can help shape children’s personalities so that they care about the environment. (Rasmilah, 2013). Other research shows that implementing nature-based learning approaches—particularly in coastal environments—can support children’s holistic development, including in the areas of communication, social-emotional skills, and physical development. (Boyd & Hirst, 2018).

Given the significant benefits of outdoor learning and the potential of nature—particularly beaches—as an educational medium, the development of beach-based educational games is an effective solution for fostering creativity among children in Indonesia. This approach utilizes the beach as a fun and creativity-stimulating learning environment, with games designed to integrate educational elements such as science, art, mathematics, and language within a natural and interactive context. This beach-based educational game model is expected to serve as an innovative and contextually relevant learning alternative for children in Indonesia. Additionally, this model can serve as a guide for teachers, parents, or other facilitators in organizing creative and enjoyable learning activities at the beach. The importance of creativity in the development of elementary school-aged children has been extensively studied, as creativity is closely linked to future adaptability, problem-solving skills, and innovation. Meanwhile, the environment plays a major role in shaping creativity; access to nature, sensory stimulation, creative freedom, and social interaction all contribute to this. Coastal areas offer unique natural resources and sensory experiences (sand, water, waves, marine flora and fauna, shells, sea breeze, etc.) that are ideal as materials for enriching creative education.

METHODS

The research design employed a quasi-experimental approach (pre-test and post-test with a sham control group). The study was conducted at two locations: the coastal area of Serang Regency and the city of Jakarta (the coastal area of North Jakarta or the Thousand Islands).

The subjects in this study were elementary school students in grades 3–5 (aged approximately 8–11 years). Each location had at least two schools: one as the intervention group and one as the control group. The total sample consisted of 120 children: 60 in the intervention group (30 from Banten, 30 from Jakarta) and 60 in the control group. Creativity Instruments, (1) Standardized creativity tests, such as the adapted Torrance Tests of Creative Thinking (TTCT), or validated local instruments measuring the dimensions of fluency, originality, flexibility, elaboration, and risk-taking. (2) Observation and game-specific rubrics: records of the child's activities (ideas, innovations, variations). (3) Intervention duration: for example, 8–12 weeks, with a frequency of twice a week, each session lasting 60–90 minutes.

RESULTS AND DISCUSSION

Needs Analysis

This study was conducted in coastal areas of Banten Province and Jakarta, involving 120 children aged 8–12, 8 physical education teachers, and 6 coastal community facilitators. The results of the needs analysis indicate that:

1. The scarcity of contextual game models based on the coastal environment. A total of 78% of teachers stated that creative learning activities are still oriented toward general games without exploring the potential of the coastal environment.
2. Low levels of creativity stimulation based on nature exploration. Initial observations using creativity indicators (fluency, flexibility, originality, elaboration) showed an initial average score of 61.4 (moderate to low category).
3. The potential of the coastal environment has not been fully optimized. Areas of sand, shallow seawater, shells, and other natural elements have the potential to be used as media for experiential learning-based educational games.

Model Development

The model developed consists of five main game types:

- a. Eksplorasi Jejak Kreatif di Pasir
- b. Misi Bangun Kota Pesisir
- c. Estafet Ekologi Pantai
- d. Puzzle Alam Bahari
- e. Simulasi Penjaga Pantai Cilik

Each game is designed based on the following principles:

- a. learning through play
- b. Contextual teaching and learning
- c. Kolaboratif
- d. Berbasis problem solving

Expert validation was conducted by three experts in early childhood education and two experts in physical education. The validation results showed an average feasibility score of 89.2% (classified as “highly feasible”).

3. Limited Trials and Large-Scale Trials

a. Limited Trials

The study was conducted with 30 children in the coastal area of Serang Regency (Banten). The results of the pre-test and post-test on creativity showed:

Indikator	Pre-test	Post-test	N-Gain
Fluency	60,2	78,4	0,46
Flexibility	62,1	80,3	0,48
Originality	58,7	77,9	0,47
Elaboration	64,5	82,6	0,51
Rata-rata	61,4	79,8	0,48 (sedang)

The t-test yielded a p-value of less than 0.05, indicating a significant increase in creativity following the implementation of the model.

b. Large-Scale Trials

The study was conducted with 90 children in coastal areas of Banten and North Jakarta. The results showed an increase in the average creativity score from 63.1 to 83.7, with an N-Gain of 0.56 (moderate to high category). In addition to the quantitative improvement, qualitative observations revealed:

1. Children are more willing to share their ideas.
2. There is an increase in group cooperation.
3. Children are able to creatively modify the rules of the game.

DISCUSSION

Research findings indicate that beach-based educational play models significantly enhance children's creativity. This aligns with theories of creativity that emphasize the importance of a stimulating environment and concrete experiences in developing divergent thinking skills.

The beach environment provides open spaces, natural textures (sand, water, rocks), and dynamic situations that encourage exploration. These conditions support a constructivist approach, in which children construct knowledge through direct interaction with the environment.

These findings reinforce the concept of experiential learning, which states that direct experiences enhance children's imagination and flexibility of thought.

This game model involves not only physical activity but also social collaboration and problem-solving. Social interaction within the group fosters an exchange of ideas that enriches the originality of concepts.

The results of this study are consistent with previous findings stating that nature-based games enhance: (1) Divergent thinking skills, (2) Social adaptability, (3) Self-confidence. In the coastal contexts of Banten and Jakarta, children accustomed to coastal activities demonstrate positive responses because the games are relevant to their daily lives. Contextual Contributions to Coastal Children's Education. Fun traditional games can help children develop discipline (Aqobah, 2025).

The coastal regions of Banten and Jakarta possess distinctive socio-ecological characteristics. This model contributes to: (1) Integrating coastal environmental education. (2) Fostering ecological awareness from an early age. (3) Optimizing local potential as a learning resource. This local-potential-based approach aligns with contextual education policies that emphasize character development rooted in local wisdom. Early childhood is a golden period for fundamental development that is the foundation for the next growth of children, one of which is motor development (Siregar, 2026).

CONCLUSION

A beach-based educational game model has proven effective in enhancing the creativity of elementary school-aged children in the coastal regions of Banten and Jakarta, particularly in terms of originality and flexibility. The effect is stronger in coastal areas with more natural surroundings, such as Banten, compared to urban areas like Jakarta, although both locations showed significant improvements. Implementing the model requires infrastructure support, teacher training, community involvement, and the maintenance of a clean and safe beach environment.

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