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ORIGINAL RESEARCH ARTICLE

Exploration of the Application of Loose Parts Media in Developing STEAM-Based Early Childhood Creativity at TKS Muslimat NU VI Pamekasan

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ABSTRACT

Developing creativity in early childhood requires a learning approach that provides space for exploration, imagination, and meaningful problem solving. This study aims to explore the implementation of STEAM-based loose parts media (Science, Technology, Engineering, Arts, and Mathematics) in developing the creativity of early childhood at TKS Muslimat NU VI Pamekasan. The research employed a qualitative approach with a case study design. The data sources consisted of twenty-two Group B children aged 5--6 years, three classroom teachers, and the school principal. Data collection techniques included participatory observation, in-depth interviews, and documentation of play activities. Data were analyzed using the Miles and Huberman model through the stages of data reduction, data display, and conclusion drawing. The validity of the data was checked through source and technique triangulation. The findings show that the implementation of STEAM-based loose parts media is able to enrich four indicators of creativity, namely fluency, flexibility, originality, and elaboration. The children demonstrated high enthusiasm when arranging, assembling, and designing works using natural materials such as stones, twigs, shells, seeds, and recycled objects. The STEAM approach encourages children to integrate scientific skills, simple technology, engineering, art, and mathematics in one integrated play experience. The study concludes that STEAM-based loose parts media is effectively applied as a creative learning strategy that is in line with the learning characteristics of early childhood.

Keywords: Loose Parts; STEAM; Creativity; Early Childhood; Innovative Learning

ABSTRAK

Pengembangan kreativitas pada anak usia dini membutuhkan pendekatan pembelajaran yang menyediakan ruang untuk eksplorasi, imajinasi, dan pemecahan masalah yang bermakna. Penelitian ini bertujuan untuk mengeksplorasi implementasi media loose parts berbasis STEAM (Sains, Teknologi, Teknik, Seni, dan Matematika) dalam mengembangkan kreativitas anak usia dini di TKS Muslimat NU VI Pamekasan. Penelitian ini menggunakan pendekatan kualitatif dengan desain studi kasus. Sumber data terdiri dari dua puluh dua anak kelompok B berusia 5-6 tahun, tiga guru kelas, dan kepala sekolah. Teknik pengumpulan data meliputi observasi partisipatif, wawancara mendalam, dan dokumentasi aktivitas bermain. Data dianalisis menggunakan model Miles dan Huberman melalui tahapan reduksi data, penyajian data, dan penarikan kesimpulan. Validitas data diperiksa melalui triangulasi sumber dan teknik. Hasil penelitian menunjukkan bahwa implementasi media loose parts berbasis STEAM mampu memperkaya empat indikator kreativitas, yaitu kelancaran, fleksibilitas, orisinalitas, dan elaborasi. Anak-anak menunjukkan antusiasme yang tinggi ketika mengatur, merakit, dan mendesain karya menggunakan bahan-bahan alami seperti batu, ranting, cangkang, biji-bijian, dan benda-benda daur ulang. Pendekatan STEAM mendorong anak-anak untuk mengintegrasikan keterampilan ilmiah, teknologi sederhana, teknik, seni, dan matematika dalam satu pengalaman bermain yang terpadu. Studi ini menyimpulkan bahwa media bagian-bagian lepas berbasis STEAM efektif diterapkan sebagai strategi pembelajaran kreatif yang sejalan dengan karakteristik pembelajaran anak usia dini.

Kata kunci: Loose Parts; STEAM; Kreativitas; Anak Usia Dini; Pembelajaran Inovatif

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1. INTRODUCTION

Early childhood education (ECE) is a fundamental phase in shaping a child's personality, character, and thinking abilities. At this age range, children are in a golden age where all aspects of development—physical-motor, cognitive, language, social-emotional, and artistic—grow rapidly. One aspect of development that is a primary focus in early childhood education is creativity. Creativity is not only related to the ability to produce works of art but also reflects the child's ability to think originally, flexibly, and innovatively in solving daily problems.

Reality in the field shows that the development of creativity in early childhood has not been fully implemented optimally in many educational institutions. Learning still tends to be teacher-centered, with the dominance of using worksheets, coloring provided images, and tracing lines. Such learning patterns place children as passive recipients and provide less room for exploration, imagination, and expression, which are the core of children's play experiences. In fact, the principle of learning for young children emphasizes that children learn through play and through direct interaction with concrete objects in their environment.

Amidst these concerns, the loose parts-based learning approach has gained wide attention as a promising alternative. Loose parts are loose, open-ended materials that do not have a single

function so they can be used, moved, assembled, and combined by children according to their imagination. This concept was first introduced by Simon Nicholson through the theory of loose parts, which states that the level of creativity and ability to discover in an environment is directly proportional to the number and variety of open-ended objects within it. Materials such as stones, shells, twigs, dry leaves, buttons, wood pieces, fabric scraps, seeds, and recycled objects are examples of loose parts that are easily accessible and environmentally friendly.

In addition to the loose parts approach, contemporary learning also emphasizes the importance of integrating disciplines through the STEAM approach (Science, Technology, Engineering, Arts, and Mathematics). The STEAM approach encourages children not only to master knowledge concepts separately but to combine them in a holistic and contextual learning experience. When loose parts are combined with the STEAM framework, children have a broad space to experiment scientifically, use simple technology, design simple constructions, express themselves through art, and at the same time develop basic mathematical skills such as measuring, sorting, and classifying.

Taman Kanak-Kanak Swasta (Private Kindergarten) Muslimat NU VI Pamekasan is one early childhood education institution that strives to develop a learning model based on natural materials and surrounding objects. Based on a preliminary study conducted by the researchers, this institution has begun utilizing loose parts in children's play activities; however, its application still varies among teachers and has not been fully integrated with the STEAM approach systematically. Therefore, an in-depth study is needed on how the practice of implementing STEAM-based loose parts media is carried out and how it impacts the development of children's creativity.

Based on this background, this research has three main objectives. First, to describe the learning planning based on loose parts media with the STEAM approach at TKS Muslimat NU VI Pamekasan. Second, to describe the implementation of learning and children's interactions with loose parts media. Third, to analyze the development of children's creativity that emerges from the application of this approach. The results of this study are expected to provide practical contributions for ECE teachers in designing more meaningful learning, while enriching the academic treasury regarding creative learning practices based on natural and surrounding materials.

2. LITERATURE REVIEW

Loose Parts Media

Loose parts is a term referring to materials or objects that can be moved, manipulated, combined, and transformed freely by children. This concept was popularized by Simon Nicholson in 1971 through an article titled "How NOT to Cheat Children: The Theory of Loose Parts." Nicholson argued that an environment rich in variables or open-ended materials will encourage creativity and the ability to discover in its users, including children. Loose parts materials can be categorized into natural materials (stones, twigs, leaves, shells, seeds), manufactured materials (buttons, fabric scraps, beads, straws), and recycled materials (cardboard, bottle caps, tissue rolls).

The use of loose parts media in early childhood education has several advantages. First, their open-ended nature allows children to use objects in various ways according to their imagination so there is no single correct answer. Second, loose parts invite children to interact actively, explore, and discover new concepts for themselves. Third, these materials are easily obtained from the surrounding environment, making them economical and environmentally friendly. Fourth, loose parts support various aspects of child development in an integrated manner, including cognitive, fine motor, social, and artistic aspects.

The STEAM Approach in Early Childhood Education

STEAM is an acronym for Science, Technology, Engineering, Arts, and Mathematics. This approach was developed from STEM by adding the Arts element to address the need for more holistic and creative learning. In the context of early childhood education, STEAM is adapted as a way to integrate learning experiences that involve scientific curiosity, the use of simple technology, engineering problem-solving, artistic expression, and mathematical reasoning in one meaningful activity.

The application of STEAM in early childhood is not intended to teach complex concepts but to foster attitudes and basic skills relevant to these five domains. For example, when a child constructs using twigs and stones, they are conducting a science experiment (observing balance), using simple technology (measuring tools, adhesives), practicing engineering (building a sturdy structure), expressing art (choosing colors and shapes), and applying mathematics (counting, measuring, grouping). This approach aligns with early childhood learning principles that emphasize direct, integrative, and contextual experience.

Creativity in Early Childhood

Creativity is the ability to produce ideas, thoughts, or works that are new and meaningful to oneself and the environment. In early childhood, creativity can be observed through four main indicators proposed by Guilford and Torrance, namely fluency, flexibility, originality, and elaboration. Fluency relates to the ability to generate many ideas; flexibility relates to the ability to generate ideas from various perspectives; originality refers to the ability to produce unique ideas; and elaboration is the ability to develop an idea into something richer and more detailed.

The development of creativity in early childhood is greatly influenced by a learning environment rich in stimulation, freedom of expression, the teacher's role as a facilitator, and the availability of flexible media. Learning that positions the child as an active subject, provides opportunities to make choices, and appreciates the diversity of work results has proven effective in fostering creativity. In this context, STEAM-based loose parts media is relevant as a creative learning strategy.

3. RESEARCH METHODS

This research uses a qualitative approach with a case study design. The choice of a qualitative approach is based on the effort to understand the practice of implementing STEAM-based loose parts media in depth, contextually, and comprehensively. A case study was chosen because the research focus is limited to one educational institution, namely TKS Muslimat NU VI Pamekasan, allowing for an exploration of the details of the learning process in the field.

The research subjects consisted of twenty-two Group B children aged 5--6 years, three classroom teachers who were the learning implementers, and the school principal as the policy maker at the institution. Subject selection used purposive sampling with criteria of direct involvement in loose parts-based learning activities. The research was conducted over three months, from January to March 2026, covering the stages of planning, implementation, and learning reflection.

Data collection techniques consisted of three methods. First, participatory observation was conducted to directly observe children's interactions with loose parts media and how the STEAM approach was applied by teachers. Second, in-depth interviews were conducted with teachers and the school principal to explore their understanding, planning, and reflections on learning practices. Third, documentation was used to collect activity photos, children's work results, daily lesson plans (RPPH), and teacher reflection notes.

Data analysis used the Miles and Huberman interactive model consisting of three stages: data reduction, data display, and conclusion drawing. Data reduction was carried out by selecting, focusing, and simplifying field data. Data was presented in the form of descriptive narratives, tables, and thematic categorization. Conclusions were drawn gradually by verifying findings until a complete conclusion was obtained. The validity of the data was checked using source triangulation and technique triangulation to ensure the credibility of the findings.

4. RESULTS AND FINDINGS

Learning Planning Based on Loose Parts with the STEAM Approach

Observation and interview results show that learning planning at TKS Muslimat NU VI Pamekasan begins with the preparation of weekly themes that raise contextual topics such as "My Environment," "Animals Around Me," and "Plants in the Schoolyard." These themes are then elaborated in daily lesson plans (RPPH) which contain development indicators from six aspects, learning outcomes, play activities, and assessment. At the planning stage, teachers collaboratively map the types of loose parts to be provided for each theme and associate them with the STEAM domains.

For example, on the theme "Plants in the Schoolyard," the teacher prepares twigs, dry leaves, seeds, stones, used plastic cups, and bottle caps. These materials are organized in open trays that are easily

accessible to children. The STEAM aspects are realized through activities: observing seed structure (Science), using magnifying glasses and simple scales (Technology), designing a miniature garden from twigs and stones (Engineering), arranging leaf color patterns (Arts), and counting and grouping seeds by size (Mathematics).

Based on interviews, teachers revealed that collaborative planning provides flexibility to share ideas. One teacher stated: "We discuss every weekend to choose materials that are safe and interesting for the children. We also prepare open-ended questions so children are encouraged to think, not just follow instructions." This shows that learning planning does not only focus on materials but also on questioning strategies that stimulate children's creative thinking processes.

Table 1. Classification of Loose Parts Media Used at TKS Muslimat NU VI Pamekasan

Category	Examples of Materials	STEAM Domain Developed
Natural materials	Stones, twigs, dry leaves, shells, seeds	Science, Engineering, Mathematics
Manufactured materials	Buttons, beads, straws, fabric scraps	Arts, Mathematics, Engineering
Recycled materials	Cardboard, bottle caps, tissue rolls, plastic pieces	Engineering, Technology, Arts
Supporting tools	Magnifying glasses, simple scales, tape measures	Science, Technology, Mathematics

Implementation of Learning and Children's Interaction with Loose Parts Media

The learning implementation takes place through a daily routine consisting of opening activities, core activities with four play centers (natural materials center, block center, art center, and role-play center), rest time, and closing activities. The application of STEAM-based loose parts is most apparent during core activities, especially in the natural materials center, block center, and art center. The teacher acts as a facilitator who provides scaffolding before, during, and after play, and asks open-ended questions to expand children's exploration.

In one observation session, children were asked to design an "insect house" from various available loose parts. Children were free to choose materials, determine size, and use simple tools. Some children arranged twigs into triangular structures, while others combined bottle caps with shells to make a roof. The teacher did not give a single instruction but asked questions like "How can we make sure this house doesn't collapse?", "What material is best for the door?", or "How many shells do you need?". These questions guided children towards scientific, engineering, and mathematical thinking processes without losing their freedom of expression.

Observations showed that children not only played individually but also built productive social interactions. Some children collaborated to design a single work together, discussing material choices and exchanging ideas. This social aspect is an added value of implementing STEAM-based loose parts, as children learn to negotiate, accept differences of opinion, and appreciate friends' contributions. This aligns with the constructivist learning principle that knowledge is built through social interaction.

Observed Development of Children's Creativity

Based on observations and analysis of work documentation, it was found that the four indicators of creativity—fluency, flexibility, originality, and elaboration—emerged in various forms of children's behavior and work. The manifestations of these creativity indicators are presented in Table 2.

Table 2. Manifestations of Children's Creativity Indicators in STEAM-Based Loose Parts Learning

Creativity Indicator	Operational Definition	Observed Child Behavior Example
Fluency	Ability to generate many ideas or answers	Children mention various functions of a single type of loose part (e.g., stone as a path, roof, decoration, counting tool)
Flexibility	Ability to generate ideas from various perspectives	Children change the form of their work from a house to a vehicle when given a new challenge by the teacher
Originality	Ability to produce unique and rarely appearing ideas	Children combine twigs, shells, and bottle caps to create a unique "rain-making machine"
Elaboration	Ability to develop an idea to be richer and more detailed	Children add details to their work, e.g., adding a door, window, and stairs to the insect house

The fluency indicator was evident when children were given one type of loose parts material and asked to mention its possible functions. In a question-and-answer session, some children were able to mention five to eight possible functions for a stone, ranging from stone as a base, decoration, counting tool, to "food for dolls." This shows that children are able to generate many ideas in a short time, which is a hallmark of thinking fluency.

The flexibility indicator was evident when children quickly changed their direction of thought when the teacher gave a new challenge. For example, when the teacher asked the children to change a "house" into a "vehicle," the children seemed able to shift perspective by moving twigs, adding wheels from bottle caps, and changing the orientation of their work. This flexibility is an important skill that supports children's ability to adapt to new situations.

The originality indicator was visible from the emergence of unique works that differed from their peers' works. One child created a work he called a "rain-making machine" by combining twigs as a frame, shells as a container, and bottle caps as drive wheels. This work was not instructed by the teacher but was purely the child's initiative after observing the rain fall the previous day. This shows a process of transferring experience into a symbolic, distinctive work.

The elaboration indicator was evident when children expanded or detailed their existing work. A child who made a house from twigs then added a small door from a wood piece, windows from buttons, and a staircase from cut straws. Adding these details shows that the child was not satisfied with the initial idea but continued to explore and enrich their ideas. This experience aligns with the theory that a stimulation-rich environment can encourage children's elaborative abilities.

Discussion

The research findings affirm that loose parts media and the STEAM approach have a strong philosophical compatibility. Loose parts, with their open-ended nature and lack of a single function, encourage children to think divergently, i.e., the ability to generate multiple alternative solutions. Meanwhile, STEAM encourages the integration of cross-disciplinary skills that enrich children's learning experiences. When combined, children gain broad exploration space along with complete conceptual guidance.

Furthermore, the synergy of loose parts and STEAM addresses the criticism of ECE learning which is still predominantly textual. Children do not only learn through books and worksheets but through direct interaction with real objects. This manipulative experience aligns with Piaget's theory of cognitive development that early childhood is in the preoperational stage, which highly requires concrete and symbolic experiences. Similarly, Vygotsky's theory of the zone of proximal development, where the teacher's role as a facilitator through open-ended questions helps children reach their maximum potential.

The application of STEAM-based loose parts media at TKS Muslimat NU VI Pamekasan also shows that creative learning does not require high costs. Most of the materials used come from the surrounding environment and recycled objects. This is good news for ECE institutions with limited budgets, while also supporting sustainable, environmentally friendly education. Additionally, parental involvement can be enhanced by inviting them to help provide loose parts materials from home, thus building a learning collaboration between school and family.

Nevertheless, several reflective notes were found. First, not all teachers have equal confidence in asking open-ended questions. Some teachers tend to revert to instructive patterns when children appear to be struggling. This implies the importance of ongoing training for teachers on open learning strategies. Second, documentation of the learning process is still a challenge; most documentation focuses on the results of the work, while the child's thinking process has not been systematically recorded. The use of pedagogical documentation techniques could be an alternative to improve this practice in the future.

5. CONCLUSION AND SUGGESTIONS

This research concludes that the application of STEAM-based loose parts media at TKS Muslimat NU VI Pamekasan is implemented through three main stages: collaborative planning that integrates weekly themes with STEAM domains, center-based learning implementation with the teacher as a facilitator of open-ended questions, and reflection focusing on documenting children's work and thinking processes. The application of this strategy proved to enrich the four indicators of children's creativity—fluency, flexibility, originality, and elaboration—through meaningful play experiences.

The synergy of loose parts with the STEAM approach gives children the opportunity to integrate scientific skills, simple technology, engineering, art, and mathematics in one integrated activity.

This research recommends that other ECE institutions adopt a similar approach by adjusting the availability of materials in their respective environments, strengthening teacher competence in asking open-ended questions, and improving the quality of learning process documentation. Further research is suggested to test the effectiveness of this approach with quantitative experimental designs and a broader subject scope\.

6. REFERENCES

Afriyanti, F., & Kurniawati, L. (2020). Pengembangan kreativitas anak usia dini melalui bermain dengan bahan alam. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 4*(2), 711--718. https://doi.org/10.31004/obsesi.v4i2.476

Beghetto, R. A., & Kaufman, J. C. (2014). Classroom contexts for creativity. *High Ability Studies, 25*(1), 53--69. https://doi.org/10.1080/13598139.2014.905247

Casey, T., & Robertson, J. (2019). *Loose parts play: A toolkit* (2nd ed.). Inspiring Scotland.

Daly, L., & Beloglovsky, M. (2015). *Loose parts: Inspiring play in young children*. Redleaf Press.

Daly, L., & Beloglovsky, M. (2018). *Loose parts 3: Inspiring culturally sustainable environments*. Redleaf Press.

Fitriani, R., & Adawiyah, R. (2018). Pengembangan kreativitas anak usia dini melalui pendekatan saintifik. *Jurnal Pendidikan Anak Usia Dini Undiksha, 6*(2), 79--88. https://doi.org/10.23887/paud.v6i2.15182

Guilford, J. P. (1967). *The nature of human intelligence*. McGraw-Hill.

Gull, C., Bogunovich, J., Goldstein, S. L., & Rosengarten, T. (2019). Definitions of loose parts in early childhood outdoor classrooms: A scoping review. *International Journal of Early Childhood Environmental Education, 6*(3), 37--52.

Hayati, N., & Hosnan, M. (2021). Pendekatan STEAM dalam pembelajaran anak usia dini: Tinjauan konseptual. *Jurnal Pendidikan Anak, 10*(1), 25--34. https://doi.org/10.21831/jpa.v10i1.39014

Henriksen, D., Mishra, P., & Mehta, R. (2015). Novel, effective, whole: Toward a NEW framework for evaluations of creative products. *Journal of Technology and Teacher Education, 23*(3), 455--478.

Jeffers, O. (2019). Loose parts and the development of creativity in early years settings. *Early Years Educator, 21*(4), 24--28.

Kemendikbud. (2014). *Peraturan Menteri Pendidikan dan Kebudayaan Nomor 137 Tahun 2014 tentang Standar Nasional Pendidikan Anak Usia Dini*. Kementerian Pendidikan dan Kebudayaan Republik Indonesia.

Munandar, U. (2016). *Pengembangan kreativitas anak berbakat*. Rineka Cipta.

Nicholson, S. (1971). How not to cheat children: The theory of loose parts. *Landscape Architecture, 62*(1), 30--34.

Permadani, K. G., & Pohan, A. E. (2020). Penerapan pendekatan STEAM pada pendidikan anak usia dini di Indonesia. *Jurnal Caksana: Pendidikan Anak Usia Dini*, *3*(2), 158--166. https://doi.org/10.31326/jcpaud.v3i2.793

Piaget, J. (1972). *The psychology of the child*. Basic Books.

Rahayu, S., & Suryana, D. (2021). Efektivitas penggunaan loose parts terhadap kreativitas anak usia 5--6 tahun. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, *5*(2), 1413--1422. https://doi.org/10.31004/obsesi.v5i2.928

Sousa, D. A., & Pilecki, T. (2018). *From STEM to STEAM: Brain-compatible strategies and lessons that integrate the arts* (2nd ed.). Corwin Press.

Sugiyono. (2019). *Metode penelitian kualitatif*. Alfabeta.

Torrance, E. P. (1974). *Torrance tests of creative thinking: Norms-technical manual*. Personnel Press.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Yuliani, N. S. (2017). *Konsep dasar pendidikan anak usia dini*. Indeks.