Effectiveness of Project Based Learning Model with Loosepart Media in Improving Early Children's Creativity

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Abstract: This study explores the effectiveness of the Project-Based Learning (PBL) model, which encourages children to independently construct their learning and produce tangible outcomes. The PBL approach, particularly when combined with Loose Parts media, has been suggested to enhance creativity in early childhood, aligning with Sharp's assertion that creative projects foster enjoyable and creative learning experiences. The purpose of this research is to examine the planning, implementation, and learning outcomes of early childhood education through the development of a PBL model with Loose Parts media and its impact on children's creative abilities. This study employs a Research and Development (R&D) methodology, following the Borg and Gall model, utilizing a mixed-method approach within a sequential exploratory design. Data collection was conducted through observations, interviews, questionnaires, and tests. Descriptive analysis was used to evaluate the accuracy, effectiveness, and appeal of the learning models and media. The participants included teachers and children from early childhood education institutions (PAUD) in Serengan District, Surakarta City. The findings indicate that the PBL model with Loose Parts media is more effective in enhancing creativity in early childhood compared to conventional learning methods, as evidenced by test results showing higher creative abilities among children exposed to the PBL model. This suggests that the developed PBL model with Loose Parts media is a more effective approach for fostering creativity in early childhood education in Surakarta.

Keywords: Effectiveness, project-based learning, loosepart, creativity

1.   Introduction

Early childhood education (PAUD) in Indonesia is designed to support the development of children aged 0 to 6 years, focusing on various aspects such as religious, physical/motor, language, socio-emotional, cognitive, and artistic growth. These formative years are often referred to as the "golden age," characterized by a "sensitive period" that occurs only once, making early education crucial for maximizing children's potential. Over the years, PAUD has become an essential part of education before entering elementary school, leading to increased government efforts to improve the quality of these institutions (Imamah & Muqowim, 2020).

The learning process is a critical indicator of educational success, requiring careful planning, including the selection of appropriate learning media. An effective learning process is interactive, engaging, and meaningful, shaped by various factors such as teachers' understanding of student characteristics, student-centered teaching methods, adequate learning facilities, and the availability of engaging learning resources. Learning media, in particular, play a vital role in stimulating children's thoughts, emotions, and abilities, thereby enhancing the overall learning experience (Savira & Suharsono, 2013).

With the rapid advancement of science and technology, there is a growing need to develop learning media that are creative, interactive, and modern. The primary benefit of learning media is to facilitate interaction between teachers and children, making learning activities more effective and efficient. For early childhood, learning media extend beyond teacher-designed tools to include any object that holds educational value and benefits (Erdiyanti & Syukri, 2021).

One important aspect of early childhood education in Indonesia is the development of creativity through artistic activities. However, implementing learning that aligns with the developmental characteristics of preschool children presents unique challenges. Often, learning focuses too heavily on cognitive domains, such as reading, writing, and

arithmetic, while neglecting other critical aspects of development. Daniel Goleman emphasizes that emotional intelligence accounts for 80% of a person's success in society, while cognitive intelligence contributes only 20% (Alsukayti & Singh, 2022).

To foster comprehensive development, early childhood education must address all five developmental aspects and provide opportunities for creativity. Creativity is essential for maximizing human potential, enhancing well-being, and driving positive social change. It involves the ability to generate new ideas, solve problems uniquely, and envision various possibilities (Maulana & Mayar, 2019).

Children with high creative self-efficacy are better equipped to handle stress and feel more confident about their future. Creativity in children develops through cognitive processes fostered by social interaction, play, and imagination. However, the current development of creativity in early childhood is not optimal, often due to monotonous activities and a lack of responsiveness from parents and teachers. Creativity is frequently undervalued, with the focus at school and home often placed on traditional academic skills like reading, writing, and arithmetic (Chen & Cheng, 2023).

The learning models and media used in schools significantly impact the development of children's creativity. To cultivate creativity, children must be provided with diverse learning resources that stimulate creative thinking. However, the use of such resources in schools remains limited, with an overreliance on routine worksheets and a lack of innovative learning approaches (Norhikmah et al., 2022). This research aims to develop a project-based learning model using loose parts as a medium, designed to make teaching and learning activities more engaging and enjoyable for children. The outcome will be an instructional module on project-based learning with loose parts, implemented in early childhood education to enhance children's creativity during the learning process.

2. Methodology

The type of research used is applied research using Research and Development (R&D) or research and development methods. The research design is using research and development (Research and Development) using the Borg and Gall models. Data collection techniques through interview guidelines, expert validation guidelines and observation sheets. Data analysis techniques using preliminary study data analysis, product validation analysis and product effectiveness analysis. The population frame of the study was teachers from varoius Early Childhood Education (PAUD) institution including PAUD Negeri Kartini Danukusuman, TK Al-Islam 1, TK Al Islam 5, and TK Pertiwi Surakarta. The needs analysis conducted includes interviews with teachers, observation of learning activities, and questionnaire-based needs analysis.

3. Results and Discussion

3.1 Needs of Teachers and Students for the Development of a Project-Based Learning Model with Loose Parts Media in the Creativity Skills of Early Childhood

The researcher conducted a comprehensive needs analysis to inform the development of the instructional model. This analysis aimed to gather insights on the type of learning model required by teachers and young children. The needs analysis employed multiple methods, including interviews with teachers, classroom observations, and the distribution of a needs analysis questionnaire to teachers in several Early Childhood Education (PAUD) institutions, such as PAUD Negeri Kartini Danukusuman, TK Al-Islam 1, TK Al-Islam 5, and TK Pertiwi Surakarta. These methods were chosen to obtain a well-rounded understanding of the current state of creative development among children and the instructional practices in use.

The interviews revealed several key findings. At PAUD Negeri Kartini Danukusuman, teachers noted that the existing teaching methods were relatively basic and lacked the integration of cooperative learning models with specific media aids. At TK Al-Islam 1 Surakarta, teachers expressed concerns that the current learning approach was not optimal, emphasizing the need for a new instructional model to better foster creativity in children. Similarly, teachers at TK Al-Islam 5 Surakarta highlighted the importance of developing a project-based learning model using loose parts, which aligns with the benefits of group-oriented learning tailored to children's interests, talents, and developmental stages. Meanwhile, at TK Pertiwi Surakarta, teachers stressed the necessity of a learning concept that could effectively nurture children's creativity through group activities, such as pattern-making.

The interviews across these Early Childhood Education and kindergarten institutions in Surakarta led to a consensus: there is a strong preference for the development of an integrated instructional model that combines hands-on learning with manipulative materials. This model is designed to encourage creativity by engaging children in group work, with the teacher acting as a facilitator and supervisor (Hasanah & Priyantoro, 2019).

Observations were conducted to gain insights into the current learning processes, classroom management strategies, instructional models employed, and children's responses during lessons. The data collected through these observations and accompanying questionnaires revealed a clear need for innovative changes in children's learning experiences (Rahmawati et al., 2021). The findings suggest that there is significant room for improvement in the instructional models currently in use. Specifically, there is a call for the development of a model that can effectively stimulate creativity in

children. The observations and feedback highlight the potential of a project-based learning model using loose parts as a suitable approach for achieving these educational goals (Dewi et al., 2022).

Overall, the results of this needs analysis underscore the necessity of developing a more innovative and engaging instructional model to foster creativity in early childhood education. The proposed project-based learning model with loose parts offers a promising solution, providing a structured yet flexible framework that can be adapted to the developmental needs and creative potential of young learners.

3.2 Design Development of a Project-Based Learning Model with Loose Parts Media for the Creativity Skills of Early Childhood

Based on the results of the needs analysis and theoretical review, a project-based learning model utilizing loose parts has been developed to enhance the creativity of young children. The instructional model design follows a structured process that begins with planning, continues with implementation, and concludes with evaluation (Black et al., 2017). The planning phase includes several key components: potential problem analysis, curriculum analysis, goal formulation, material development, and the creation of a syntax model centered around a song-based approach. This phase also involves the development of lesson plans (RPP), syllabi, teaching materials, worksheets (LKN), and relevant learning media.

The core of this instructional model lies in its syntax, which the researcher has carefully formulated as the foundation for model development (Febriana & Iswantiningtyas, 2022). The model incorporates a six-step Problem-Based Learning approach designed to foster creativity in children. These steps are: 1) Determining fundamental questions: Identifying key questions that will guide the project and stimulate children's curiosity; 2) Designing product planning: Creating a detailed plan for the project that outlines the objectives, materials, and activities involved; 3) Scheduling project creation: Establishing a timeline for the project to ensure systematic progress and completion; 4) Monitoring project activity and development: Overseeing the project's progression, providing guidance, and making adjustments as necessary; 5) Testing the teacher's activity results: Evaluating the effectiveness of the teacher's facilitation and the children's engagement with the project; and 6) Evaluating instructional material observations: Assessing the overall success of the project, with a particular focus on the enhancement of children's creative abilities. The evaluation phase is critical as it focuses on assessing the learning process and its outcomes, with a strong emphasis on the development of children's creativity. This structured approach ensures that each phase of the instructional model is aligned with the goal of fostering creativity in young learners, ultimately leading to a more engaging and effective learning experience.

3.2.1 Types of Projects Developed with Loose Parts Media

Several projects have been developed that can be combined with the project-based learning model, including: 1) Building My Sturdy Ship. In this first project, children will construct a ship using loose parts media, following the steps of the project-based learning model. Materials used include blocks of various sizes, Lego, used cardboard, pebbles, plastic balls, and bamboo pieces, and 2) Creating Animals in the Garden. In the second project, children will create various types of animals found in the garden using loose parts media and following the steps of the project-based learning model. Materials used include various leaves, glue, markers, pom-poms, paper, trays and bins, paper cutouts, lighters, candles, clips, wood, and stones. The goal of this project is to stimulate the creative abilities of early childhood. The design layout for the implementation guide is presented in the following images.

Fig. 1: Project design building my sturdy ship and creating animals in the garden

3.2.2 Feasibility of Developing a Project-Based Learning Model with Loose Parts Media for the Creativity Skills of Early Childhood

To assess the feasibility of the developed product, validation by expert validators is essential. Product validation is carried out after the final model design is completed and documented to serve as a guide for teachers during instruction. In the

validation process, the researcher employs a scoring scale of 4 as proposed by Widoyoko (2015). The response scale ranges from very positive to very negative, with a score range of 1-4. The score interpretation is as follows: a score of 1 indicates a less satisfactory assessment, a score of 2 suggests a fair assessment that needs improvement, a score of 3 signifies a good assessment suitable for use, and a score of 4 indicates an excellent assessment of the evaluated aspect. Keys et al. (2013), validators are free to provide objective assessments in line with the actual feasibility criteria.

3.3 Effectiveness of the Project-Based Learning Model with Loose Parts Media in Enhancing the Creativity of Early Childhood

To evaluate the effectiveness of the project-based learning model with loose parts media in enhancing the creativity of early childhood in Surakarta, this study involved the formation of an experimental class and a control class. The experimental class received a learning intervention using the developed project-based learning model with loose parts media, which was implemented across three kindergartens: PAUD Negeri Kartini Danukusuman, TK Al-Islam I, and TK Al-Islam 5, with 15 students in each class. In contrast, the control class, consisting of 15 students at TK Pertiwi, engaged in creativity-based early childhood learning without the application of the project-based learning model with loose parts media (Amelia & Aisya, 2021). Descriptive statistics were employed to assess the independence and creativity levels of children in both the experimental and control groups. The classification criteria used were as follows: a score between 0 and 35 indicated "Not Growing" (BB), a score between 36 and 60 indicated "Start Growing" (MB), a score between 61 and 80 indicated "Growing as Expected" (BSH), and a score between 81 and 100 indicated "Very Well Growing" (BSB) (Arikunto, 2017).

As shown in Fig. 2, the project-based learning model with loose parts media proved to be effective for instructional use, particularly in enhancing the creativity of children in the experimental group. The children in the experimental group, who were taught using the developed project-based learning model with loose parts media, demonstrated significantly higher creativity levels compared to those in the control group, who were taught using conventional methods. This indicates that the project-based learning model with loose parts media is more effective in fostering creativity in early childhood education (Dewi et al., 2020).
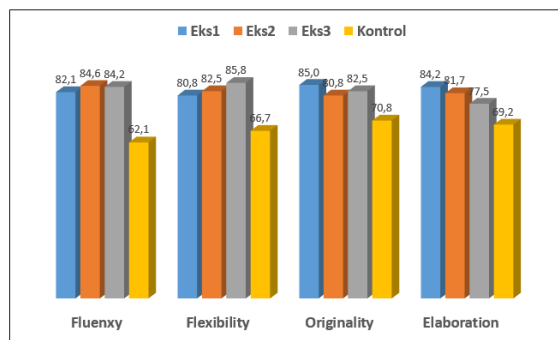

Fig. 2: Graph of creativity in early childhood based on posttest results in Surakarta city

To determine the effectiveness of developing a project-based learning model with loosepart media for early childhood creativity in Surakarta City, this study used a paired sample T test. Independent sample t-test and calculation of the gain index. However, before carrying out the test, a prerequisite test is first carried out, namely the normality test, homogeneity and average similarity test. The normality test is used to determine whether the data to be analyzed is normally distributed or not. Cresswell (2019), the normality test uses the test of normality test formula. The next step is to make a decision if the sig value > 0.05 is normal, and if sig < 0.05 it can be said to be abnormal.

Table 2: Normality test

Class	Pretest						Posttest					
	Kolmogorov-Smirnov[a]			Shapiro-Wilk			Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Stat	df	Sig.	Stat	df	Sig.	Stat	df	Sig.	Stat	df	Sig.
Experiment 1	0.14	15	0.20	0.96	15	0.65	0.11	15	0.21	0.96	15	0.68
Experiment 2	0.11	15	0.22	0.98	15	0.99	0.16	15	0.31	0.92	15	0.17
Experiment 3	0.13	15	0.22	0.94	15	0.36	0.10	15	0.32	0.95	15	0.58
Control	0.09	15	0.24	0.97	15	0.79	0.11	15	0.21	0.96	15	0.73

The results of the data normality test above show that the significance value is greater than the 5% or 0.05 significance level so that it can be concluded that the data in each class are normally distributed. Debeturu and Wijayaningsih (2019), this normality assumption is necessary because if normality is not met, the decision to test the

hypothesis (t-test) obtained becomes invalid. Data from the results of homogeneity test calculations obtained results shows in Table 3. Based on the results of the homogeneity test, it is known that the results of the significance value (sig) Based on Mean is 0.894 > 0.05 at a level of 5% so that it can be concluded that the variance of the data in the control and experimental classes is homogeneous.

Tabel 3: Homogeneity test

|		Levene Statistic	df1	df2	Sig.
Early childhood creativity	Based on Mean	0.202	3	56	0.894
	Based on Median	0.171	3	56	0.915
	Based on Median and with adjusted df	0.171	3	53.825	0.915
	Based on trimmed mean	0.196	3	56	0.899

The mean similarity test aims to determine whether the sample has the same/balanced average or not. Amelia & Aisya (2021), the data obtained is said to have the same or not the same average, which can be seen from the Sig. value. The decision rule is that if the sig. > 0.05, then the data tested has the same average and vice versa. Based on the results of the analysis of the average similarity test (Table 4.) a significance value of 1.000 was obtained > 0.05, so it can be concluded that both classes (experimental and control) have the same average value or the initial creativity abilities of the experimental and control group children are the same or balanced. Astuti and Aziz (2019), it is known that the early creativity abilities of the experimental and control group children are the same or balanced, so the sample meets the requirements to be given treatment, namely providing learning by developing project-based learning models with loosepart media in the experimental group while for the control group, namely providing learning with conventional methods. Based on the results of the analysis of the balance test on the posttest value significance value of 0.000 <0.05 was obtained so it can be concluded that the two classes (experimental and control) had unequal or unbalanced averages after being given different treatments.

Tabel 4: Test of similarity to the average initial and final ability of children's creativity

		Sum of Squares	df	Mean Square	F	Sig.
Initial (Pretest)	Between groups	0.313	3	0.104	0.001	1.000
	Within groups	4180.000	56	74.643		
	Total	4180.313	59			
Final (Posttest)	Between groups	3043.333	3	1014.444	9.553	0.000
	Within groups	5946.667	56	106.190		
	Total	8990.000	59			

After the prerequisite analysis consisting of the normality test and homogeneity test and the average similarity were met. Nurliana et al. (2022), the effectiveness test was then carried out using the paired-samples t test to find out whether there were differences in the creativity of early childhood in the city of Surakarta before and after using the development model project. Based learning with loose part media. Khairi (2018), the gain index calculation is conducted as a supporting test to determine the level of effectiveness of learning in the control class using conventional teaching methods compared to the experimental class using the developed project-based learning model with loose parts media. The criteria for interpreting N-Gain intervals are as follows when N-Gain is between 0.7 and 1, it is considered High. If N-Gain is between 0.3 and 0.7, it is categorized as Medium. When N-Gain is below 0.3, it is characterized as low.

Based on the gain index in Fig. 3, it explains that learning using the development of project based learning model development with loose part media is more able to increase the creativity of early childhood in Surakarta City compared to conventional learning. Differences in Early Childhood Creativity in Surakarta City Between the Experiment Group and the Control Group. Nurjanah (2020), to assess the effectiveness of developing the project-based learning model with loose parts media for the creativity of early childhood, one can observe the difference in the creativity of young children in Surakarta City between the experimental group using the developed project-based learning model with loose parts media and the control group with conventional learning.
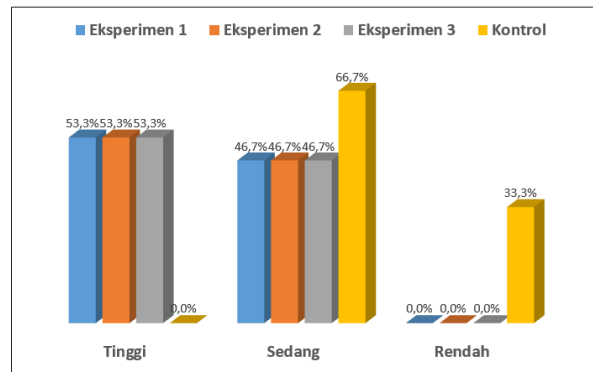
Fig. 3: Graph of early childhood creativity improvement in Surakarta city

Based on the Table 5, the mean value of the creativity of the children who were taught using the development of a project-based learning model with loose part media was 82.8 in the experimental class 1; 82.5 in the experimental class 2 and 82.5 in the experimental class 3 while the mean value of the creativity of children who were given conventional learning was 66.2. These results mean that the average creativity of children who are given learning using project-based learning model development with loose part media is better than children who are given conventional learning. Muryaningsih (2021), this indicates that learning using the development of a project-based learning model with loose part media for early childhood creativity in Surakarta is more effective than conventional learning

Table 5: Experimental class children's creativity statistics group with control class

	Class	N	Mean	Std. deviation
Early childhood creativity	Posttest Experiment 1	15	82.833	9.4900
	Posttest Experiment 2	15	82.500	9.9553
	Posttest Experiment 3	15	82.500	10.2644
	Posttest Control	15	66.167	11.4122

4.   Conclusion

Based on the description of the background of the problem and the results of the research above, the following conclusions can be drawn: The effectiveness of project-based learning with loosepart media can be used to increase the creativity of early childhood, this is based on test results that children who are given learning using the development of project-based learning models with loosepart media have better creative abilities compared to children who are given conventional learning. This indicates that learning using the development of a project based learning model with loose part media for early childhood creativity in Surakarta is more effective than conventional learning.

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