ThufuLA: Jurnal Inovasi Pendidikan Guru Raudhatul Athfal
Volume 12 issue 1, 2024
http://dx.doi.org/10.21043/thufula.v12i1.26612
https://journal.iainkudus.ac.id/index.php/thufula
p-ISSN 2355-0163 | e-ISSN 2502-3845

THE IMPLEMENTATION OF THE DESIGN, EXPLAIN, DEVELOP, AND EVALUATION-PROJECT BASED LEARNING (DEDEn-PjBL) MODEL IN KINDERGARTEN TO STIMULATE CHILDREN'S CREATIVITY

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Abstract: *This study examines the implementation of the Design, Explain, Develop, and Evaluation-Project-based Learning (DEDEn-PjBL) model in stimulating creativity among children aged 5-6 years in two kindergartens in Makassar City, using a mixed-methods approach. Employing an embedded concurrent design, 30 participants were involved in project-based learning activities using the DEDEn-PjBL model. This model encompasses the Design, Explanation, Development, and Evaluation phases to foster creativity. Data were collected through educator interviews, project observations, and quantitative assessments of children's creative development using standardised rating scales from the Ministry of Education and Culture. The validity of the collected information was verified using source triangulation techniques. The findings indicate a significant increase in creativity in terms of fluency, flexibility, originality, and elaboration. The children designed their projects using pre-prepared materials and tools, resulting in a 33.33% improvement to the "Developing as Expected" category and a 66.66% improvement to the "Developing Very Well" category. This study recommends incorporating the DEDEn-PjBL model into the curriculum, as it significantly enhances creativity. However, the study is limited to two kindergartens, thus its findings cannot be widely generalised. Additionally, the*

short implementation period may not be sufficient to observe the long-term effects of the DEDEn-PjBL model.

Keywords: *Creativity, DEDEn-PjBL Model, Early Childhood*

A. Introduction

Children's creativity is widely recognised in education as an essential skill for the 21st century (Kupers et al., 2019). Research has shown that factors such as openness to aesthetic and imaginative experiences significantly predict creative potential in adolescents and young adults (Asquith et al., 2024). Additionally, a correlation between physical activity, especially active play, and creativity has been highlighted in childhood development, emphasising the need for optimal physical activity to improve creative thinking skills (Kyritsi & Davis, 2021). Additionally, educational environments, such as Montessori schools, have been shown to positively influence creative thinking and brain-wiring in children, demonstrating the impact of pedagogy in fostering creativity (Harold, 2024). Overall, nurturing children's creativity through various factors such as openness, physical activity, and educational environment is essential for their holistic development and adaptation to future challenges (Panenkova, 2022; Rotaru, 2020; Vasilopoulos et al., 2023).

Children's creativity is a multifaceted phenomenon observed globally and specifically in Indonesia. Research highlights the importance of semantic memory in creativity (Widodo, 2010), the influence of divergent thinking abilities on creative potential in children (Rastelli et al., 2020), and the development of children's preferences for handmade rather than factory-made goods (DeJesus et al., 2022). In Indonesia, cultural elements such as *lelagon dolanan* (play while singing) an essential role in fostering creativity and identity among children (Hoicka et al., 2016). Indonesia's rich cultural heritage, including Javanese gamelan music, contributes to cultivating creative skills in children. Additionally, the research emphasises the need for support from various sectors, including government, media, and society, to preserve and promote traditional art forms such as *lelagon dolanan* among young Indonesians (Misyukevich

& Kalandarova, 2019). This collective evidence highlights the various factors influencing children's creativity globally and in the Indonesian context.

Factors that can enhance the creativity of 5-6-year-old children include various elements. Research shows that age plays a vital role in creative development, with children aged 5-6 years showing increased creative thinking (Agnoli et al., 2023; Xiong et al., 2022). In addition, emotional intelligence traits, cognitive resources such as executive function, and environmental factors such as teachers' implicit conceptions can positively influence creative potential in children (Zhang, 2023). Musical improvisation has increased children's musical creativity and overall creative skills (Jankowska & Gralewski, 2022). In addition, a constructive parenting style, characterised by accepting and granting autonomy and encouraging creativity in the parent-child relationship, can foster children's creativity (Yeh, 2008). Exposure to creative drama instruction has also been linked to increased creativity in preschool children.

Project-based learning is the most dominant factor and has significantly enhanced creativity among students in various educational environments. Research has highlighted the positive impact of project-based learning on creative thinking skills, such as fluency, flexibility, originality and elaboration (Amini & Usmeldi, 2022; Illahi et al., 2022). In addition, integrating project-based learning with STEAM approaches has effectively developed students' creative thinking skills, leading to an increased capacity for problem-solving and product creation (Indahwati et al., 2023). Psychological safety and empowerment in project-based learning environments have also been identified as critical factors that positively influence student creativity, with a culture of tolerance for mistakes playing a supportive role in this process (Han et al., 2022). These findings collectively emphasise the critical role of project-based learning in fostering creativity among students by engaging them in active learning processes and empowering them to solve problems creatively.

Factors that hinder children's creativity can vary based on different aspects. An authoritarian parenting style can inhibit children's creative thinking, potentially limiting their imaginative development (Stolte et al., 2022). Additionally, personal and

socio-economic problems within the family can impact the development of creative talents in children, with some cultural factors inhibiting creative abilities, especially among girls (Qizi, 2019). Psychological barriers such as self-doubt, lack of interest, fear of making mistakes, and reluctance to take risks can also hinder the manifestation of creative abilities in young adolescents (Yan, 2023). Additionally, Attention Deficit Hyperactivity Disorder (ADHD) can have a complex relationship with creativity, as ADHD children can show scattered attention and difficulty inhibiting irrelevant stimuli, which can affect their creative performance (Yan, 2023). These factors collectively highlight the multifaceted nature of inhibitory influences on children's creativity.

Efforts to stimulate creativity in children aged 5-6 years may include facilitating collaborative creativity through material resources such as tablets (Hossain et al., 2020), providing design feedback interventions to guide young budding designers in creative thinking (Sakr, 2019), and engage children in varied creative physical activities, involving open spaces, and interactions with peers (Schut et al., 2022). Additionally, utilising books for creative writing can introduce children to literary creation, fostering creativity through fun, play, and the production of poetic and narrative texts (Vasilopoulos et al., 2023). The needs analysis results illustrate that it is necessary to develop a Project-based Learning (PjBL) model appropriate to the developmental characteristics of children who still think spontaneously in stimulating their creativity (Sadaruddin et al., 2023a). Educators can effectively nurture and enhance young children's creative abilities by offering opportunities for collaborative interactions, constructive feedback, varied physical activity, exposure to creative writing resources, and the implementation of appropriate learning models.

In various studies, applying the Project-based Learning (PjBL) model has significantly stimulated children's creativity. Research has shown that implementing the PJBL model in science learning improves students' creative thinking abilities by requiring them to solve problems through project assignments, which leads to increased creativity in learning (Chintya et al., 2023). Additionally, the PjBL model, when applied in making tempeh, resulted in better learning outcomes and increased student creativity, with

more than 80% of students responding positively to the impact on creativity and learning outcomes (P. Setiawan et al., 2023). Furthermore, the application of the DEDEn-PjBL learning model has been found to increase children's fluency, flexibility, originality and elaboration (Sadaruddin et al., 2023b)

The DEDEn-PjBL model is attractive to study because it was found that the PjBL model cannot necessarily be applied standardly to children, especially those aged 5-6 years. After all, children of that age still think spontaneously, while the demands of PJBL require abstract thinking (Sadaruddin et al., 2023b). According to Piaget (1952), the stages of child development state that children aged 2-7 years are still in the preoperational stage and have spontaneous thoughts depending on the object being observed. Children at this stage are not yet able to think abstractly.

The analysis results of the implementation of each stage of the PjBL model standardly found several problems, including the fact that, on average, children cannot answer when asked challenging questions (Amelia et al., 2020). Children's freedom to explore their abilities can be hampered if they are given the task of preparing project activities (Dinda & Sukma, 2021) because children's thinking is still spontaneous (Piaget, 1952)

Children do not need to be closely supervised in projects, let alone overprotective supervision; however, they need to be given the freedom to develop their potential (Ahmad Susanto, 2018; Musbikin, 2020). Early childhood is not given an assessment based on project results but is oriented towards the development process. The principles for assessing early childhood education levels differ from others (Jaya, 2019). Teachers do not need to provide evaluations of project results, but children are asked to reflect on experiences while working on projects (P. Setiawan et al., 2023).

Project-based learning (PjBL) is significant in Indonesia's independent Early Childhood Education Development (ECED) curriculum. The integration of PjBL is in line with the concept of self-directed learning, which emphasises freedom in organising learning activities and encourages the creativity of educators and learners (Maryati et al., 2022). The DEDEn-PjBL model, which is a development of PjBL itself, is an alternative for teachers in choosing a fun learning model, which gives freedom to children

according to the child's spontaneous thinking stage, according to the characteristics of the child and has proven to be quite effective in stimulating children's creativity. The DEDEn-PjBL model has the syntax of Design, Explain, Develop, and Evaluation (Sadaruddin et al., 2023b) Each syntax is designed to see or observe indicators of children's creativity (Munandar, 1997) as in Table 1 below:

Table 1. Activity, Children's Abilities and Creativity Indicators

No	Activity	Children's Abilities	Creativity Indicators
1	**Design**	the child's ability to produce several ideas with relevant words and expressions in a short time and the same situation fluently in the form of project **design**	Fluency
2	**Explain**	child's ability to **explain** project design that allows it to be developed	Flexibility
3	**Develop**	**Develop** children's abilities, a project that was initially the result of his thoughts	Originality
4	**Evaluation**	The child's ability to **evaluate** through reflection by telling in detail the experiences gained	Elaboration

Observations showed low levels of creativity among children at Tumbuh Kembang Kindergarten and Adzoka Kindergarten. Creativity, which includes fluency, flexibility, originality, and elaboration, is essential to child development. However, observations showed that children in both kindergartens had difficulty developing these abilities. Children tend to generate few ideas, think in rigid patterns, copy ideas from friends, and give less detailed answers.

What can overcome this problem is the application of the DEDEn-PjBL learning model. This model is proven to increase children's creativity through various systematic and interactive stages. Children are invited to design their creative projects in the Design stage. Then, in the Explain stage, they are asked to explain their ideas and plans, which trains their verbal skills and

analytical thinking. The development stage requires children to develop their ideas in detail further. In contrast, the Evaluation stage involves reflection and feedback that helps them see the strengths and weaknesses of their work.

With the application of this DEDEn-PjBL model, children's creativity at Tumbuh Kembang Kindergarten and Adzoka Kindergarten is expected to increase significantly. This model prepares them to become more creative and innovative individuals. Through project-based learning that involves designing, explaining, developing, and evaluating, children are expected to be more creative and innovative in the future.

B. Method

This research applies a mixed methods approach with simultaneous embedded design to explore the impact of the Design, Explanation, Development, and Evaluation-Project Learning model in stimulating children's creativity in kindergarten. This research integrates qualitative data, especially in describing processes of learning DEDEn-PjBL in Kindergarten, with quantitative data regarding the development of the creative abilities of the children involved in this research (Sugiyono, 2017; Wisler, 2009).

Qualitative data were collected through interviews with teachers and observations during project activities in two kindergartens in Makassar City, namely Tumbuh Kembang Kindergarten and Adzoka Kindergarten, the reason being that both kindergartens have implemented PjBL by default but are experiencing difficulties in its application. The research subjects consisted of 30 children aged 5-6 years from Tumbuh Kembang Kindergarten as many as 15 children and Adzoka Kindergarten as many as 15 children involved in four project activities, namely: (1) a project to make chocolate milk drinks (2) a project to make classroom furniture from paper, (3) a project to make a miniature aquarium, and (4) a project to make a collage of sheep pictures with cotton.

Qualitative data was collected through interviews, direct observation, and documentation of the implementation of the DEDEn-PjBL project. Meanwhile, quantitative data was obtained through observational assessments of children's creative development. Data from interviews are presented narratively

and reduced, while the observed teacher and student activities are described descriptively for each DEDEn-PjBL session. Each child's creative thinking ability is evaluated using an assessment scale based on the Ministry of Education and Culture (Jazariyah et al., 2023) namely Belum Berkembang (BB), Mulai Berkembang (MB), Berkembang Sesuai Harapan (BSH), and Berkembang Sangat Baik (BSB). Observations of children's development in this project are categorised on a scale of 1-4.

The data recapitulation was then analysed descriptively by calculating the percentage of children who met specific criteria using the formula (Sudijono, 2018).

$$P = \frac{f}{n} \times 100\%$$

Information:

P = percentage of children with specific development criteria
f = frequency/number of children who meet specific development criteria
n = total number of children

Percentage yield is categorised by referring to the following table:

Table 2. Interpretation Data Processing Results

Percentage	Category
76-100	Very high
51-75	Height
26-50	Low
0-25	Very low

The information collected was then tested for validity using the triangulation technique of information sources. In this technique, the author brings together information from teachers and observations of the implementation of DEDEn-PjBL learning in stimulating children's creativity to determine their suitability. If each information is considered appropriate, it can be considered substantial (Moleong, 2018). After that, information analysis is carried out using the information analysis technique according to Miles and Huberman, which consists of information reduction, information show, and verification (Miles et al., 2013).

C. Result and Discussion

Studies produce qualitative and quantitative data. Qualitative data was obtained regarding the implementation of DEDEn-PjBL, while quantitative data was related to observations of the development of children's creative abilities.

1. Implementation of DEDEn-PjBL through project play activities

The important thing that teachers must do before implementing the PjBL model is planning, including preparing a daily learning implementation plan that contains learning themes such as My Needs, My Environment, and Animals. In addition to the theme, there are also materials, tools, and materials that must be prepared at least one day before the implementation of the activity. The first is a project learning activity for making chocolate milk drinks that involves children directly making them, but of course, they are still under teacher supervision. The tools and materials needed for project activities to make chocolate milk drinks are a basin, spoon, glass, scissors, liquid milk, chocolate powder, wafers, ice cubes, and hot water. The second activity is a learning project activity to make miniature classroom furniture from used items, arrange them into miniature classrooms, and fold the shape of school buildings using origami paper/cardboard. The tools and materials needed for the project activity to make classroom furniture are used items: shampoo bottles, plastic drink bottles, origami paper/ cardboard, scissors, and glue.

The third activity is a learning project activity to make an aquarium from blocks, sticking snake fruit skin into fish scales on a picture of a fish and giving colour to the letters or words fish. The tools and materials needed for project activities to make an aquarium are bark, fish pictures, coloured pencils/ crayons, blocks, and "fish" books. The fourth activity is a learning activity for a goat picture collage project using cotton. First, the activity carried out is connecting the pictures of the goat's body and, finally, sorting the pictures of the goats, starting from small and medium. The tools and materials needed for the project to make an aquarium are a picture of a sheep, a pencil, an eraser, cotton wool, glue, and scissors.

The four activities mentioned are conducted using the DEDEn-PjBL model stages—Design, Explain, Develop, and Evaluation. For example, the project stages for making chocolate milk drinks, as shown in Table 3 below, are used to measure children's creativity levels through indicators such as Fluency, Flexibility, Originality, and Elaboration.

Table 3. Activity Project (Making Choco Milk Drink)

Syntax	Educator Activities	Children's Activities
Level 1: Design	1. Educators open the lesson with a challenging question such as: • "Which of you has ever drunk *chocolate milk?"* • "How does it feel"? • "Do you guys want to drink *chocolate milk* Today"?	1. Children listen to the teacher's questions, begin to think about the answers that emerge, and immediately respond to each question. The children's answers are ideas produced by themselves with relevant words and expressions in a short time and in the same situation fluently.
	2. Educators ask children to design a project plan for making choco milk drinks • "Do you know how to make chocolate milk"? • "What tools and materials are needed"?	2. Children respond to the educator's follow-up questions, and each child's answer is a form of **design** project plan. The ideas/answers that arise do not need to be expressed in a written plan, just convey them verbally.
	3. Educators introduce the tools and materials used	3. Children observe the tools and materials shown by the teacher

Syntax	Educator Activities	Children's Activities
Level 2:Explain	4. Educators ask children to explain the project plan that will be made, including the planned activity schedule • "Who wants to tell you how it is made"? • "How long will it take us to make it"?	4. Children continue to answer the teacher's questions for those who know how to make them through **explanations**. Including telling about experiences related to how long it took to make it.
Level 3:Develop	5. Educators demonstrate making chocolate milk drinks. 6. Educators give children the opportunity to ask questions 7. The educator then distributes tools and materials according to the group division according to their respective seatmates 8. The educator asks the children to start working on the project of making chocolate milk drinks in an orderly manner. 9. Educators supervise the course of the project, encourage the development of unique projects and provide an assessment of the resulting product	5. Children pay attention to the teacher when demonstrating how to make chocolate *milk*. 6. Children may ask questions during the teacher's demonstration 7. Children return to their respective tables with their group of friends 8. Children start working on projects in an orderly manner 9. Children can **develop** or produce original work resulting from their thoughts
Level 4:Evaluation	10. Educators ask children to tell stories about experiences during project work as a form of reflection	10. Children reflect on the experiences gained through **evaluations** by telling them.

2. Stimulating Children's Creativity through the Implementation of DEDEn-PjBL in Kindergarten

This also produces information about the evaluation of children's creative development, which is observed through an observation checklist before and during the project. Observation data for children's creative abilities before dancing during the project can be found in the table below:

Table 4. Observation Results of Children's Creativity

No	Pre	Creativity Indicators								(X)	Ctgr
		Project Activities I				Project Activities II					
		1	2	3	4	1	2	3	4		
1	2	2	2	2	2	3	3	3	3	3	BSH
2	2	2	2	2	2	3	3	4	3	3,25	BSB
3	2	3	3	3	2	4	4	4	3	3,75	BSB
4	1	2	2	3	2	3	3	4	3	3,25	BSB
5	2	2	2	3	3	3	3	4	4	3,5	BSB
6	2	3	3	2	3	4	4	3	4	3,75	BSB
7	2	2	2	2	2	3	3	3	3	3	BSH
8	1	1	2	3	2	2	3	4	3	3	BSH
9	2	2	2	2	2	3	3	3	3	3	BSH
10	2	3	2	3	3	4	3	4	4	3,75	BSB
11	2	2	3	2	2	3	4	3	3	3,25	BSB
12	2	3	2	2	3	4	3	3	4	3,5	BSB
13	1	2	2	2	2	3	3	3	3	3	BSH
14	2	2	3	3	2	3	4	4	3	3,5	BSB
15	2	3	2	3	2	4	3	4	3	3,5	BSB
16	2	2	2	2	2	3	3	3	3	3	BSH
17	2	2	2	2	2	3	3	4	3	3,25	BSB
18	2	3	3	3	2	4	4	4	3	3,75	BSB
19	1	2	2	3	2	3	3	4	3	3,25	BSB
20	2	2	2	3	3	3	3	4	4	3,5	BSB
21	2	3	3	2	3	4	4	3	4	3,75	BSB
22	2	2	2	2	2	3	3	3	3	3	BSH
23	1	1	2	3	2	2	3	4	3	3	BSH
24	2	2	2	2	2	3	3	3	3	3	BSH
25	2	3	2	3	3	4	3	4	4	3,75	BSB
26	2	2	3	2	2	3	4	3	3	3,25	BSB
27	2	3	2	2	3	4	3	3	4	3,5	BSB
28	1	2	2	2	2	3	3	3	3	3	BSH
29	2	2	3	3	2	3	4	4	3	3,5	BSB
30	2	3	2	3	2	4	3	4	3	3,5	BSB

No	Pre	Creativity Indicators								(X)	Ctgr
		Project Activities I				Project Activities II					
		1	2	3	4	1	2	3	4		
	(X)	2,27	2,27	2,47	2,27	3,27	3,27	3,53	3,27	3,33	BSB

Description: Pre (Pre-observation); 1 (Fluency); 2 (Flexibility); 3 (Originality); 4 (Elaboration); X̄ (Average); Ctgr (Category); BSH ("Berkembang Sesuai Harapan"); BSB ("Berkembang Sangat Baik").

The data in Table 4 illustrates the results of observations of children's creative abilities before and during the implementation of DEDEn-PjBL Learning, which is integrated with four project activities, where each kindergarten group is given two different project activities. The assessment of children's creativity was based on a rating scale developed by the Ministry of Education and Culture, which includes four levels: Not Yet Developed (Belum Berkembang, BB), Beginning to Develop (Mulai Berkembang, MB), Developing as Expected (Berkembang Sesuai Harapan, BSH), and Developing Very Well (Berkembang Sangat Baik, BSB). The majority of children demonstrated progress, with 33.33% advancing from the "Not Yet Developed" or "Beginning to Develop" stages to the "Developing as Expected" stage and 66.66% reaching the "Developing Very Well" stage. This development proves that the implementation of DEDEn-PjBL has the potential to stimulate children's creativity.

3. Achieving Children's Creativity

Observation results before and during the project can illustrate the contributions of DEDEn-PjBL towards increasing children's creative development, as shown in Figure 1. below:

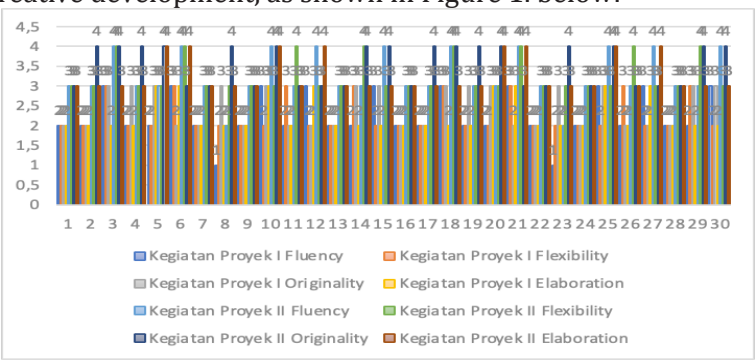

Figure 1. Information Related to Images/Graphics

Figure 1 illustrates that prior to the project implementation, children's creative thinking abilities were at the Not Yet Developed (Belum Berkembang, BB) and Beginning to Develop (Mulai Berkembang, MB) levels. A significant increase was observed during the first project. By the second project, 33.33% of the children had reached the Developing as Expected (Berkembang Sesuai Harapan, BSH) category and 66.66% had begun to reach the Developing Very Well (Berkembang Sangat Baik, BSB) category. This substantial percentage indicates a high level of contribution. The development from the Not Yet Developed and Beginning to Develop stages to a high percentage at the Developing Very Well level demonstrates the effectiveness of the DEDEn-PjBL model in stimulating and supporting children's creative growth. These findings underscore the importance of implementing project-based learning in early childhood education to foster creativity, which is crucial for children's overall development and learning.

The study results showed that applying the Design, Explain, Develop, and Evaluation-Project based Learning (DEDEn-PjBL) model effectively stimulates the creativity of 5-6-year-old children in kindergarten (Sadaruddin et al., 2023b). This finding is in line with previous studies that emphasise the importance of factors such as openness to aesthetic and imaginative experiences, physical activity, and educational environment in nurturing children's creativity (Ferrero et al., 2021; Hsin & Wu, 2023; Piya-Amornphan et al., 2020). Recognising children's creativity as an essential aspect of education has been well-established in the literature (Ortega-Sánchez & Jiménez-Eguizábal, 2019). According to Elisa et al. (2019), creativity is a crucial element in children's development that contributes to critical thinking and problem-solving skills. In this context, the DEDEn-PjBL model has improved important aspects of creativity, such as fluency, flexibility, originality, and elaboration in children.

This study is consistent with previous findings highlighting factors such as openness to aesthetic and imaginative experiences, physical activity, and educational environments as critical determinants in fostering children's creativity. Asquith et al. (2024) revealed that aesthetic and imaginative experiences are crucial in stimulating creativity. Similarly, Kyritsi and Davis (2021)

found that physical activity can enhance children's flexibility in thinking. Piya-Amornphan et al. (2020) also showed that a supportive educational environment, including project-based learning models like DEDEn-PjBL, significantly influences the development of children's creativity.

The DEDEn-PjBL model integrates essential aspects of creativity development and includes key stages that support children's creative growth. Children construct their creative projects in the Design stage, while the Explain stage helps verbally articulate ideas (Yumiko et al., 2023). Next, the Develop stage encourages further elaboration and deepening of their concepts, and the Evaluate stage offers opportunities for constructive feedback (Weng et al., 2023). This model enhances overall creativity and nurtures essential skills such as communication, collaboration, and self-reflection, which align with the 21st-century skills framework (Jankowska & Gralewski, 2022). Furthermore, the research emphasises the importance of daily creativity planning in promoting creative behaviour among students, suggesting a simple yet effective strategy for fostering creativity in educational settings (Liu et al., 2023). Integrating innovative educational experiences and instructional designs can further enhance creativity development in higher education, simultaneously fostering multiple components of creativity for broader and higher-quality creative outcomes (Parra & García, 2022).

In Indonesia, cultural elements such as traditional games have significantly nurtured children's creativity (Hoicka et al., 2016). Traditional games like congklak, egrang, and marbles not only entertain but also stimulate children to think creatively and innovatively. Children learn to solve problems, cooperate, and develop their imaginations through these games.

Support from various sectors, including the government, media, and society, is crucial in preserving and promoting traditional arts among the younger generation (Misyukevich & Kalandarova, 2019). The government formulates policies that support arts and cultural education in schools and provides adequate facilities for training and showcasing traditional arts. The media also disseminates information and raises awareness about the importance of traditional arts through educational programs and documentaries.

Factors that can enhance the creativity of 5-6-year-old children include various aspects such as age, emotional intelligence, cognitive resources, and environmental factors (Xiong et al., 2022; Zhang, 2023). Research indicates that spurious factors like older age within this range, better emotional intelligence development, and supportive environments such as family and school that facilitate exploration and creativity can significantly contribute to enhancing children's creativity.

Additionally, project-based learning approaches such as DEDEn-PjBL (Design, Explain, Develop, and Evaluation- Project-Based Learning) have been proven effective in fostering children's creativity. This model allows children to learn through active exploration, collaboration, and project creation, positively influencing their creative development (Sadaruddin et al., 2023b)

However, some factors can inhibit children's creativity, such as authoritarian parenting styles and personal or socio-economic issues within the family (Qizi, 2019; Stolte et al., 2022). Psychological barriers such as lack of interest and reluctance to take risks can also significantly affect children's creativity (Yan, 2023).

Complementation of the DEDEn-PjBL model in Kindergarten has significantly improved children's creative development. Observation results show that the majority of children experienced an improvement from the "Not Yet Developing" or "Starting to Develop" stage to the "Developing According to Expectations" and "Very Well Developing" stage after being involved in project activities (Jazariyah et al., 2023)

A mixed methods approach with an embedded design has been utilised in research methodology to integrate qualitative and quantitative data (Creswell & Creswell, 2018; Sugiyono, 2017). Qualitative data were collected through interviews with teachers and direct observation during project activities, while quantitative data were obtained through observations assessing children's creative development.

Overall, this study indicates that implementing the DEDEn-PjBL model in kindergarten has significant potential to stimulate the creativity of 5-6-year-old children. This learning model effectively nurtures creativity in early childhood by facilitating collaborative interaction, constructive feedback, and varied

physical activities (Sadaruddin et al., 2023b). Therefore, educators need to consider adopting this learning model to support the future creative growth of children.

D. Conclusion

This study highlights the importance of stimulating creativity in children aged 5-6 through a project-based learning approach, implemented through the Design, Explanation, Development, and Evaluation-Project-based Learning (DEDEn-PjBL). The research results show that the application of this model has a significant positive impact on the development of children's creativity.

In the implementation of DEDEn-PjBL, project activities that involve children directly in designing, explaining, developing, and evaluating projects, such as making choco milk drinks, classroom furniture from used materials, miniature aquariums, and goat picture collages, provide space for children to unleash their creativity.

Observations of children's creative abilities before and during the implementation of DEDEn-PjBL showed a significant increase from the levels of "Belum Berkembang" and "Mulai Berkembang" to "Berkembang Sesuai Harapan" and "Berkembangan Sangat Baik". This shows that the DEDEn-PjBL model effectively stimulates and supports children's creative growth.

Implementing DEDEn-PjBL as a fun and child-centred learning approach can be an effective alternative to increasing early childhood creativity. Teachers' critical role in planning, carrying out, and evaluating these project activities should not be neglected. Thus, the DEDEn-PjBL model can become integral to the early childhood education curriculum to foster children's creativity and potential for a brighter future.

This study was limited to two kindergartens, so the results cannot be widely generalised. In addition, the short implementation time may not be enough to see the long-term effects of the DEDEn PjBL model.

To overcome these limitations, other researchers should involve more kindergartens from different regions and backgrounds to increase the generalizability of the results. Other researchers need to consider longitudinal studies for long-term evaluation. Standardisation of implementing the DEDEn PjBL model and

thorough teacher training are needed for consistency. Other researchers also need to analyse external factors more deeply, involve multidisciplinary experts for a holistic perspective, and utilise technology for learning and measuring creativity efficiently.

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