



Revitalizing Creativity in Early Childhood Education through the Integration of Animated Videos in Problem-Based and Project-Based Learning

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Abstract

Keywords:

Project Based Learning; Problem Based Learning; Creativity Development; Animated Video Media; Early Childhood Education

Early childhood creativity is a crucial developmental outcome that can be fostered through the strategic integration of appropriate pedagogical models and digital learning media. This study examines the effect of animated video media on children's creativity when integrated with Problem Based Learning and Project Based Learning approaches. A quantitative experimental design was employed, and the data were analyzed using analysis of variance to examine both main and interaction effects. The findings reveal that the use of animated video media has a statistically significant effect on children's creativity within both instructional approaches ($p < 0.05$). However, no statistically significant difference was identified between the two learning models ($p > 0.05$), nor was a significant interaction detected between the instructional models and the use of animated video media ($p > 0.05$). These results suggest that both pedagogical approaches function comparably in supporting creativity development when combined with animated video media. Conceptually, this study reinforces the role of multimedia-supported, student-centered learning environments in early childhood education and contributes empirical evidence to discussions on instructional model equivalence in fostering creative capacities. The findings also provide a theoretical basis for future research on optimizing digital media integration to support creativity development in early childhood contexts.

Abstrak

Kata Kunci:

Pembelajaran Berbasis Proyek; Pembelajaran Berbasis Masalah; Pengembangan Kreativitas; Media

Kreativitas anak usia dini merupakan salah satu capaian perkembangan penting yang dapat dikembangkan melalui integrasi model pembelajaran dan media digital yang tepat. Penelitian ini bertujuan untuk menganalisis pengaruh penggunaan video animasi terhadap kreativitas anak melalui penerapan pendekatan Problem Based Learning dan Project Based Learning. Penelitian ini menggunakan

Video Animasi;
Pendidikan Anak
Usia Dini

pendekatan kuantitatif dengan desain eksperimen, sedangkan analisis data dilakukan menggunakan analisis varians untuk menguji pengaruh utama dan interaksi antarvariabel. Hasil penelitian menunjukkan bahwa penggunaan video animasi memberikan pengaruh yang signifikan secara statistik terhadap kreativitas anak pada kedua pendekatan pembelajaran ($p < 0,05$). Namun demikian, tidak ditemukan perbedaan yang signifikan antara kedua model pembelajaran ($p > 0,05$), serta tidak terdapat efek interaksi yang signifikan antara model pembelajaran dan penggunaan media video animasi ($p > 0,05$). Temuan ini mengindikasikan bahwa kedua pendekatan pembelajaran memiliki efektivitas yang relatif setara dalam mendukung pengembangan kreativitas anak ketika dipadukan dengan media video animasi. Secara konseptual, penelitian ini menegaskan pentingnya lingkungan pembelajaran yang berpusat pada anak dan didukung media multimedia dalam pendidikan anak usia dini, serta memberikan kontribusi empiris terhadap kajian kesetaraan model pembelajaran dalam pengembangan kreativitas. Temuan penelitian ini juga dapat menjadi landasan teoretis bagi penelitian selanjutnya terkait optimalisasi integrasi media digital dalam mendukung perkembangan kreativitas anak usia dini.

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1. Introduction

Early childhood is a period of rapid growth and development that determines the foundation of a person's future character and potential. At this stage, children possess unique characteristics such as egocentric behavior, high curiosity, rich imagination, and short attention spans, which make the learning process at this age distinct from older children (Suryana, 2021; Zaidah & Ariyati, 2024). Therefore, proper stimulation and educational support is important to help children develop holistically in physical, cognitive, social, and emotional aspects (Ambariani & Rakimahwati, 2023; Martin et al., 2025). Early Childhood Education (ECE) serves as a crucial platform to facilitate children's development and prepare them for the next educational stages (Safitri & Lestaringrum, 2021; Supriani & Arifudin, 2023).

Beyond serving as a preparatory stage for formal schooling, early childhood education is increasingly expected to foster higher-order skills, particularly creativity, which is considered a key competence in the 21st century. However, creativity development in early childhood remains a challenge due to the lack of instructional integration between pedagogical models and learning media that explicitly target creative processes.

In learning implementation, the constructivist theory emphasizes that children actively construct knowledge through

experiences and interactions with their environment (Olukoya, 2021; Sudirman & Haling, 2024). Based on this principle, teachers should design learning activities that are experiential, problem-oriented, and project-based. Problem Based Learning (PBL) provides opportunities for children to solve real-life problems using their own ideas and reasoning (Dibyantini et al., 2023), while Project Based Learning (PjBL) offers intensive experiences through creative projects that produce tangible outcomes and promote collaboration (Zhang & Ramli, 2025). Both methods encourage children to think critically, explore ideas, and enhance creativity.

Conceptually, PBL and PjBL are rooted in constructivist learning principles that emphasize active inquiry, exploration, and meaning making. Through problem analysis and project creation, children are encouraged to generate multiple ideas, experiment with solutions, and engage in reflective thinking, which are essential processes in creativity development. Nevertheless, previous studies tend to discuss PBL and PjBL independently, without clearly explaining how these models function differently or similarly when integrated with specific learning media aimed at fostering creativity.

Creativity itself is a fundamental aspect of early childhood development that contributes significantly to the formation of quality human resources (Mardiyah & Hambali, 2022). Creative skills allow children to express ideas, explore their environment, and develop flexible thinking. From a theoretical perspective, creativity in early childhood encompasses dimensions such as fluency, flexibility, originality, and elaboration, which are closely associated with divergent thinking processes. Despite its importance, many studies still address creativity in general terms, without explicitly linking instructional strategies to specific creativity indicators, leaving a gap in pedagogical clarity and empirical validation. In today's digital era, the use of technology in learning has become a necessity. Animated videos, as one form of digital learning media, are proven to increase motivation and learning outcomes (Azhari et al., 2021; Hariyati & Nurhafizah, 2023). Their attractive visuals and sounds capture children's attention and create a more enjoyable learning atmosphere.

Pedagogically, animated video media can function as cognitive scaffolding that supports imagination, visualization, and idea generation, which are essential elements in creative learning. However, empirical evidence examining how animated videos interact with different constructivist-based learning models in early childhood settings remains limited.

However, based on observations conducted from January 20 to 24, 2025, at Aisyiyah 1 Kindergarten Bukittinggi a pilot school implementing the Merdeka Curriculum it was found that classroom activities remain conventional. Teachers primarily use repetitive tasks such as coloring and block play, with limited use of varied or technology-based media. Many children appeared less enthusiastic and less focused during lessons. This condition shows the need to improve learning practices through more innovative and engaging methods and media to stimulate creativity. Although this observation reflects a local

context, it also represents a broader issue faced by early childhood education globally, particularly in responding to the challenges of digital transformation and the demand for creativity-oriented learning environments in the 21st century.

Given these findings, this study was conducted to analyze the effect of animated video media on children's creativity through the application of Problem Based Learning (PBL) and Project Based Learning (PjBL) methods. Despite the growing body of research on innovative learning models, there is still a lack of experimental studies that directly compare the effectiveness of PBL and PjBL while simultaneously examining their interaction with animated video media in early childhood education. This gap indicates the need for empirical evidence that clarifies whether different constructivist-based models produce distinct or equivalent outcomes in creativity development when supported by digital media. The novelty of this study lies in its factorial experimental approach, which not only analyzes the individual effects of PBL and PjBL but also investigates the interaction between learning models and animated video media an approach that remains rarely applied in early childhood education research.

Accordingly, this study aims to examine the effect of animated video media on early childhood creativity within Problem Based Learning and Project Based Learning frameworks, to compare the effectiveness of both instructional models, and to analyze the interaction between learning models and animated video media in supporting creativity development.

2. Methods

This research belongs to the quantitative research category. Quantitative research is a type of study that examines specific theories using valid and reliable instruments, and the findings are verified through empirical data (Branch, 2019). The method applied in this study is a quasi-experimental design with a non-equivalent control group design.

The study was conducted at Aisyiyah Kindergarten 1 Bukittinggi. The population consisted of 144 children, and the sampling technique used was purposive sampling. Therefore, the sample in this study included four classes, namely B5, B6, B7, and B8, with a total of 60 children. This selection was based on the consideration that the children in both groups had similar characteristics in terms of age, ability, and background.

Next, the data collection techniques in this study include questionnaires, interviews, and documentation. The research design applies both learning models, namely Problem Based Learning (PBL) and Project Based Learning (PjBL), to all classes involved in the study. Thus, each class gains learning experience using both learning models, each of which is integrated with animated video media.

The implementation of PBL and PjBL is carried out alternately and systematically within the series of learning activities. In PBL-based learning, children are invited to observe problems presented through animated videos, discuss simple solutions, and express their creative

ideas. Subsequently, in PjBL-based learning, children are involved in simple project activities that begin with an animated video presentation and end with a work that reflects the children's creativity.

Animated video media are consistently used in both learning models as a means to stimulate ideas, provide learning context, and support children's creative activities. The development of children's creativity is measured thru pretests and posttests using a systematically developed creativity assessment instrument.

The obtained data were then analyzed using a t-test, preceded by prerequisite tests as the basis for hypothesis testing. The research tools used to assess the development of creativity are as follows:

Table 1. Creativity Skills Instrument

Variable	Indicator	Question Item	Number Item	Collection Technique Data	Data Source
Creativity Development	Fluency	The child can develop ideas to solve problems The child can perform activities according to instructionsinst ruksi	1,2	Performance test	Child
	Flexibility	The child can find solutions The child can find solutions	3,4	Performance test	Child
	Originality	The child creates works through their imagination and ideas	5	Performance test	Child
	Elaboration	The child can retell events that occurred The child creates works according to their ideas and the sequence of the story	6,7	Performance test	Child

Source : (Sarama & Clements, 2009; Wright, 2010)

3. Result and Discussion

As an initial step in analysing the research results to be conducted in this study, the pre-test and post-test data results of

children's creativity skills scores will be analysed. The analysis results can be seen in the following table:

Tabel 2. Analysis Result

Data Results	Aspect	N	Total	Mean	SD	Max	Min
Pre-test	Creativity Development	30	1445	48.2	8.8	68	32
Post-test	Creativity Development	30	2367	78.9	8.1	89	64

Based on the research results, it can be seen that there is a difference in scores before and after using the PBL and PjBL methods. Specifically, the pre-test score data shows a value of 48.2 with a standard deviation of 8.8. Subsequently, the post-test score data shows a value of 78.9 with a standard deviation of 8.1. These data indicate that the pre-test score is lower compared to the post-test score.

Table 3. Frequency Distribution of Pre-test Data on Creativity Skills at Aisyiyah 1 Kindergarten in Bukittinggi

Interval	Midpoint	Frequency (f)	Percentage (%)
32-37	34	3	10%
38-43	40	7	24%
44-49	46	7	24%
50-55	52	7	24%
56-61	58	4	12.5%
62-68	65	2	5.5%
Range		30	100%

Based on the frequency distribution table, it can be observed that the majority of children's creativity scores fall within the interval range of 38–55, with each interval (38–43, 44–49, and 50–55) having a frequency of seven children, representing 24% of the total participants. This pattern indicates that most children demonstrate a moderate level of creativity.

Conversely, a smaller proportion of children are categorized in the lower and higher creativity levels. The lowest score range (32–37) includes three children (10%), while the highest score range (62–68) includes only two children (5.5%).

Overall, the data suggest that the distribution of children's creativity levels tends to cluster around the moderate category, with relatively few children achieving low or high scores. This finding implies that the learning methods implemented were reasonably effective in stimulating creativity; however, further pedagogical enrichment and more diverse instructional strategies may be required to encourage a greater number of children to reach higher levels of creative development.

Table 4. Frequency Distribution of Pre-test Creative Ability of Children in the Control Group at Aisyiyah 1 Bukittinggi

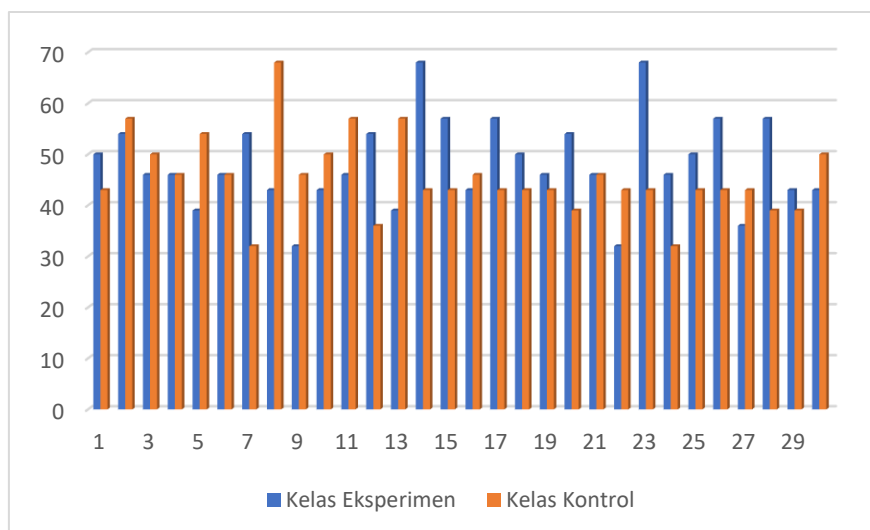
Interval	Midpoint	Frequency (f)	Percentage (%)
32-37	34	3	10%
38-43	40	14	47%
44-49	46	5	16%
50-55	52	4	13%
56-61	58	3	10%
62-68	65	1	4%
Range		30	100%

Based on the frequency distribution presented in Table 4, it is evident that the majority of children in the control group obtained creativity scores within the interval range of 38–43, with a frequency of 14 children, accounting for 47% of the total participants. This indicates that nearly half of the children demonstrated creativity at a moderate level prior to the implementation of the learning intervention.

A smaller proportion of participants achieved scores at both the lower and higher ends of the scale. Specifically, 10% of the children scored within the lowest range (32–37), while only 4% reached the highest range (62–68). The remaining children were distributed across the middle intervals, with 16% in the range of 44–49, 13% in 50–55, and 10% in 56–61.

Overall, the data suggest that before treatment, the control group’s creativity levels were predominantly in the moderate category, with only a small number of children demonstrating low or high creativity. This distribution pattern implies that, prior to the intervention, the majority of participants possessed an average level of creative ability that could still be enhanced through appropriate learning strategies.

Figure 1: Comparison of Pre-Test Creativity Scores Between Experimental and Control Groups



The bar chart above presents the comparison of pre-test creativity scores between the experimental class (blue bars) and the control class (orange bars). The data show that, prior to the implementation of the learning intervention, both groups exhibited relatively similar creativity levels, with only slight variations across individual participants.

Most students in both groups obtained scores ranging from 35 to 60, indicating that the initial creativity level of children before treatment was moderate and comparable between the experimental and control classes. This similarity suggests that both groups started from an equivalent baseline condition, allowing for a fair comparison of the post-test results following the application of the Problem-Based Learning (PBL) and Project-Based Learning (PjBL) methods through animated video media.

The relatively balanced pre-test results confirm that any significant difference observed in the post-test scores can be attributed to the intervention effect rather than pre-existing differences in creativity levels. This finding supports the internal validity of the study and strengthens the conclusion that the applied learning model had a genuine and measurable impact on enhancing children's creativity development.

Next, after seeing the results of the pre-test on children's creativity skills, treatment was carried out for 3 meetings using PBL and PjBL learning with animated videos. Then, a post-test was conducted. The following are the results of the post-test data at Aisyiyah 1 Kindergarten Bukittinggi:

Table 5. Frequency Distribution of Post-test Creativity Skills of Children in the Experimental Group at Aisyiyah 1 Bukittinggi

Interval	Midpoint	Frekuensi (f)	Percentage (%)
64-69	66	5	17%
70-75	72	6	20%
76-81	78	4	13%
82-89	85	15	50%
Range		30	100%

Based on the frequency distribution in Table 5, it can be observed that the majority of children in the experimental group achieved creativity scores within the interval range of 82–89, with a frequency of 15 children, representing 50% of the total participants. This finding indicates that half of the children in the experimental group demonstrated a high level of creativity after the implementation of the learning intervention.

In addition, 20% of the children scored within the interval range of 70–75, and 13% fell within 76–81, which are still categorized as relatively high levels of creativity. Only 17% of the participants obtained scores in the lowest range (64–69).

Overall, the data show a significant shift in the distribution of creativity scores toward higher categories compared to the pre-test results. This suggests that the learning treatment applied in the

experimental group utilizing animated videos through the Problem Based Learning (PBL) and Project-Based Learning (PjBL) methods had a positive and substantial impact on improving children’s creative abilities.

Table 6. Frequency Distribution of Post-test Creative Ability of Children in the Control Group at Aisyiyah 1 Bukittinggi

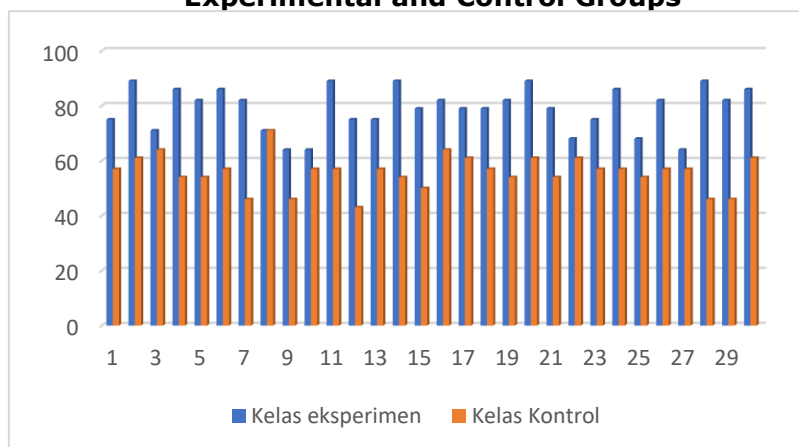
Interval	Midpoint	Frequency (f)	Percentage (%)
43-48	45	5	16%
49-54	51	7	24%
55-60	57	10	33%
61-66	63	7	24%
67-71	69	1	3%
Range		30	100%

As shown in Table 6, the majority of children in the control group obtained creativity scores within the interval range of 55–60, with a frequency of 10 children, representing 33% of the total participants. This indicates that most children in the control group demonstrated a moderate level of creativity after the learning process.

Furthermore, 24% of the children scored within the interval ranges of 49–54 and 61–66, respectively, showing a relatively balanced distribution across middle categories. Only 16% of the participants scored in the lower interval (43–48), while a small proportion (3%) achieved the highest score range (67–71).

Overall, the data suggest that the creativity level of children in the control group remained relatively moderate after the learning activities. Compared to the experimental group, which showed a clear improvement in higher score intervals, the control group exhibited limited progress in developing creativity. This outcome implies that conventional learning methods are less effective in stimulating children’s creative potential compared to innovative approaches such as PBL and PjBL supported by animated video media.

Figure 2: Comparison of Post-Test Creativity Scores Between Experimental and Control Groups



The bar chart above illustrates the comparison of post-test creativity scores between the experimental class (blue bars) and the control class (orange bars). The results show that the creativity scores of children in the experimental class are consistently higher than those in the control class across almost all participants (1–30).

Most children in the experimental class achieved scores ranging from 70 to 90, indicating that the implementation of Problem-Based Learning (PBL) and Project-Based Learning (PjBL) methods integrated with animated video media had a positive impact on enhancing children's creativity. In contrast, the control class, which applied conventional learning methods, generally achieved lower scores, ranging from 45 to 65, reflecting a comparatively lower level of creativity development.

The significant difference between the two groups demonstrates that the integration of problem- and project-based learning supported by animated video media is more effective in stimulating ideas, imagination, and creative thinking skills among young children. Therefore, this innovative learning approach can be recommended as a strategic alternative for kindergarten teachers to optimize the development of children's creativity.

Statistical analysis was conducted to ensure that the research data met the fundamental assumptions required before hypothesis testing. The analytical procedures included tests of normality, homogeneity, and a two-way ANOVA, all of which were performed using SPSS version 22.0 for Windows. The normality test was conducted using the Shapiro–Wilk method on both pre-test and post-test scores of the experimental and control groups. The results showed that all significance (Sig.) values were greater than 0.05, specifically 0.253 and 0.333 for the experimental group and 0.167 and 0.233 for the control group. These values indicate that the data were normally distributed, thereby satisfying the assumption for conducting further parametric statistical analyses.

Next, a homogeneity test was performed to determine whether the data from the experimental and control groups had equal variances. The test was conducted using a one-way ANOVA. The results showed that all significance values were greater than 0.05, namely 0.456, 0.288, and 0.723. These findings indicate that the data were homogeneous, meaning both groups had similar variances. Therefore, it can be concluded that the experimental and control groups had equivalent characteristics prior to the intervention, fulfilling the assumption of homogeneity.

After confirming normality and homogeneity, hypothesis testing was carried out using a two-way ANOVA. The results indicated that both the Problem-Based Learning (PBL) and Project-Based Learning (PjBL) methods, when combined with animated video media, had a significant effect on children's creativity development. Specifically, the PBL method yielded a significance value of $0.000 < 0.05$, suggesting a significant influence on children's creativity. Similarly, the PjBL method produced a significance value of $0.000 < 0.05$, indicating a significant effect on improving creativity. However, the combined influence of both

methods resulted in a significance value of $0.804 > 0.05$, suggesting no significant joint effect between the two learning methods on creativity development. Moreover, the interaction between PBL and PjBL showed a significance value of $0.932 > 0.05$, implying that there was no significant interaction effect between the two approaches in influencing children's creativity.

Overall, the model produced a value of 0.454, which means that approximately 45.4% of the variance in children's creativity development can be explained by the application of Problem-Based Learning and Project-Based Learning using animated video media. These results indicate that both teaching methods are effective in enhancing early childhood creativity, although their interaction effects are significant.

Discussion

The findings of this study revealed that the implementation of the Problem Based Learning (PBL) and Project Based Learning (PjBL) methods through animated video media had a significant effect on improving children's creativity at Aisyiyah 1 Kindergarten Bukittinggi. Both methods effectively enhanced children's creative thinking abilities through contextual, active, and enjoyable learning activities. This result aligns with (Elsa, 2022), who stated that problem and project based learning fosters reflective thinking and strengthens collaborative skills among children. Furthermore, (Tullah et al., 2022) emphasized that animated video media provides powerful visual stimuli that enhance children's motivation and engagement during learning activities.

Interestingly, the results also indicate that there was no statistically significant difference between the effectiveness of PBL and PjBL in improving children's creativity. From a theoretical perspective, this finding can be explained by the shared constructivist foundations of both learning models. PBL and PjBL equally emphasize active learning, learner autonomy, problem exploration, and meaning-making processes, which are essential mechanisms in creativity development. As a result, when both models are supported by animated video media, they provide comparable cognitive and experiential conditions that stimulate divergent thinking, imagination, and idea generation in early childhood.

The PBL method encourages children to develop critical thinking and problem solving skills, while the PjBL method provides opportunities to create tangible and imaginative works through collaborative projects. The combination of these two methods, supported by interactive digital media, strengthens children's ability to express and develop their creative ideas (Stadlinger et al., 2021). This is also supported by (Munar & Maemonah, 2022), who noted that creativity is an essential aspect that must be developed from an early age because it significantly influences children's cognitive, social, and emotional development. Moreover, (Hapsari et al., 2019) found that animated video media offers meaningful and memorable learning experiences for young learners.

Compared to previous studies that predominantly employed single-method designs or descriptive approaches, this study adopts a comparative experimental design that simultaneously examines two learning models and their interaction with digital media. This approach provides a more comprehensive understanding of how constructivist-based pedagogies function within technology-supported learning environments, particularly in early childhood education contexts. The novelty of this study lies in the integration of two innovative learning approaches, Problem Based Learning (PBL) and Project Based Learning (PjBL), supported by interactive animated video media within the context of early childhood education in Indonesia. More specifically, the novelty of this research is reflected in its examination of the comparative effectiveness and interaction effects of PBL and PjBL when integrated with animated video media an experimental approach that remains underexplored in early childhood creativity research. By testing both main and interaction effects, this study contributes empirical evidence to the limited body of research on pedagogical model equivalence and digital media integration in early childhood settings.

Although the study demonstrated a significant improvement in children's creativity, several limitations were identified. The research was confined to a single institution and conducted within a relatively short period, limiting its generalizability. In addition to these limitations, methodological constraints should be acknowledged, including the relatively small sample size, potential teacher bias in implementing instructional models, and the reliance on observational instruments that may not fully capture the multidimensional nature of creativity. These limitations suggest the need for caution in interpreting the findings and highlight opportunities for future studies to employ larger samples, longer interventions, and more diverse creativity assessment tools. Additionally, technical constraints such as limited technological resources and teachers' proficiency in operating digital media posed challenges during implementation (Idhan et al., 2025; Martin et al., 2025). Therefore, further research with a broader scope and extended duration is recommended to comprehensively examine the effectiveness of integrating PBL and PjBL using animated video media in early childhood education.

From a practical perspective, the findings imply that early childhood teachers can flexibly implement either PBL or PjBL supported by animated video media to foster creativity, provided that learning activities are well structured, contextual, and developmentally appropriate. Schools are encouraged to design sustainable digital-supported learning environments that empower teachers to integrate problem-solving and project-based activities as part of routine classroom practice.

4. Conclusion

The novelty of this study lies not merely in integrating animated video media with Problem-Based Learning (PBL) and Project-Based Learning (PjBL), but in employing a comparative experimental design

that systematically examines the main and interaction effects of two constructivist-based learning models within the context of early childhood education. This study provides empirical evidence that animated video media significantly enhance children's creativity when implemented within both PBL and PjBL frameworks. Importantly, the absence of a significant interaction effect indicates that the effectiveness of each learning model operates independently rather than synergistically, suggesting that both PBL and PjBL can serve as equally viable pedagogical alternatives for fostering creativity when supported by digital visual media. Through this design, the study contributes to a clearer understanding of instructional model equivalence and interaction effects in technology-supported early childhood learning environments. Theoretically, this study contributes to the growing body of knowledge that emphasizes the effectiveness of technology-assisted learning in fostering divergent thinking, problem-solving, and originality in early childhood education.

This research provides practical benefits for the community, particularly for teachers and school leaders in kindergartens, as it offers a creative and enjoyable learning model that aligns with the goals of the Merdeka Curriculum. Teachers are encouraged to apply digital-based learning methods to optimize children's creative growth, while school principals are expected to provide institutional support to ensure effective learning implementation. For future research, it is recommended to conduct qualitative studies to explore more deeply the interaction between PBL and PjBL in stimulating creativity through digital media. Furthermore, this program can serve as a model for broader community engagement initiatives that empower teachers to integrate technology, creativity, and child-centered learning practices in early education settings.

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