



Project Based Learning: Enhancing Character and Creative Thinking Skills through Activity-Based Projects in Numeracy Literacy Courses

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Abstrak

Banyaknya peristiwa tawuran dan bullying yang terjadi di kalangan pelajar menandakan adanya masalah dengan karakter yang dihadapi saat ini. Selain itu, kemajuan teknologi dan ilmu pengetahuan menuntut seseorang untuk menguasai kemampuan berpikir kreatif. Oleh karena itu, penelitian ini bertujuan untuk mengeksplorasi dampak model PjBL berbasis aktivitas terhadap pengembangan karakter dan keterampilan berpikir kreatif. Penelitian ini menggunakan desain kuasi-eksperimental yang dikenal sebagai nonequivalent post-test only control group design. Populasi terdiri dari seluruh mahasiswa pendidikan dasar yang terdaftar dalam mata kuliah Pengembangan Literasi Numerasi, berjumlah 120 mahasiswa. Tes dan kuesioner sering digunakan dalam penelitian untuk mengumpulkan data. Metode pengumpulan data yang digunakan dalam penelitian ini melibatkan analisis deskriptif dan analisis statistik inferensial. Analisis inferensial dilakukan dengan menggunakan MANOVA. Hasil penelitian menunjukkan adanya perbedaan karakter dan keterampilan berpikir kreatif setelah siswa diajarkan menggunakan Model PjBL Berbasis Aktivitas. Berdasarkan penelitian, terdapat perbedaan dalam karakter dan keterampilan berpikir kreatif, yang terlihat dari perbedaan nilai rata-rata. Perbedaan karakter antara siswa yang diajarkan dengan model PjBL Berbasis Aktivitas dan yang tidak adalah 13,74, dengan kelompok eksperimen memiliki karakter rata-rata yang lebih tinggi. Demikian pula, perbedaan keterampilan berpikir kreatif antara siswa yang diajarkan dengan model PjBL Berbasis Aktivitas dan yang tidak adalah 11,44, dengan kelompok eksperimen menunjukkan kemampuan berpikir kreatif rata-rata yang lebih tinggi. Selain itu, analisis menunjukkan bahwa variabel yang lebih mempengaruhi adalah karakter dibandingkan keterampilan berpikir kreatif. Temuan ini memberikan dasar yang kuat untuk merekomendasikan model PjBL berbasis aktivitas sebagai solusi untuk meningkatkan karakter dan keterampilan berpikir kreatif siswa.

Kata Kunci: Aktivitas, Berpikir Kreatif, Karakter, PjBL

Abstract

The numerous incidents of fights and bullying among students indicate current problems with character development. Additionally, advances in technology and science require individuals to master creative thinking skills. Therefore, this study aims to explore the impact of an activity-based PjBL model on the development of character and creative thinking skills. This research employs a quasi-experimental design known as the nonequivalent post-test only control group design. The population consists of all elementary education students enrolled in the Numeracy Literacy Development course, totaling 120 students. Tests and questionnaires are often used in research to collect data. The data collection methods employed in this study involve descriptive analysis and inferential statistical analysis. Inferential analysis was conducted using MANOVA. The research results indicate differences in character and creative thinking skills after students were taught using the Activity-Based PjBL Model. Based on the study, there are differences in character and creative thinking skills, as seen from the differences in mean values. The difference in character between students taught with the Activity-Based PjBL model and those who were not was 13.74, with the experimental group having a higher average character. Similarly, the difference in creative thinking skills between students taught with the Activity-Based PjBL model and those who were not was 11.44, with the experimental group showing a higher average creative thinking ability. Additionally, the analysis indicates that the variable influencing more is character rather than creative thinking skills. These findings provide a strong basis for recommending the activity-based PjBL model as a solution to improve students' character and creative thinking skills. This model not only focuses on the completion of concrete projects but also integrates activities that encourage collaboration, problem-solving, and innovation.

Keywords: Activity, Creative Thinking, Character, PjBL

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1. INTRODUCTION

Technological and scientific advancements offer numerous benefits, such as simplifying daily activities, improving efficiency across various sectors, and accelerating information dissemination. However, without strong character and morals, these advancements can lead to negative consequences. Character strength is now recognized as crucial for understanding career choices, therapeutic relationships, and overall human development, offering insights and practical strategies to enhance quality of life (Dewi et al., 2021; Stahlmann et al., 2024). Character refers to a person's consistent lifestyle and values, shaped from childhood and continuing throughout life, closely linked to psychosocial development and forming a strong foundation for personality (Birhan et al., 2021; Torimtubun et al., 2020; Utomo & Muntholib, 2018). Character development includes fostering positive habits and instilling strong moral values. For example, integrity, honesty, empathy, and responsibility are key aspects of good character development. Education and the family environment play a critical role in this process. Children raised with positive values tend to have strong characters and can better face life's challenges.

The importance of character development is also evident in professional and social contexts. In the workplace, individuals with strong character are more trusted, capable of teamwork, and exhibit high work ethics. In social life, they can build healthy and constructive relationships with others. Therefore, investing in character development benefits not only individuals but also society as a whole. By understanding the importance of character strength, we can more wisely utilize technological and scientific advancements, ensuring these advancements provide maximum positive impact for everyone (Sakti et al., 2024; Sugiarti et al., 2022; Sumartias et al., 2020). Character does not develop spontaneously but through a lengthy process involving many parties. Character formation begins in childhood and continues throughout life, involving education, family environment, and life experiences. This process is closely linked to psychosocial development and is crucial as it forms a strong foundation for an individual's personality. Investing in character development benefits not only individuals but also society as a whole, helping to utilize technological and scientific advances wisely and positively.

In addition to the factors supporting an individual's progress in facing STEM development, creative thinking plays a crucial role. Creative thinking involves a combination of various cognitive processes (Zhuang et al., 2021), which have been shown to correlate with higher performance at certain cognitive levels, particularly in memory-based processing (Gray et al., 2019; Kenett et al., 2018). This includes the ability to effectively gather information and semantically link it to generate new ideas. In this context, individuals with high levels of creativity tend to excel in accessing and manipulating their memories, enabling them to create innovative and original solutions. Furthermore, creative thinking also involves convergent thinking abilities (Dang et al., 2023; Willemsen et al., 2023). The importance of student motivation also becomes a crucial factor to consider when attempting to develop creative thinking among students (Wilkie, 2024). The presence of creative thinking abilities holds tremendous potential in enhancing various individual skills. Creative thinking isn't just about generating new ideas (Fatmawati et al., 2021; Purwati & Alberida, 2022), but also about seeing problems from different perspectives and finding innovative solutions. By practicing creative thinking, one can expand the boundaries of their imagination (Rosen et al., 2020; Tan & Tan, 2023) and become more open to new possibilities. This ability also has a positive impact on communication skills, helping individuals express their ideas clearly and effectively. Furthermore, creative thinking strengthens collaboration skills (Bahtiar et al., 2023), enabling individuals to contribute innovatively and solve problems collectively. Therefore, creative thinking skills are not only relevant in the context of creativity but also make a valuable contribution to enhancing various individual skills in everyday life. Thus, the

significance of creative thinking skills leads to their development from an early age (Segundo-Marcos et al., 2023).

The issues of character and creative thinking abilities in children and adolescents have become pressing topics in discussions about their development. Firstly, character issues often arise due to a lack of education in moral and ethical values in their social and educational environments (Ridho, 2023). The insufficient emphasis on aspects such as empathy, integrity, and social responsibility can lead to detrimental delinquent behaviors, such as neglecting social obligations, exerting power dominance, or engaging in other aggressive and destructive actions (Moudatsou et al., 2020). Children who do not receive proper guidance in character may struggle to develop healthy relationships with others and face conflicts or everyday life challenges constructively. Second, the limited creative thinking abilities in children and adolescents are often attributed to educational approaches that do not support creativity and innovation. In many educational systems, excessive emphasis is placed on academic achievement measured through standardized tests and evaluations. This approach often promotes convergent thinking, which focuses on memorizing material and solving problems based on predetermined patterns. As a result, children may not be encouraged to think outside the box, explore new ideas, or create innovative solutions to complex problems. They may tend to be trapped in conventional thinking patterns, inhibiting the development of creativity and critical thinking skills necessary to compete in a rapidly evolving world.

This situation clearly requires attention and a solution. One of the solutions that can be employed is the activity-based Project-Based Learning (PjBL) model. PjBL is used as a solution to this problem because it has a significant impact on learning. Moreover, in the new curriculum, this model is one of the recommended learning models. The implementation of PjBL affects various student abilities, including writing skills (Darmawan, 2020; Isman et al., 2022), collaboration skills (Saenab et al., 2019), higher-order thinking skills (Winarni, 2019), creativity (Surya et al., 2018; Wulandari et al., 2019), numeracy literacy skills (Faridah et al., 2022), and critical thinking skills (Efendi et al., 2020). By applying PjBL, students not only acquire knowledge but also skills relevant to contemporary needs. This is expected to enhance the overall quality of education. Several studies related to the Project Based Learning (PjBL) model have been conducted. For example, research indicates that the implementation of the Problem Based Learning (PBL) model has a positive impact on students' independence (Andy et al., 2022). Additionally, character education values can be enhanced through the Project of Strengthening the Pancasila Student Profile (P5) (Fitriani et al., 2023). It has been reported that the project-based learning model significantly influences students' creative thinking skills and learning outcomes (Rafik et al., 2022). An increase in students' creative thinking abilities has also been observed (Sinta et al., 2022). PjBL based on ethnomathematics has been demonstrated to positively affect students' creative thinking skills (Nurislamiati & Muh. Irfan, 2022). Furthermore, PjBL has been concluded to significantly enhance students' creative thinking abilities (Pulungan & Khairuna, 2023; et al., 2024). Overall, these studies confirm that the Project Based Learning (PjBL) model and its variations significantly contribute to the development of students' creative thinking skills, learning outcomes, and character values. This learning model provides a deeper and more meaningful learning experience, preparing students to face future challenges.

This research aims to explore the impact of activity-based PjBL models on the development of character and creative thinking skills. The uniqueness of this study lies in the variables analyzed, which encompass activities primarily focused on media creation and lesson scenario development. Through this research, it is hoped that students will experience improvements in their character and creative thinking abilities. In this context, character refers to positive attitudes such as concern for the environment and others. The

implementation of PjBL models focusing on specific activities is expected to reinforce these attitudes through direct experience in projects that promote these values. Additionally, creative thinking skills are also a primary focus of this research. By introducing students to various activities requiring creative thinking, it is hoped that they can develop out-of-the-box thinking and innovative solutions to the problems they encounter. Thus, this research aims not only to enhance academic knowledge but also to strengthen non-academic aspects crucial to the formation of holistic individuals. In conclusion, it is hoped that the results of this study will provide new insights into the effectiveness of activity-based PjBL models in shaping the character and creative thinking skills of students, with the potential to influence educational approaches in the future.

2. METHODS

This research employs a quasi-experimental design known as nonequivalent post-test only control group design, as described (Rogers & Revesz, 2019). In this study, the experimental group was treated with an activity-based PjBL model, while the control group received treatment not involving the activity-based PjBL model. Subsequently, both groups were assessed using a post-test to compare their character and creative thinking abilities. Data collected includes the character (Y_1) of students learning with the activity-based PjBL model, character (Y_1) of students learning with non-activity-based PjBL approaches, creative thinking ability (Y_2) of students learning with the activity-based PjBL model, and creative thinking ability (Y_2) of students learning with non-activity-based PjBL approaches. The research proceeds through three stages: research preparation, research implementation, and the final stage of experimentation or research completion. The first stage involves several activities, starting with an initial analysis of goals to observe learning activities before treatment. Subsequent discussions with educators focus on students' creative thinking abilities and character. The research sample was determined based on the population within the PGSD Department at Musamus University, with a curriculum plan developed accordingly. Learning materials for the experimental group are prepared using the activity-based PjBL model. Additionally, research instruments, such as post-test assessments, are designed and validated by experts before implementation. The second stage involves the implementation of the study, where the experimental group undergoes eight sessions of activity-based PjBL model learning. Finally, in the last stage, post-tests were administered to both experimental and control groups to obtain significant data. Data analysis is then conducted to process the results of students' character and creative thinking abilities, along with testing the proposed hypothesis.

In this study, the population consists of all elementary education students enrolled in the Numeracy Literacy Development course, totaling 120 students distributed across 4 classes. After conducting equivalence testing using One Way-ANOVA (Anaava-A) with SPSS 25.0 for Windows, simple random sampling was employed via a drawing method to select two classes as the research sample. Two classes, labeled as Class C and Class B, were drawn from the pool. Subsequently, another random drawing was conducted to determine the experimental and control groups. Following the draw, one class was designated as the experimental group, receiving treatment with the Activity-based PjBL model, while the other class served as the control group without implementing this model. The initial draw resulted in Class B being chosen as the experimental group with 25 students, while the second draw, selecting Class C, comprised 24 students and was assigned as the control group.

Tests and questionnaires are often used in research to collect data. In this study, the test method is employed to measure creative thinking ability, assessed using a test developed from numeracy literacy indicators. Numeracy literacy encompasses understanding and the

ability to use numbers in various contexts, including numerical problem-solving, data interpretation, and comprehension of mathematical concepts. The test instrument comprises 10 items, but only 10 questions are provided to participants. This may be done to ensure focus on specific aspects of creative thinking abilities to be measured, while still covering relevant numeracy aspects. Furthermore, in this research, character focusing on environmental and interpersonal care is gauged through the use of a questionnaire as a data collection instrument. The questionnaire's development considers predetermined indicators of environmental and interpersonal care. It consists of 30 questions designed to discuss various aspects of environmental and interpersonal care. Questions in the questionnaire cover indicators such as awareness of environmental issues, pro-environmental behavior, participation in conservation activities, attitudes toward environmental protection, and involvement in environmental advocacy. Additionally, the questionnaire includes indicators of interpersonal care such as empathy and social engagement, tolerance and openness, willingness to provide assistance, participation in social activities, and understanding and appreciation of others' needs. Therefore, the questionnaire is designed to provide a comprehensive overview of individuals' attitudes toward the environment and others, as well as valuable information for understanding the level of awareness, behavior, and social engagement of respondents in the context of environmental and interpersonal care.

The data collection method employed in this study involves descriptive analysis and inferential statistical analysis. Descriptive analysis conducted in this study was processed using SPSS 26.0 for Windows, focusing on post-test data. The statistical parameters sought include mean, standard deviation, maximum, and minimum values. Meanwhile, inferential analysis was conducted using MANOVA test for post-test data. Prior to conducting the MANOVA test, preliminary tests were carried out, including normality test using Kolmogorov-Smirnov, homogeneity test using Levene Statistics and Box's Test of Equality of Covariance Matrices, and multicollinearity test. Both MANOVA and preliminary tests were performed using SPSS 25.0 for Windows.

3. RESULTS AND DISCUSSION

Results

The research results indicate an improvement in character and creative thinking skills after students were taught using an Activity-Based PjBL Model. This is evident from the detailed descriptive analysis presented in Table 1. Based on the study, there are differences in character and creative thinking skills, as seen from the differences in mean values. The difference in character between students taught with the Activity-Based PjBL model and those who were not was 13.74, with the experimental group having a higher average character. Similarly, the difference in creative thinking skills between students taught with the Activity-Based PjBL model and those who were not was 11.44, with the experimental group showing a higher average creative thinking ability. Additionally, the analysis indicates that the variable influencing more is character rather than creative thinking skills.

Table 1. Descriptive Analysis Results

Treat Dependent	Variable	Mean	Standard deviation	Minimum	Maximum	Range
Activity-Based	Character	80.64	12.68	50.37	97.81	47.44
PjBL	Creative thinking skills	78.21	13.40	51.17	98.18	41.01

Treat Dependent	Variable	Mean	Standard deviation	Minimum	Maximum	Range
Non-activity- based PjBL model	Character	66.90	16.87	37.44	91.62	54.00
	Creative thinking skills	66.77	14.94	41.48	98.92	57.44

After conducting descriptive analysis, the next step is inferential testing. Before performing the MANOVA test, preliminary tests were conducted. Preliminary analysis tests include testing for the normality of data distribution, homogeneity of variances, homogeneity of multivariate data, and multicollinearity. The first preliminary test conducted was the normality test using Kolmogorov-Smirnov. The analysis results indicate that all data come from normally distributed data groups, as evidenced by Sig. values > 0.05 , as presented in Table 2. After ensuring the normality assumption is met, the next preliminary test is homogeneity testing. In this study, homogeneity testing was conducted through two analyses: testing for homogeneity of variances using Levene's Test of Equality and testing for homogeneity of multivariate data using Box's Test of Equality of Covariance Matrices.

Table 2. Tests of Normality

Variable	Treat	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Character	Experiment	0.133	25	0.200	0.921	25	0.055
	Control	0.137	24	0.200	0.940	24	0.162
Creative	Experiment	0.119	25	0.200	0.956	25	0.340
Thinking	Control	0.112	24	0.200	0.971	24	0.693

The homogeneity analysis results indicate that the research data came from homogeneous data groups, as evidenced by the Sig. values for each test being greater than 0.05. The Sig. value for Levene's Test of Equality is 0.081 for character, while the Sig. value for learning outcomes is 0.74. Similarly, the homogeneity test using Box's Test of Equality of Covariance Matrices yields a Sig. value of 0.56 with an F value of 0.68. The next preliminary test is multicollinearity testing. The analysis results show that the VIF (Variance Inflation Factor) and tolerance values are close to 1, indicating that there is no correlation between the Character and Creative Thinking Ability variables. The prerequisites for MANOVA analysis have been met, as the research data obtained are normally distributed, homogeneous, and there is no linear relationship between variables. Therefore, hypothesis testing with MANOVA can be conducted. The complete analysis results are presented in Table 3 and Table 4.

Table 3. Multivariate Tests

	Effect	Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	0.979	1065.58	2.00	46.00	0.000
	Wilks' Lambda	0.021	1065.58	2.00	46.00	0.000
	Hotelling's Trace	46.330	1065.58	2.00	46.00	0.000
	Roy's Largest Root	46.330	1065.58	2.00	46.00	0.000
Treat	Pillai's Trace	0.256	7.90	2.00	46.00	0.001
	Wilks' Lambda	0.744	7.90	2.00	46.00	0.001
	Hotelling's Trace	0.344	7.90	2.00	46.00	0.001
	Roy's Largest Root	0.344	7.90	2.00	46.00	0.001

Based on the analysis results, several findings were obtained. The MANOVA results show Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root with an F coefficient of 1065.58 and a Sig. value of 0.00. This indicates that there is a simultaneous difference in character and creative thinking ability among student groups taught with the Activity-Based PjBL Model.

Table 4. Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Character	2311.01	1	2311.006	10.43	0.00
	Creative Thinking	1600.51	1	1600.545	7.97	0.00
Intercept	Character	266543.30	1	266543.295	1203.47	0.00
	Creative Thinking	257406.01	1	257406.01	1281.11	0.00
Treat	Character	2311.00	1	2311.00	10.43	0.00
	Creative Thinking	1600.55	1	1600.55	7.97	0.00
Error	Character	10409.71	47	221.48		
	Creative Thinking	9443.44	47	200.92		
Total	Character	280389.47	49			
	Creative Thinking	269386.73	49			
Corrected Total	Character	12720.71	48			
	Creative Thinking	11043.98	48			

The analysis of Between-Subjects Effects shows an F value of 10.434 with a Sig. value of 0.00, which is smaller than 0.05. This indicates that the Activity-Based PjBL Model has an influence on character. Thirdly, the analysis of Between-Subjects Effects shows an F value of 7.97 with a Sig. value of 0.00, which is smaller than 0.05. This indicates that the Activity-Based PjBL Model has an influence on students' creative thinking abilities.

Discussion

Project-based Learning (PjBL) model that focuses on activity has a significant impact on students' character and creative thinking abilities. First, through active participation in learning, students can apply learned concepts in real-world contexts. For example, in numeracy literacy, they can design projects involving data analysis or mathematical modeling, providing them with opportunities to understand and apply knowledge practically. Active participation in learning is the foundation of the activity-based Project-based Learning (PjBL) model. In this context, students not only become recipients of information but also primary actors in the learning process. One of the main advantages of active participation is students' ability to apply learned concepts in real-world contexts. For example, in numeracy literacy, they may be faced with projects requiring them to perform data analysis or mathematical modeling. In such projects, students must apply learned mathematical concepts in situations similar to the real world. For example, they may be asked to collect sales trend data at a store or perform statistical analysis on population data. By undertaking such projects, students not only understand mathematical concepts theoretically but also see how relevant and useful these concepts are in everyday life. Additionally, through these projects, students also have the opportunity to develop practical skills such as data collection, analysis, and problem-solving. They learn how to overcome challenges that may arise in modeling or data analysis, which are valuable skills beyond the classroom environment. Thus, active participation in learning, particularly through activity-based PjBL models, provides valuable opportunities for students to apply learned concepts in real-world contexts, which in turn can

enhance their understanding as well as the practical skills needed to succeed in the real world (Indarti, 2016; Kusadi et al., 2020).

Kedua, kolaborasi dalam kelompok memperkaya keterampilan sosial siswa, seperti Second, collaboration within groups enriches students' social skills, such as communication and teamwork abilities. Within a group environment, they learn to support and appreciate each other's contributions, reinforcing values such as empathy and cooperation. In the context of the Project-based Learning (PjBL) model, group collaboration essential, as students must work together to complete complex projects (Sagala et al., 2020). During collaboration, students learn to listen to others' opinions, articulate ideas clearly, and resolve conflicts that may arise. Moreover, through this experience, they can also develop empathy towards their group members, understand their perspectives, and learn to collaborate to achieve common goals (Hendrawati et al., 2024). Thus, group collaboration not only enhances students' social skills but also strengthens interpersonal relationships and fosters a shared work ethic crucial for success in various life domains (Darmuki et al., 2023).

Third, recognition for showcased works in the classroom space provides an additional boost for students to create high-quality and unique pieces. This not only enhances their confidence but also motivates them to continue innovating and creating. When students see their work displayed and acknowledged in front of peers and instructors, they feel validated and inspired to further develop their abilities and explore new ideas. It also reinforces their sense of responsibility towards the quality of the work they produce. The practice of giving and receiving feedback not only improves the quality of work but also strengthens social responsibility and environmental awareness. By providing constructive feedback, students not only help their peers grow but also strengthen relationships among group members. Additionally, they learn to appreciate others' contributions and recognize the importance of collaboration in achieving common goals. These practices create an inclusive and supportive learning environment where every individual feels valued and supported to thrive. Therefore, acknowledged works and practicing feedback contribute significantly to the formation of positive character (Gan et al., 2021) and social skills of students..

In the learning process using activity-based PjBL model, students are accustomed to cleaning their learning environment after completing a project or before the start of a learning session. This is closely related to instilling in students the habit of maintaining their environment, which in turn impacts their attitudes towards the environment. Cleaning the learning environment after completing a project or before learning begins is not just a routine for cleanliness but also becomes part of a larger educational process. By involving students in this action, they not only understand the importance of maintaining cleanliness and tidiness in the environment but also begin to form a sense of responsibility towards the environment. The habit of cleaning the learning environment together also creates collective awareness of the importance of environmental upkeep. Students learn that maintaining cleanliness and tidiness in the environment is a shared responsibility as members of the academic community. This gradually fosters an attitude of caring for the environment, where students not only appreciate physical cleanliness but also value and take care of the environment around them. Thus, the practice of cleaning the learning environment in the context of activity-based PjBL learning not only reinforces values of cleanliness and tidiness but also shapes attitudes of concern and responsibility towards the environment as a whole (Darmawan, 2021; Triani et al., 2019). This creates a better learning environment not only for current students but also for future generations.

Fourth, in the implementation of the PjBL (Project-based Learning) model, students have ample opportunities to develop creative thinking skills comprehensively. Through a series of projects they encounter, students are not only involved in real problem-solving but are also encouraged to explore various ideas, collaborate synergistically, and generate

innovative solutions. Crucial elements of this approach, such as exploration, collaboration, and problem-solving, provide a foundation for students to deepen their understanding of creativity and how to apply it in real-world contexts. Exploration activities prompt students to delve into various concepts, ideas, and approaches they may not have previously understood. By boldly exploring diverse perspectives and pushing the boundaries of their thinking, students can open themselves up to emerging possibilities. Collaboration is also key in this process. By working together with their peers, students not only gain access to various viewpoints and experiences but are also encouraged to think more broadly and creatively. Group discussions can spark fresh ideas and solutions that were previously unconsidered. Furthermore, the importance of problem-solving as an integral part of PjBL provides a strong foundation for the development of creative thinking skills. Students are faced with real challenges that require unconventional solutions. By encouraging them to think outside the box, PjBL helps enhance their creativity in finding unique and effective solutions. Through this process, students learn that failure is not the end of everything but an opportunity to learn and grow stronger. PjBL also encourages students to regularly reflect on their learning experiences (Ida, 2023). By contemplating their process, students can identify strengths, weaknesses, and areas where they can enhance their creative thinking skills. This enables them to continue to grow and improve over time. By taking these steps, students can utilize every PjBL project as an opportunity to train and develop their creative thinking skills (Febriyanti et al., 2020; Mulyani et al., 2023), equipping themselves to be valuable innovators and problem solvers in various future contexts.

The delineations provided herein depict that the Project-based Learning (PjBL) model, with its emphasis on activity, lays a sturdy foundation for enriching students' characters and enhancing their creative thinking abilities. Through collaboration on projects relevant to their surroundings, students engage in direct learning experiences that bolster their social and communication skills. Beyond just passive listening, they encounter real challenges requiring creative solutions, thereby strengthening problem-solving skills and critical thinking. This model also fosters students' independence in seeking information, planning, and executing their projects while appreciating the uniqueness and creativity of their individual approaches. Consequently, through sustained experiences making tangible impacts in their environment, the activity-based PjBL model emerges as a potent tool in shaping students' characters and fostering their creative thinking abilities.

4. CONCLUSION

The Activity-Based Project-Based Learning (PjBL) model has been proven to have a positive impact on students' character and creative thinking skills. Research shows that there is a significant difference in the average scores between students taught with the activity-based PjBL model and those who are not. These findings provide a strong basis for recommending the activity-based PjBL model as a solution to improve students' character and creative thinking skills. This model not only focuses on the completion of concrete projects but also integrates activities that encourage collaboration, problem-solving, and innovation.

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