

EFFECTIVENESS OF PROJECT-BASED LEARNING MODELS TO IMPROVE INDEPENDENCE AND COLLABORATION IN CHILD AGE 4-5 YEAR

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ABSTRACT

The project-based learning approach allows children to be actively involved in activities encouraging them to take independent roles and work together to complete tasks. This study used a quantitative experimental method with a single-group pretest-posttest design involving 30 children. The sample in the survey was group A children aged 4-5 years at Agropolitan Kindergarten, Kabila District, Kabila Bone Regency, Gorontalo, totaling 15 children. The study results showed that Before treatment (pretest), the average scores of independence and collaboration were at a lower level, namely 52 and 48 respectively. After being given treatment in the form of Project-Based Learning (posttest), the independence score increased to 78, while the collaboration score increased to 75. From the results of the statistical analysis of the t-test hypothesis test above, the researcher can conclude that the significant test obtained a t-count value = 14.38 independence and 14.68 collaboration while the t-table value at $(\alpha) = 0.05$ is as large as 0.242. If $t\text{-count} > t\text{-table}$; $14.38 > 0.242$ and $14.68 > 0.242$ then H_0 is rejected and H_1 is accepted. By being accepted, the hypothesis is accepted, meaning that there is an Influence of the Project-Based Learning Model to Improve Independence and Collaboration in Children Aged 4-5 Years at Kindergarten Pembina Agropolitan Kabila Bone Gorontalo. This study enriches the literature on project-based learning in early childhood education and implies that this approach effectively builds the foundation of independence and collaboration. Further studies can explore the long-term impact of this model on other aspects such as children's creativity and problem solving.

Key Words: Project Based Learning (PBJL) Model; Independence; Collaboration

ABSTRACT

Pendekatan pembelajaran berbasis proyek memungkinkan anak-anak terlibat aktif dalam kegiatan yang mendorong mereka untuk mengambil peran mandiri dan bekerja sama untuk menyelesaikan tugas. Penelitian ini menggunakan metode eksperimen kuantitatif dengan desain single-group pretest-posttest yang melibatkan 30 anak. Sampel dalam survei adalah anak kelompok A usia 4-5 tahun di TK Agropolitan, Kecamatan Kabila, Kabupaten Kabila Bone, Gorontalo, yang berjumlah 15 anak. Hasil penelitian menunjukkan bahwa Sebelum perlakuan (pretest), skor rata-rata kemandirian dan kolaborasi berada pada level yang lebih rendah, yaitu masing-masing 52 dan 48. Setelah diberikan perlakuan berupa Project-Based Learning (posttest) skor kemandirian meningkat menjadi 78, sedangkan skor kolaborasi meningkat menjadi 75. Dari hasil analisis statistik uji hipotesis uji-t di atas, peneliti dapat menyimpulkan bahwa uji signifikan diperoleh nilai t hitung = 14,38 kemandirian dan kolaborasi 14,68 sedangkan nilai t tabel pada $(\alpha) = 0,05$ sama besar yaitu 0,242. Apabila $t\text{ hitung} > t\text{ tabel}$; $14,38 > 0,242$ dan $14,68 > 0,242$ maka H_0 ditolak dan H_1 diterima. Dengan diterima maka hipotesis diterima, artinya ada Pengaruh Model Project-Based Learning Terhadap Peningkatan Kemandirian dan Kerjasama pada Anak Usia 4-5 Tahun di TK Pembina Agropolitan Kabila Bone Gorontalo. Studi ini memperkaya literatur tentang pembelajaran berbasis proyek dalam pendidikan anak usia dini dan menyiratkan bahwa pendekatan ini secara efektif membangun fondasi kemandirian dan kolaborasi. Studi lebih lanjut dapat mengeksplorasi dampak jangka panjang model ini pada aspek lain seperti kreativitas anak dan pemecahan masalah.

Kata Kunci: Model Pembelajaran Berbasis Proyek (PBJL); Kemandirian; Kolaborasi

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INTRODUCTION

Project-Based Learning (PBJL) is a learning approach that is increasingly being applied in various levels of education, including early childhood education. (Samina et.al 2023) PBJL emphasizes the learning process centered on students through involvement active in finish a real and relevant project. (Fawwaziara et al., 2024) On early child age, model learning can play an important role in building independence as well as enhancing collaboration skills, two important aspects of child development. Independence is one of the main of education in early childhood, in which children are expected to manage themselves, make decisions, and solve problems without relying too much on others. on person mature (Turpin et et al., 2024). Learning based on projects supports the development of independence by allowing children to be directly involved in learning activities that require personal initiative and responsibility (Prasutri et al., 2019). According to Piaget, children at an early age are at a stage of development where exploration and experimentation are their main ways of learning. PBJL provides space for children to learn through experience, allowing them to develop cognitive and social skills simultaneously (Piaget, 1952). In addition to independence, collaboration is also an important skill that needs to be developed early on. (Vygotsky, 1978) in his sociocultural development theory emphasized the importance of social interaction in the learning process. According to him, children learn most effectively when they collaborate with peers or with more experienced people. Project-based learning provides an environment that encourages children to work in groups, share ideas, and help each other complete tasks together (Masdiana & Fauzi, 2023). (Masdiana & Fauzi, 2023) This collaboration not only develops social skills and communication but also forms a sense of empathy and cooperation that will benefit children in everyday life.

In the context of early childhood learning, the projects designed must be adapted to their cognitive and emotional development. These projects must be concrete, interesting, and relevant to the child's world, such as making simple crafts, planting plants, or build models from block. According to (Helmet And Katz, 2011), projects that involve children in the process of independent inquiry and exploration support them to understand deeper concepts and enrich their learning experiences (Ananda & Yunus, 2017). The superiority of the PBJL model in increasing independence and collaboration in early childhood is also supported by other studies showing that children who learn through projects have higher levels of participation, deeper engagement, and better learning outcomes (Thomas, 2000). PBJL provides opportunities for children to experience an authentic learning process, where they not only master the content, but also develop broader skills such as problem-solving, communication, and teamwork (Azizah et al., 2023). Thus, the Project-Based Learning model has great potential to increase independence and collaboration in

early childhood. (Beno et al., 2022) said that this approach not only enriches children's learning experiences but also prepares them to become individuals who can think critically, work together, and be responsible. Implementation of PBJL in education child age early can give foundation Which strong for the development child in various aspects, both cognitive, social, and emotional (Darmuki et al., 2022).

Early childhood learning plays an important role in forming the foundation of character, independence, And social skills. In Indonesia, the system of education at an early age is often focused on the method based on instructions direct from the teacher. Method This tends one-of-a-kind direction, in which Teacher more dominant in providing direction, while children act as passive recipients of the information. This approach has the potential to hinder the development of children's independence and collaboration because it provides less chance for child to active participate, think critically, And Work in groups (Ilmiyatni et al., 2019). One of the problems that arise from the conventional learning approach in Agropolitan Kindergarten schools based on observation results is the lack of space for children to explore their interests freely. In an environment learning Which too structured, children are often time restricted by rule and strict guidelines, which make them unaccustomed to taking initiative or making decisions Alone. As a result, skills of independence they No sharpened with Good, and children become too dependent on instructions and guidance from teachers or adults in around them. Besides that, aspect collaboration Also often time neglected in the learning system. Children Possibly given task for done in a way individuals, do without being encouraged to collaborate or share ideas with their peers. In the context of learning Which emphasizes competition individual, children are not Enough given opportunities to develop important social skills such as communication, negotiation, and empathy. As a result, their ability to work in groups or teams is less honed, and they tend to develop a competitive rather than collaborative mindset. In today's increasingly global and complex world, collaboration skills are critical.

Various studies have shown that the Project Based Learning (PBJL) model offer solution potential for overcoming problems. However, Although PBJL has been proven effective at various levels of education, its application in the context of early childhood education still requires further research. One of the main problems is how to adapt PBJL to the needs and capacities of children at an early age. (Darmuki et al., 2022) said that early childhood has a way of thinking that is different with children which is bigger or person mature, so that design effective projects for them must be designed by considering their cognitive and emotional developmental aspects. Thus, the importance of in-depth research on the Effectiveness of Project-Learning models for early childhood is not only for find a method to effective

implement it, but also to ensure that this model really has a significant positive impact on the development of children's independence and collaboration.

METHOD

The research method used in this study is a quantitative approach with an experimental method. According to Sugiyono (2022), the experimental research method is method Which used uentk look for influence treatment certain to another, in condition Which under control. Study This aiming For test effectiveness of the model Learning Project Based Learning (PBJL) in increase independence And 4-5 year collaboration at Tk Pembina Agropolitan Bone Bolango Gorontalo using experimental methods *one group pretest-posttest* . Study This use technique *purposive Sampling*. The research sample consisted of 15 children aged 4-5 years at Tk Pembina Agropolitan Bone Bolango Gorontalo who were given treatment in the form of PBJL implementation for six weeks. Before the intervention, the children took a pretest to measure the level of independence and collaboration. After the intervention, a posttest was conducted to measure changes in both variables. The measurement instrument used an observation scale that included indicators of independence (such as the ability to make independent decisions and complete tasks) as well as collaboration (ability Work in team And share role) And social emotional. Technique collection data which used namely observation, documentation and test performance.

Grid Observation Instruments

Observed Aspects	Indicator	Description Observation
Child Independence	1. Children are able take decision in a way independent in choose tools / materials For project	Observing whether children choose materials and tools without directions from the teacher.
	2. The child completes task project without too Lots help from the teacher	See how much often child request help to the teacher in finish task.
	3. The child shows initiative in finish problem	Observing the child who tries finish problem Alone moment meet difficulty in project.
Children's Collaboration	1. Children are able share tools and materials with Friend	Observing whether children share materials, tools, or source other power with Friend a group.
	2. Children are involved in discussion group	Observing how much often child follow as well as in discussion groups and share ideas or opinion.
	3. Children help Friend in finish task project	See how much often child help a friend in trouble in project group.

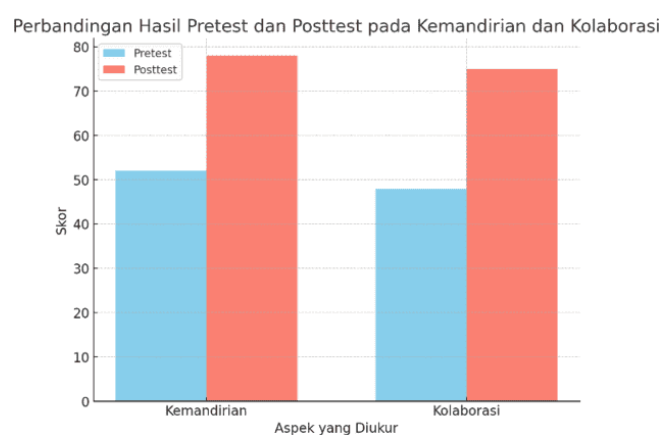
The Role of Teachers	1. The teacher gives directions without take project process transfer	Observing does the teacher give Instructions with possible way child still independent and collaborative.
	2. The teacher encourages children for think and finish problem in a way independent	Observing how teachers motivate child for solve problem without direct give solution.
Social-Emotional Child	1. Children are able finish conflict with Friend in a way independent	Observing How children finish conflict or difference opinion without mix teacher's hand.
	2. Children can express ideas and opinions in group	See whether children feel comfortable speak and give ideas in group project.
Project Process	1. Children are involved in all stage project (planning, implementation, and evaluation)	Observing whether child participate active in all stages project from beginning until end.
	2. The child shows creativity in project	Observing whether child show creativity in choose methods, materials, or solution in settlement project.

RESULTS AND DISCUSSION

RESULTS

The results of observations show that the implementation of project-based learning is very helpful for children in increasing their independence, collaboration, and social-emotional. Seen from when children work on the Mount Eruption project, children cooperate, children interact with the theme, and teachers also help children by provoking children with provocative questions so that children can think critically. They managed to complete the project that had been made, sometimes some children tried to help their friends wipe the table, and then some children returned toys when they finished playing using APE. The role of the teacher here is very important so that children's abilities in independence and collaboration are shown directly by children when playing. And this is a habit that is often done by children so it becomes a good child habit that needs to be continuously stimulated. The interactions that occur between children in project groups show how social skills such as sharing, communicating, and resolving conflicts are more honed. In terms of children's independence, it is also very good, because children are trained to do their work in groups but when returning toys and washing their hands they are very good at queuing and putting toys back in their original place. This shows that PBJL encourages children to not only focus on individual results but also to value the process of teamwork, a very

important skill in social life. The ability to work together with others is one of the essential skills. Social interaction and real-world experience play an important role in the learning process, and the implementation of PBL provides children with greater access to experience rich learning in real contexts. In addition, the increase in children's collaboration is also very prominent. This study was done to measure the effectiveness of model Project Based Learning (PBJL) in improving the independence and collaboration of 4- to 5-year-olds in Kindergarten Pembina Agropolitan Bone Bolango Gorontalo before and after being given treatment. Comparison description results Pretest And post-test on independence And children collaboration aged 4-5 years in this study can be seen in the graph that has been presented.



Picture. 1 chart *pretest- posttest*

The graph above shows a comparison of the pretest and posttest results on the aspects of independence and collaboration. Before the treatment (pretest), the average scores for independence and collaboration were at a lower level, namely 52 and 48 respectively. After being given treatment in the form of Project-Based Learning (posttest), the independence score increased become 78, whereas the score of collaboration go on become 75. Chart This illustrates that the implementation PBJL has impact significant on the second aspect, with a marked increase in the independence and collaboration skills of young children.

Variables	Mean Pretest	Mean Posttest	T- Value	P- Value	Information
Independence	18.92	24.13	14.38	<0.05	Significant (there is increase)
Collaboration	18.48	24.75	14.68	<0.05	Significant (there is increase)

Table. 1. Results Test Hypothesis (Paired Sample t- test)

To ensure the validity of the data and the significance of the research results, a hypothesis test was conducted using a *paired sample t-test*, which compared the pretest and posttest results. on sample Which same. From the results test hypothesis produced a mean pre-test value was 18.42 and an average post-test value was 37.75 with a total of 15 respondents. Results analysis statistics test hypothesis t-test in on, can researcher conclude from results significance test obtained t-value = 14.38 independence and 14.68 collaboration while the steel value at $(\alpha) = 0.05$ namely as big as 0.242. If t-count > t-table; $14.38 > 0.242$ And $14.68 > 0.242$ then H0 is rejected and H1 is accepted. If t-count > t-table, it means that there is an influence of the Project Based Learning (PBJL) model in increasing the independence and collaboration of 4-5-year-olds at Tk Pembina Agropolitan Bone Bolango Gorontalo. This confirms that the increase observed on the second variable after the implementation of PBJL is significant, not the result of chance factors or random variations in the data.

Variables	Score Pretest (P- Value)	(P- Score Posttest Value)	(P- Distribution
Independence	0.121	0.087	Normal
Collaboration	0.098	0.094	Normal

Table 2. test Kolmogorov- Smirnov

In addition, to ensure that the pretest and posttest data are normally distributed, a normality test was conducted using the Kolmogorov-Smirnov test. The results of the normality test showed that the pretest and posttest data on independence and collaboration were normally distributed with a p-value > 0.05, thus meeting the requirements for analysis using the t-test. Normality data it is important to ensure that the statistical analysis is used in accordance and provides valid results. From the analysis results, it can be seen that the implementation of

PBJL has succeeded in increasing independence and collaboration in early childhood significantly. This finding is in accordance with with theory of Piaget and Vygotsky Which states that interaction active And Work same social in activity learning can improve the ability And social children. In addition, increased independence shows that PBJL provides space for children to manage tasks and make decisions Alone, Which in accordance with the principle of constructivism in which child build knowledge through experience direct (Belaire et et al., 2024). In general overall, data produced through method experiment And statistical analysis showed high validity and reliability. Significant improvement in posttest results, as well as validity from test normality and test hypothesis, strengthen the conclusion that PBJL is effective in increasing early childhood independence and collaboration.

DISCUSSION

Project Based Learning (PBJL) is a pedagogical approach that places students at the center of the learning process, where they actively participate. in completing real projects that encourage them to think critically, work together, and learn independently (Beno et al., 2022). In this study, the application of PBJL in early childhood was shown to have a significant influence on the development of children's independence and collaboration. This finding is in line with constructivist educational theories such as those proposed by Piaget and Vygotsky, where the learning process involving active exploration and social interaction plays an important role in the development of the cognitive and social child. Results observation show that independent children improved significantly during the implementation of PBJL (Doikou, 2024). Most children were able to select tools and materials independently and complete project tasks with minimal assistance. from teacher. This reflects Piaget's principle (1952) which emphasizes that children learn through interaction with their environment, which in matter This facilitated by projects that provide freedom for children to take their own decisions. (Parwoto et al., 2024) said that PBJL allows children to engage in experience-based learning, which facilitates the process of constructing knowledge independently, in line with the concept of *discovery learning* (Rina Nurdiana, 2024). In terms of independence, children involved in the project have the opportunity to make decisions directly about choice tools and materials, how to finish tasks, to solutions to problems faced (Afelia et al., 2023).

Vygotsky (1978) emphasized that social interaction and real-world experiences play an important role in the learning process, and the implementation of PBJL provides children with greater access to experience rich learning in real contexts. In addition, increased in collaboration among children

are also very prominent. Although Some children still show a passive attitude, the majority of them are actively involved in sharing tools and materials and discussing with Friends a group (Mohammad Taufikur Rokhman, The Prophet Aria Putra, 2024). This finding supports Vygotsky's theory (1978) which emphasizes the importance of social interaction in the learning process. According to Vygotsky, through collaboration with peers, children can develop higher abilities, which is known as *the zone of proximal development (ZPD)*, where children learn from interactions with other people. more skilled (Rokhman, Ba'i Aria Son, 2024). (Turpin et et al., 2024) say in the context of PBJL, more passive children are encouraged by their group mates to get involved. in discussions and finish the problem in a way together so that collaboration skills they sharpened. Aspect collaboration Also gets attention special in this research. (Us et al., 2024) Interaction That happens between child in the group The project shows how social skills such as sharing, communicating, and resolving conflicts become more sharpened. According to Bruner (1996), learning is done in a way Collaborative learning allows children to build deeper understanding through social interaction. (Afifah et al., 2019) Children who work on projects together with peers learn to respect the opinions of others, find solutions together, and discuss the various options available. Collaboration that occurs during projects is also closely related to the formation of interpersonal skills, where children learn about cooperation and sharing responsibilities (Wela et al., 2020). In this study, most children were able to work effectively in groups, share roles, and help each other complete tasks. This shows that PBJL encourages children to not only focus on individual results but also appreciate the work process team, A skill which very important in life social. The ability to work the same with a person another is wrong One skill essential identified by Trilling and fadel (2009) as skills century 21st, And PBJL capable provide an environment which conducive for children to start developing skills from an early age.

The role of the teacher as a facilitator in this study is also very crucial. The teacher is no longer the main center that gives instructions but rather acts as a companion who guides children through questions and encouragement that encourage them to think independently (Wela et al., 2020). This principle is in line with the constructivist learning model, where the teacher must act as a *scaffolder*, providing the necessary support when children encounter difficulties, but without taking control of the learning process. According to research by Helm and Katz (2011), the role of the teacher in PBJL is to facilitate the process think and reflection of children, not to provide a direct answer. In the study, teachers succeed in facilitating independence and collaboration by giving minimal direction

However meaningful. The development of social-emotional children is also positively affected by the implementation of PBJL. Children are better able to resolve conflicts independently and express their ideas in group discussions (Cade, 2023). This is in line with findings in the literature showing that PBJL helps improve children's social and emotional abilities through direct experience in solving problems and working together with peers (Thomas, 2000). Children who previously tended to depend on the teacher in finishing conflicts, now more often try to finish it by discussing and looking for solutions together with their friends (Agbaria & Mahamid, 2023). This strengthens the argument that PBJL supports children's social-emotional development by providing them with opportunities to interact in a supportive learning environment.

The social-emotional aspects of children also develop during the implementation of PBJL. Children who are involved in the project not only study and work the same, but also develop the ability to manage their emotions when faced with differences of opinion or problems in the project. (Belaire et al., 2024) The ability to complete conflict independently which is shown by part big child is an indication that PBJL not only focuses on the results cognitive but also forms children to become individuals who can manage interactions social with better. According to Durak et al. (2011), learning which supports the social-emotional development of children is able to produce individuals who are more emotionally balanced and better prepared to face social challenges. The application of PBJL also helps children become more believable in express their ideas. (Garg & Kumari, 2024) Children which previously passive in class start more often being involved in discussions and expressing their opinions during the project. This supports Vygotsky's theory of the important role of social interaction in the development of children's language and thinking skills. Through interaction in project groups, children not only learn from their own experiences but also from the ideas and opinions of their friends, which then enriches their understanding of the problems faced (Dussault & Thompson, 2024). Overall, the application of PBJL in early childhood education has been proven effective in improving independence and collaboration skills, supporting various constructivist learning theories and previous research findings. This learning not only contributes to cognitive aspects but also encourages children's social-emotional development through active involvement in an environment that supports exploration and deep social interaction.

CONCLUSION

The conclusion of this study shows that the Project Based Learning (PBJL) model is effective in increasing independence and collaboration in early childhood. The results of the hypothesis test showed a significant increase in

independence and collaboration scores after the implementation of PBJL, with a p-value <0.05 , which indicates that the intervention this not just a coincidence. PBJL encourages children for more independent in making decisions and finishing task, as well as increases their ability to work together and share roles with peers. The implications of these findings confirm that the approach PBJL can applied in the education child age early as a strategy to build important social and cognitive skills from an early age. This research contributes in educational literature, especially in identifying the effectiveness of PBJL for early age groups, which previously received less focus than other levels of education. In addition, this study supports constructivism and sociocultural theories regarding the role of direct experience and social interaction in child development. Further research is recommended. to explore the long-term impact of PBJL on aspect development others like creativity or ability breakdown problems. Research This opens opportunities for further studies to explore the long-term impact of PBJL on developmental aspects, such as creativity and ability breakdown problems children age early, which can further enrich the child's education curriculum.

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