

The Effect of Project Based Learning on Science Process Skills in Early Children

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Abstract: The results of preliminary observations indicate that learning still uses Project Based Learning Model Learning. So that the child's ability to speak is still lacking, especially telling the contents, communicating with simple words, expressing ideas, retelling the story according to the flow. The right learning model to stimulate children's speaking ability is Project Based Learning assisted by big books, because project learning is carried out in groups and uses big book media so that it can stimulate children's speaking abilities. The purpose of this study was to determine the differences in group learning outcomes using the Project Based Learning model assisted by big books and the Project Based Learning class groups on speaking skills. The study design uses quasi-experimental research. The subjects in this study were all children of group B in TK Al-Muhajirin Malang in the 2018/2019 academic year even semester which consisted of two classes namely B1 totalling 17 children as an experimental class and B2 totalling 17 children as a control class, using purposive sampling. The prerequisite test used in this study was the construct validation test with 3 validators, namely one lecturer as a learning expert, one lecturer as a media expert, and one school principal as a practitioner to assess the validity level of the Daily Learning Implementation Plan (RPPH) and an observation sheet of participants' speaking skills students using big book.

Keywords: Project Based Learning; Science; Process Skills

INTRODUCTION

Education runs dynamically following the times so that the changes that occur in the world of education are very rapid. The existence of changes in education in Indonesia is marked by changes in the 2013 curriculum which aims to create the next generation that is able to compete in the 21st century. Learning activities in schools must refer to 4 21st century learning characters which are usually formulated in the 4Cs, namely: a) Communication; b) Collaboration; c) Critical Thinking and Problem Solving; and d) Creativity and Innovation.

The impact of these changes requires children to have several competencies and skills. Some of the competencies possessed by children according to (Greinstein, 2012) include: information and media literacy skills, contextual learning abilities, the ability to create and update, communication skills, collaboration skills, critical thinking skills, and problem solving. One of the lessons that can stimulate all aspects of development in the 21st century is science learning.

Learning science in early childhood has a very important role in helping to lay the foundation for the ability and formation of the expected human resources. It is important to provide science to individuals from an early age so that each child's early experience of science can be facilitated and develop as expected. Science is simply an activity that gives children the opportunity to explore, ask questions and learn to recognize their immediate environment through active and direct experiences experienced by children. Science for children is everything that is amazing, something that is found that is considered interesting and gives knowledge or stimulates them to know and investigate (Perdaningsari, A. P., Kristanto, A., 2014).

In addition, the purpose of learning science is to emphasize the importance of learning science for early childhood. Leeper in (Putra, 2013) suggests that the purpose of developing science for early childhood is as follows (a) so that children have the ability to solve the problems they face through the use of scientific methods, so that children are helped and become skilled in solving various problems that they face. he faced. (b) So that children have a scientific attitude. Basic things, for example: not quick in making decisions, can see things from various points of view, be careful of the information they receive and are open (c) so that children get better and more reliable scientific knowledge and information, meaning that the information obtained by the child is based on appropriate scientific standards, because the information presented is the result of findings and objective formulations and is in accordance with the rules of scientific rule that overshadows it (d) so that children are more interested and interested in living the science that is and is found in the environment. and the surrounding nature. It also gives children the opportunity to be involved in activities in daily life and society (Jain, J., Lim, B. K., & Abdullah, 2013).

Science is divided into two, namely product and process science, as a product of science is a body of well-organized knowledge about the physical and natural world, as a science process is an activity of tracing, observing, and conducting experiments (Hesti, D., & Somantri, 2015). An important ability that needs to be introduced from an early age in science learning is science process skills. The results of learning science through the scientific process produce a long impression, are not easily forgotten, and can be used as a basis for solving problems that will be faced in everyday life (Bundu, 2013).

There are three science process skills, namely basic, intermediate, and advanced process skills. Basic process skills are the most appropriate skills for preschoolers which include observing, comparing, classifying, measuring, and communicating. While intermediate skills are skills that are suitable for higher levels of education which include inferring and predicting. Finally, advanced process skills include hypotheses, defining and controlling variables (Charlesworth, R., & Lind, 1979).

Based on the results of observations that have been carried out, science process skills in children are still not optimal, including observing, comparing, measuring and communicating skills. This is indicated by the fact that there are still children who are not optimal in carrying out exploratory activities. In observing skills, there are children who have not been able to identify the characteristics of an object, identify the differences and similarities of objects, sort and provide a description of certain objects and events. In measuring skills, there are still children who have not been able to measure and use non-standard units of measure. Likewise, in comparing skills, there are still children who are not able to compare objects such as volume, color and weight. While i Based on the results of PISA (Program for International Student Assessment) (2012), Indonesian children's abilities in mathematics, science, and reading are still low compared to other children in the world. Indonesia is ranked 64th out of 65 countries participating in the test. The average math score of Indonesian children is 375, the average reading score is 396, and the average score for science is 382. These conditions must be addressed immediately considering that the existence and development of a nation lies in the quality of its human resources, not on the quality of its natural resources. . These data encourage the need to improve the quality of human resources through early childhood education (Directorate of Early Childhood Education Development, 2015). In terms of time spent on daily learning activities, focus on language and literacy (17%), social (15%), and art (15%). science (11%) and mathematics (8%) each activity has a small share. These activities do not stand alone but are interrelated activities such as literacy and science. Based on the above, science gets the second smallest portion after mathematics.n communication skills, children have not been able to convey their knowledge both orally and in writing to teachers, peers, and other adults.

Based on the explanation above, there is a need for an effort to improve science process skills in early childhood. One of them is through a project-based science learning model. This learning model is the development of a project-based learning model that is specifically designed to develop children's process science skills. Project Based Learning is an innovative teaching and learning method that involves students in research activities to solve relevant projects that allow students to work independently to build their knowledge based on projects involving real situations (Dos, SE, Gonçalves, BC, Oliveira, KB). , & Silva, 2018). In line with that, Suparno in (Trianto, 2014), states that what is meant by Project Based Learning is learning where children in groups are asked to create or do a project together, and present the results of the project. Project based learning is constructivist, meaning that students build their own understanding with the help of groups.

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teaching and learning method that involves students in research activities to solve relevant projects that allow students to work independently to build their knowledge based on projects involving real situations (Dos, SE, Gonçalves, BC, Oliveira, KB). , & Silva, 2018).

Project-based learning is a very effective approach that allows students to express opinions on topics that cover interest, to ask questions, to estimate, to develop theories, to use different tools (Du, X., & Han, 2016), so that in In this approach the child has the right to choose activities, be active and child-centred activities. The use of the project approach meets the characteristics of children who like to explore and emphasizes the importance of experiential learning, giving children to be actively involved with child-centered learning methods (Rahman, S., M. Yasin, R., & M, 2012).

Stoller in (Du, X., & Han, 2016) put forward the criteria for project based learning as follows: (1) having a process and a product; (2) give the child a project (3) have a long period of time (several days, weeks, or months); (4) integrating skills; (5) develop students' understanding of a topic through the integration of language and content; (6) collaborate with students and work alone; (7) holding students accountable for their own learning through processing, and reporting of information from target language resources; (8) assigning new roles and responsibilities to students and teachers; (9) provide a tangible final product; and (10) reflect the process and the Product.

Project-based science learning model activities consist of opening activities, core activities consisting of project activities which are divided into 3 stages, namely the project planning stage, the project implementation stage, the stage of presenting the results, the last one is the closing activity. The steps for implementing the project-based science learning model are: (a) Opening activity, the teacher opens learning with a question by asking questions that lead children to think critically (b) Core activities consist of the project planning stage, the project implementation stage and the presentation of project results (products) which has been made. (c) In closing activities, the teacher evaluates the products that have been made and provides conclusions regarding the activities that have been carried out.

Based on the results of observation, background exposure and previous research, it can be concluded that Project Based Learning contributes to improving and developing aspects of early childhood according to the age and standard of the child's level of achievement. Project Based Learning is a learning component that is a solution to problems in the field and can support aspects of children's abilities to face competition in the 21st century. In Project Based Learning children are required to find out and build their own knowledge (student center) where children are trained to be independent, train children think critically, work together in solving problems, establish communication, and exchange ideas. Therefore, researchers conducted a similar study but carried out on different subjects and places, with the title "The Effect of Project Based Learning on Early Childhood Science Skills".

METHODS

This study aims to examine the effect of project based learning on Science Process Skills in Early Childhood in group b TK al Muhajirin Malang. This study uses a quantitative approach and uses a quasi-experimental research design. This research design uses a non-equivalent pretest-pretest control group design, which will use one class as the experiment and one class as the control class. The researcher chose the research in the form of a nonequivalent control

group design because he wanted to see how much influence the process of science skills using the project based learning method had by comparing two groups, namely those who were treated and those who were not. There are two kinds of variables used in this study, namely, the independent variable, namely the learning model or Project Based Learning. The dependent variable is the ability of science skills. Before being given treatment, a pre-test will be carried out, while to determine the effect of Project Based Learning, a post-test will be carried out. After the pre-test and post-test treatment, the results of the experimental class and control class will be compared procedurally following the pattern.

O1 X O2

O3 - O4

Information

O1,O3 : Pretest

O2,O4 : Posttest

X : Project Based Learning Strategy for Science Skills

In this study there are two variables, the independent variable and the dependent variable. The independent variable in this study is Project Based Learning, the dependent variable is the factors that are measured to find the influence of the independent variable. The dependent variable in this study is the ability of science skills.

The population in this study were all children of group B in Al-Muhajirin Kindergarten Malang in the 2018/2019 academic year even semester which consisted of two classes, namely B1 and B2. This study uses a sampling technique that is purposive sampling. The researcher uses this technique with the reason of considering the age of the children who will be the research subjects, namely 5-6 years who are in group B. The sample used in this study is group B1 which is taken by 17 students as the experimental class and group B2 which is taken by 17 participants. taught as a control class.

There are two instruments that will be used, namely the treatment instrument and the assessment instrument. For the treatment instrument in the form of RPPH (Daily Learning Implementation Plan), the implementation of the treatment plan was carried out 6 times. As for the assessment instrument in the form of an observation sheet on the implementation of project-based learning to determine changes in the use of the project-based learning model.

The intervention procedure is a series of steps that become a work reference in order to complete a research. Here, the researcher describes the stages of the research procedure to be carried out to determine the effect of Project Based Learning on the ability of science skills. The intervention procedure in this study used steps that were modified by the researcher according to the condition of children aged 5-6 years based on the steps proposed by Colley (2008), namely Orienting the child; Pre-Development; Development and Closing. Meanwhile, the data analysis technique used descriptive analysis, inferential analysis, homogeneity test, and difference test. The data obtained will be processed using the SPSS 20.0 software for windows

RESULTS

The comparison test of the difference in acceptance of speaking skills between before and after the use of Big Book Assisted Project Based Learning in this study was conducted using the

Independent sample t-test. Decision making on the difference test, among others, is as follows:

- a. If the t-count value is greater than the t-table value or the significance value is <0.05 then H_0 is rejected, so there is a difference in speaking ability between before and after the use of Big Book-assisted media.
- b. If the t-count value is smaller than the table, then H_0 is accepted or the significance value is >0.05 , so the difference in speaking ability between before and after using Big Book-assisted media.

Based on the results of the independent sample t-test, it can be seen that the t-count value is 4.174 from 43 respondents, which is 2.11. From these results it can be seen that the t-count value $>$ than t-table, besides the significance value is $0.000 < 0.05$ so it can be concluded that H_1 is rejected, so there is a significant difference in speaking ability between Project Based Learning before and after using the Analysis Diagram. Descriptive of Big Book Control Class Speaking Ability.

DISCUSSION

From the research results that have been obtained, a discussion is made regarding the results of the research. The discussion will describe the results of research on the effect of Big Book Assisted Project Based Learning on the Speaking Ability of Group B in Al-Muhajirin Kindergarten Malang. In accordance with the problem formulation and research objectives on how the effect of Big Book Assisted Project Based Learning on Group B's Speaking Ability in Al-Muhajirin Kindergarten Malang, it was found that Big Book Assisted Project Based Learning had an effect on children's speaking ability in group B1 (experimental class) in Kindergarten. Al-Muhajirin Malang. Further, the results obtained will be discussed and described in full as follows:

The results of the research and the results of hypothesis testing described in chapter IV prove that learning through the influence of Big Book Assisted Project Based Learning on the Speaking Ability of Group B in Al-Muhajirin Kindergarten Malang. From the descriptive analysis showed that the results of the pretest in the experimental group and the control group had the homogeneity and normality of the data met, it showed that the two classes had the same quality or ability. Furthermore, based on the posttest results, it is known that there is a significant increase in the experimental class while in the control class there is a not too large increase.

The results of the t-test using the independent sample t-test showed that there was a significant gain difference between the control class and the experimental class, so it can be concluded that Big Book Assisted Project Based Learning had a positive and significant impact on the speaking ability of Group B in Al-Muhajirin Kindergarten Malang. Indicators of improving speaking skills can be seen from the increase in children's ability to tell stories according to pictures; communicate and ask questions using simple wording; answer express ideas, ideas and thoughts; retell the activities that have been carried out according to the flow of activities and the results of the work.

The results of this study are in accordance with the results of research conducted by Septiyani and Kurniah (2017) that there is a significant effect between the experimental group and the control group in speaking ability (tcount 5.437 from ttable 2.145) with an average experimental group of 13.7 (good). and control group 13.1 (good). In addition, Mahayanti,

NWS, Artini, LP and Nur Jannah, IA (2017) about The Effect Of Big Book As Media On Students' Reading Comprehension At Fifth Grade Of Elementary School In SD Laboratorium Undiksha Singaraja also supports the results of this study which is shown by the results of his research that there is a significant difference in reading comprehension achievement between children treated with large books as media and those treated using conventional media in fifth grade elementary school at SD Laboratorium Undiksha Singaraja.

Speech development is something that is essential and very needed by children, because speech development is very useful for children to facilitate communication skills. The stimulus process can be with interaction between peers and the child's environment. One of the ways to support children's speaking skills is using the Big Book Assisted Project Based Learning learning model. Project Based Learning Assisted by Big Book requires children to think about realizing their ideas by using Big Book media, discussing finding solutions to the difficulties faced by the group, evaluating and informing or presenting. At each stage the child needs interaction with group friends. At the evaluation stage, many require children to describe what problems they face to problem solving to get the work or results of solving the problem. Describing is expressed by speaking, speaking can be interpreted as a conveying of one's intentions (ideas, thoughts, ideas, or heart contents) to others by using spoken language, so that these intentions can be understood by others (Suhartono, 2015). Henry Guntur Tarigan (2018) argues that speech is the ability to pronounce articulation sounds or words to express, state and convey thoughts, ideas, and feelings.

Through the Big Book media, teachers can also develop and improve every aspect of the development of their students. This has been investigated by Fitriani and Aminin (2013) who examined the Effect of the Use of Big Book Media on the Beginning Reading Ability of Group B Children in Qoshrul Ubudiyah Kindergarten Surabaya. The results of this study indicate that the calculation results obtained $T_{count} < T_{table}$. So H_0 is accepted, it is stated that there is an effect of using big book media on the reading ability of group B children in TK Qoshrul Ubudiyah Surabaya. Based on the results of these studies, it can be concluded that the use of Big Book media can be used as a media reference which is quite effective in achieving the development of students according to the level of development of their age.

The combination of Project Based Learning with Big Book learning media is done to increase children's interest in learning themes and children's learning processes in building knowledge. This is because the right media can create an active, effective, and efficient learning atmosphere (Singgih, 2013:40). Big Book is an interesting learning media for children, by combining components of large books, interesting pictures and writings according to the child's world so that they can create powerful learning media.

Children's speaking ability as a focus in this study can also not only be supported by Project Based Learning, but can also be supported through problem based learning as has been studied by Muharromi and Sa'ud (2016) that the application of the problem based learning approach has a significant effect on improve creativity and speaking skills in early childhood. Children can practice carrying out 4 commands sequentially when learning Project Based Learning using Big Book media in class.

In the implementation of Project Based Learning in learning can also affect the results of research. So it is necessary to pay attention to the steps used when conducting research using Big Book media so that children's speaking skills can increase. This is also supported by

the results of research conducted by Rochmahwati (2015) who researched Project-Based Learning To Raise Students' Speaking Ability: Its' Effect And Implementation (A Mix Method Research In Speaking II Subject At Stain Ponorogo). The results of this study indicate that there is a significant effect of Project Assisted Learning on children's speaking skills. In addition, an effective procedure for implementing Project Assisted Learning is (a) dividing the class into groups, (b) explaining the project and (c) carrying out the project. Finally, the children showed a significant positive attitude towards the implementation of Project Assisted Learning in the speaking class.

Project Based Learning is also not only used to improve speaking skills, there are several other functions that can be used for research to determine child development. As done by Rosadi, Antara, Magta (2017) who have researched the Effect of the Project Based Learning Method on the Eye-Hand Coordination Ability of Kindergarten Group B Children in Cluster Ii, Buleleng Regency. The results of this study indicate that there are differences in the eye-hand coordination ability in the control group and the eye-hand coordination ability in the experimental group, so the project-assisted learning method affects the eye-hand coordination ability.

In the implementation of Project Based Learning assisted by big books, the researchers observed that the procedures that had been carried out by the teacher were in accordance with the learning process assessment instruments that had been prepared previously by the researchers based on Colley's (2008) theory, the Developmental Achievement Level Unit (STPPA) for Kindergarten B level children. Minister of Education and Culture of the Republic of Indonesia Number 137 of 2014, and several journals as reference

CONCLUSION

The effect of Project Based Learning Assisted by Big Books on the Speaking Ability of Group B in Al-Muhajirin Kindergarten Malang that the use of Big Books has a significant effect on children's speaking skills. This is indicated by a significant difference in speaking ability between the control group and the experimental group, namely the speaking ability in the experimental group is better than the control group, from the average value and significance level of 0.000 (<0.05) resulting in a t-count value of 4.174.

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REFERENCES

- Brostrom, S. (2015). Science in Early Childhood Education. *Journal of Education and Human Development*, 4(2).
- Bundu, P. (2013). *enilaian Keterampilan Proses dan Sikap Ilmiah Dalam Pembelajaran Sains SD*. Depdiknas.
- Charlesworth, R., & Lind, K. K. (1979). *Math and Science for young Children*. Delmar Publishing.
- Dos, S. E., Gonçalves, B. C., Oliveira, K. B., & Silva, M. B. (2018). Project Based Learning Applied to Technical Drawing. *Scientific Research Publishing*, 9(3), 479-496.

- Du, X., & Han, J. (2016). A Literature Review on the Definition and Process of Project-Based Learning and Other Relative Studies. *Creative Education*, 7(07).
- Fathurrohman. (2015). *Model-model Pembelajaran Inovatif*. Ar-ruzz Media.
- Greinstein, L. (2012). *Assesing 21st Century Skill. A Guide To Evaluating Mastery and Authentic Learning*. Crowwin, A Sage Company.
- Hesti, D., & Somantri, E. B. (2015). Penerapan Pembelajaran Sains dalam mengembangkan Kemampuan Matematika Anak Usia 4-5 Tahun di Pendidikan Anak Usia Dini Sasana Balita Puspita Pontianak. , 4(2). *Jurnal Edukasi Pendidikan Anak Usia Dini*, 4(2).
- Jacobs, G., & Crowley, K. (2017). *Play, Projects, and Preschool Standards: Nurturing Children's Sense of Wonder and Joy in Learning 1st Edition*. Corwin Press.
- Jain, J., Lim, B. K., & Abdullah, N. (2013). Pre-service Teachers' Conceptions of The Nature of Science. *Procedia-Social and Behavioral Sciences*, 90.
- Katz, L. G., Chard, S. C. & Kogan, Y. (2014). *Engaging children's minds: The project approach (3rd Ed.)*. Ablex.
- Lie. (2012). *Kooperatif Learning (Mempraktikkan Cooperative Learning di Ruang-ruang Kelas)*. Grasindo.
- Perdaningsari, A. P., & Kristanto, A. (2014). Pengaruh Model Pembelajaran Inkuiri Terhadap Kemampuan Sains Anak Kelompok A di Taman Kanak-kanak ABA. *PAUD Teratai*, 3(3).
- Putra, S. R. (2013). *Desain Belajar Mengajar Kretaif Berbasis Bisnis*. Diva Press.
- Rahman, S., M. Yasin, R., & M, S. F. (2012). Project-based Approach at Preschool Setting. *World Applied Science Journal*, 16(1).
- Trianto. (2014). *Mendesain Model Pembelajaran Inovatif, Progresif, dan Konstektual*. Kencana.
- Wena, M. (2014). *Strategi Pembelajaran Inovatif Kontemporer*. Bumi Aksara.