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Systematic Literature Review: Application of the Project-Based Learning Model to Increase Interest, Creativity Skills, and Science Learning Outcomes

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ABSTRACT

Project based learning is a learning model that is currently widely used in all circles. Such as teachers, lecturers and research students. For this reason, researchers chose project-based learning as the topic of this systematic literature review research. This SLR research used article selection with inclusion criteria using the PICOS (Population, Intervention, Comparison, Outcomes, Study design) approach and from the 30 articles obtained, 15 articles were selected that met the inclusion criteria. After being selected and explained, it was found that the application of project based learning was very effective and increased interest, creativity skills and science learning outcomes.

1. INTRODUCTION

Learning is an activity carried out intentionally or unintentionally by each individual, so that there is a change from not knowing to knowing, from not being able to walk to being able to walk, not being able to read to being able to read and so on, while learning means learning activities carried out by students and educators. Learning brings about changes in the thoughts and character of students. The teacher's challenge is not only to equip current students with skills, but to ensure that their students are successful in the future (Yoga et al., 2025). Success means that students after learning in learning activities at school can enter life in society. For this reason, teachers must provide skills to their students according to their needs that they can use in their daily lives.

The learning activities studied can be said to be optimal, student learning outcomes are influenced by several factors, including internal factors and external factors. Internal factors are factors that come from within a person such as interest, motivation, attention to learning, readiness to learn and health. Meanwhile, external factors are factors that come from outside a person, for example family, school conditions, friends, teachers and learning media. Learning outcomes are the result of the learning process. Learning outcomes are learning outcomes achieved as indicators of achieving certain competencies. Good achievement is the result of successful learning, one indicator of successful learning is the use of learning methods (Makausi, et al., 2022). As with the use of appropriate learning models, when implemented well, it will affect the quality of learning. Learning in the 21st century can be used as an alternative for educators to develop the learning process well to increase interest, creativity skills and learning outcomes through project based learning. So that students can be active in learning and do what they learn directly.

Based on the problems above, the solution is project based learning. This model does not only focus on the end result, but places more emphasis on the process of how students can solve problems and ultimately produce a product. This model allows students to gain valuable experience by actively participating in project work. This is of course more challenging than just sitting quietly listening to the

teacher's explanation or reading a book then taking a quiz or test. Student learning creativity is the ability of students to create new things in their learning, whether in the form of the ability to develop information obtained from the teacher in the teaching and learning process in the form of knowledge so that they can create new combinations in their learning (Sumarti et al., 2018). Therefore researchers are interested in conducting research about "Systematic Literature Review: Application of the Project-Based Learning Model to Increase Interest, Creativity Skills and Science Learning Outcomes.

2. RESEARCH METHODS

This research uses the systematic literature review (SLR) method, which is research that systematically identifies relevant journals and then the results of several studies are summarized to present comprehensive and balanced facts. In SLR research, there are steps that have been determined in the process of identifying journals, namely: Formulating questions, searching for articles that are appropriate to the research topic, determining inclusion criteria for selecting articles, analyzing data and reporting the findings obtained in the articles studied. (1) Population (population) - Learning at all levels of education in Indonesia, (2) Intervention (intervention) - Learning that uses the project based learning model, (3) Comparison (comparison) - comparison group in conventional learning (4) Outcomes (results) – There has been an increase in interest, creativity skills and learning outcomes through the application of the project based learning model and (5) Study Design (study design) – type of literature study research, experiments with classroom action research. Apart from the criteria above, the researcher added one inclusion criterion, namely that the articles used in this SLR research were research published in the last 10 years 2015-2023 (Yasin dan Novaliyosi, 2023). In this article, the author uses articles that are relevant to the title and focuses on the application of the project based learning model which is then analyzed. The articles used as data in this literature review research are articles obtained using 1 database, namely Google Scholar by entering keywords namely "application of project based learning, interests, creativity skills and science learning outcomes" (Nida et al, 2022).

3. RESULTS AND DISCUSSION

Based on the selection results, 30 articles were included in the search for the application of project-based learning to interests, creativity skills and learning outcomes. Next, the researchers selected articles that met the inclusion criteria using the PICOS approach and obtained 15 articles as follows:

Table 1. Research on the Application of Project Based Learning on Interests, Creativity Skills and Learning Outcomes

No	Researcher and Year of Publication	Research Title	Conclusion of Research Results
1	Yulistyana Pradita, Bakti Mulyani, and Tri Redjeki, 2015	Implementation of the Project Based Learning Model to Improve Student Achievement and Creativity in the Main Material of Colloid Systems Class XI Science Even Semester Madrasah Aliyah Negeri Klaten Academic Year 2013/2014	The application of the PjBL learning model can improve student learning achievement and creativity in the main material of colloid systems for class XI IPA2 even semester at MAN Klaten
2	Silmy Nauli Izati, Wahyudi, and Martin Sugiyarti, 2018	Literacy-Based Project Based Learning to Improve Thematic Learning Outcomes	Implementing literacy-based project based learning can improve activities and thematic learning outcomes.
3	Elisabet , Stefanus C. Relmasira, and Agustina Tyas Asri Hardini, 2019	Increasing Motivation and Science Learning Results by Using the Project Based Learning (PjBL) Learning Model	Using the Project Based Learning model can help students increase motivation and learning outcomes in science subjects.

No	Researcher and Year of Publication	Research Title	Conclusion of Research Results
4	Novita Wulandari, Henny Dewi Koeswanti, and Sri Giarti, 2019	Application of the Project Based Learning Model Assisted by Pop Up Book Media to Improve the Creative Thinking Ability of Class V Students	The Project Based Learning model can improve creative thinking abilities
5	Richard Adony Natty, Firosalia Kristin, and Indri Anugraheni, 2019	Increasing Student Creativity and Learning Outcomes Through Project Based Learning Models for Elementary School Students	The use of the Project Based Learning (PjBL) learning model has succeeded in increasing student creativity and thematic student learning outcomes for theme 2 sub themes 3 and 4 in grade 3 students at SD Negeri Gendongan 02 Salatiga semester I 2019/2020
6	Fakhri Ramadhani, 2020	Application of the Project Based Learning Model to Improve Science Learning Outcomes in Online Learning in Class IX SMP	The application of the project based learning (PjBL) learning model can improve student learning outcomes at SMP Negeri 2 Binjai Kab. Step T.P. 2019/2020 with online learning during the Covid-19 pandemic, on food production biotechnology material
7	Lingga Indra Yani, and Taufina Taufik, 2020	Application of the Project Based Learning Model in Integrated Thematic Learning in Class V Elementary School (Literature Study)	The Project Based Learning learning model is effective in improving student learning outcomes
8	Lilis Setiawan, Naniek Sulistya Wardani, and Trifosa Intan Permana, 2021	Increasing Student Creativity in Thematic Learning Using a Project-Based Learning Approach	Learning with a Project Based Learning approach can increase student learning creativity
9	Nopita Sitompul, Sri Agus Adi Syahputra Sihombing, and Sondang Manurung, 2020	Application of the Project Based Learning (PjBL) Learning Model to Science Learning Outcomes of Middle School Students	Improving student learning outcomes by applying the project based learning model to environmental pollution material in science subjects in junior high schools
10	Nur Eva Zakiah, Ai Tusi Fatimah, and Yoni Sunaryo, 2020	Application of Project-Based Learning to Explore Students' Creativity and Mathematical Creative Thinking Abilities	Helping students improve promoting creative ideas from assignments and to build confidence in producing innovative work
11	Nurul Nisah, Aan Widiyono, Milkhaturrohman, and Nia Nur Lailiyah, 2021	The Effectiveness of the Project Based Learning Model in Improving Science Learning Outcomes in Elementary Schools	The application of the Project Based Learning model is able to make a significant difference in improving the science learning process and outcomes for fourth grade students at SD N 2 Tahun during the pandemic

No	Researcher and Year of Publication	Research Title	Conclusion of Research Results
12	Bonifatius Sigit Yuniharto, and Siti Rochmiyati, 2022	Increasing Interest in Learning and Creativity Through Project Based Learning in Class V Students of SDN Sariharjo	Increasing interest in learning and creativity of class V students at SDN Sariharjo by implementing Project Based Learning for Students
13	Shima Elya Fahadah, Nurika, and Firya Lutfiya, 2021	Implementation of Online PjBL (Project Based Learning) to Improve Student Learning Outcomes during the Covid-19 Pandemic	The application of the PjBL (Project Based Learning) learning model can improve student learning outcomes during the Covid-19 pandemic where learning is carried out online or distance learning (PJJ)
14	Suryana Rajagukguk, 2023	Application of Project Based Learning to Increase Elementary School Students' Creativity	The project based learning model can increase elementary school students' creativity
15	Yusron Abda'u Ansya, 2023	Efforts to Increase Interest and Learning Achievement of Grade IV Elementary School Students in Science Learning Using PjBL (Project-Based Learning) Strategies	There is a better improvement in using the PjBL strategy to increase the interest and learning achievement of Grade IV elementary school students in science learning

Based on table 1, of the 15 scientific articles selected, the researchers grouped the suitability of the article variables into 3 categories, namely "interests", "creativity skills", and "learning outcomes", through the application of the project based learning learning model in the table below.

Table 2. Grouping of Scientific Article Data that has been obtained

Learning Model	Interest	Creativity Skills	Learning Outcomes	Number of Article Reviews
Project Based Learning	2	6	10	15

Based on tables 1 & 2, the suitability of the variables arranged in relation to interest, creativity skills and science learning outcomes means that the application of the project based learning model can increase interest, creativity skills and science learning outcomes.

Application of the Project-Based Learning Model to Increase Interest, Creativity Skills and Science Learning Outcomes

Choosing the right science learning model is very important because it will determine learning outcomes and the level of student creativity in applying what has been taught. To improve student learning outcomes and creativity, an effective learning model is needed to be implemented. One effective learning model is the project based learning model. To increase student creativity, it is necessary to choose the right learning model. One of the right learning models to increase student creativity is the project based learning model where students will be taught how to solve problems during class and be able to produce products (Kencana and Rifa'i, 2021).

In this case, teachers also play an active role in helping develop student creativity in the learning process. Teacher encouragement in developing student creativity will make students more motivated in expressing ideas in the process of developing student creativity. Research shows that it is not only non-cognitive factors such as traits, attitudes, interests and temperament that determine cross-creative production. Apart from that, training and developing non-cognitive aspects such as the attitude of daring to try something, taking risks, efforts to increase interest and motivation to be creative, clever use of time as well as self-confidence and self-esteem will greatly determine creativity (Zubaedi, 2018). Creativity is one of the basic human needs, namely the need for self-realization (self-actualization) and

is the highest need for humans. Basically, every person is born into the world with creative potential. Creativity can be identified and fostered through appropriate education (Nisa, 2017). Creativity includes both aptitude characteristics such as fluency, flexibility and originality in thinking, as well as non-aptitude characteristics, such as curiosity, liking to ask questions and always wanting to seek new experiences. and creativity is the ability to combine, solve or answer problems, and reflects the operational abilities of creative children. The project based learning learning model is a learning model that uses projects or activities as the core of learning. In every activity carried out, students will gain direct experience which can later improve children's creativity and learning outcomes (Hutapea and Simanjuntak, 2017).

Implementing learning using a project-based learning approach has the advantage of being able to increase student learning motivation, increase learning motivation skills, improve student skills in managing various learning resources, encourage students to be more active in learning, foster collaboration between students, improve communication skills, train students in organizing a project, improving skills in time management, and having fun learning (Fahrezi et al., 2020). The project-based learning approach is a learning approach that uses problems as the first step in collecting and integrating new knowledge based on experience in real activities (Setiawan et al., 2020).

Students are actively involved in the process of building knowledge in learning, able to increase students' interest and creativity in science learning to support learning outcomes and make students understand more and can apply principles and concepts directly. Project-based learning is a model that actively involves students in the learning process which can be used as an alternative solution to the problem. Some of the advantages of this model include: increasing student motivation and making students more active in solving problems. Apart from attracting students' attention, project-based learning can also make students more active in collecting information either through books or other information media to solve problems in the real world (Aini, et al., 2018) According to Hamidah and Citra (2021), implementing PjBL can make students learn more meaningfully because learning gives a pleasant impression so that students feel confident to present the results of the projects they have created. Project based learning is not only learning to understand the subject matter, but students are also able to learn to make a product through the analysis process of that process. When students are faced with new experiences, they are able to develop mental and intellectual development to be able to solve problems that may be faced in the future. Hujjatusnaini et al, 2022 reported that PjBL integrated with 21st century skills had a significant effect on higher order thinking skills. Sinification is supported by evidence of a positive correlation with creative thinking abilities, where student creativity is able to increase their ability to solve problems. The application of the project based learning model is a learning model that is able to support the implementation of education in increasing student interest and creativity because PjBL supports the application of real life and experiential learning so that increasing student creativity and innovation can run effectively during learning. in class (Rizkasari, et.al., 2022).

4. CONCLUSION

The research aims to apply project-based learning to students' interests and creativity skills and science learning outcomes. The research results show that after being selected and explained, it is found that the application of project-based learning is very effective and increases interest, creativity skills and science learning outcomes.

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