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Implementation of Project-Based Learning Model to Improve Students' Collaboration Skills: Literature Review

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ABSTRACT: Collaboration skills are one of the important skills in 21st-century learning, especially in supporting students to work together to achieve common goals. This article examines the effectiveness of project-based learning models (Project Based Learning or PjBL) in improving students' collaboration skills through a literature review of several relevant studies. This study is a literature review that collects theoretical references related to the problems found. The data in this study were obtained through a literature study, namely a way of collecting data or sources related to research topics from scientific articles searched through Google Scholar over the last 10 years sourced from Google Scholar. The data was analyzed using a descriptive analysis method, which describes facts followed by analysis, providing sufficient understanding and explanation. The results of the study indicate that the implementation of PjBL not only improves collaboration but also encourages creativity and social skills of students. Challenges faced in the implementation of PjBL include the need for teacher training, time management, and management of group dynamics. However, the PjBL model has proven effective in creating an interactive learning process and supporting the achievement of academic and non-academic outcomes.

KEYWORDS: Project Based Learning, collaboration skills, creativity, social skills, 21st century learning

I. INTRODUCTION

Collaboration skills play an important role in supporting students in producing cooperation, responsibility, a sense of belonging, and caring. The development of the 21st century in the learning process is characterized by students who must have four abilities (4C), namely critical thinking and problem-solving skills, creative thinking skills, communication skills, and collaboration skills (González-Salamanca, JC, Agudelo, OL, & Salinas, 2020). The most important 21st-century skill is the ability to collaborate with others (Andersen, R., & Rustad, 2022). Collaboration skills are important skills for successful learning. Students can have the ability to work together and there is interaction between students when learning objectives are achieved.

Collaboration skills refer to the capacity required for learners to collaborate or work together and take responsibility for the tasks they do to achieve common goals during learning activities. Collaboration skills are one of the keys to effective learning and collaboration skills are needed in the world of education and the world of work (Arinta, D., Masruroh, B., Deffinika, I., Arif, M., Mkumbachi, RL, & Djoumoi, 2024). Collaboration skills are the ability that a person has to work together effectively and be responsible for making decisions and reaching joint decisions (Hidayati, 2019). Collaboration skills are the abilities that individuals have so that they can interact and work together to achieve common goals (Almulla, 2020).

Rahayu, et al (2019) collaboration skills involve students working on assignments together, so responsibility in working on assignments has an impact on students (Fadillah, N., Bahri, A., & Rauf, 2024). Yim, et al (2019) collaboration skills act as a mediation that connects learning outcomes with interactivity skills. Collaboration skills encourage students to be able to interact with friends and their groups in solving problems faced individually or in groups (Indriwati., 2019).

The learning process can take place, one of which is if it is based on collaboration. The theory of collaboration by Roucek and Warren in 1984, as quoted by Risdiantoro & Firmansyah (2021) defines collaboration as cooperation to achieve common goals. Cooperation requires joint efforts in achieving collective success for each individual that is related to the success of other individuals in the group (Hasan., 2023)

Maria & Mariono (2020) when students use their collaboration skills to the maximum, learning outcomes can be improved. Students who participate in group learning do not respect differences of opinion in expressing ideas and concepts, do not want to complete assignments together, and are less responsible when completing project assignments (Hairida., 2021). This shows that collaboration is considered important in learning because it can support students to understand better what they are learning and have a positive learning experience.

Erlistiani, et al (2020) said that students' abilities can increase and make the learning atmosphere more effective if the learning model used is the same as the problem being faced. Learning objectives and learning outcomes can be achieved with several behavioral changes that can be beneficial and can be influenced by a suitable learning model (Hayati, Usnul, Kurniadi Saifuddin, 2023). The right learning model can help educators find the contribution of students' abilities and learning processes (Tengler., 2022)

Students become more active in expressing their ideas and opinions when collaboration skills are applied effectively in the learning process. One strategy to support teamwork skills is to identify, refine, produce, and distribute learning models (Mona, N., & Rachmawati, 2023).

Based Learning (PjBL) model uses projects as its goal and focuses on student activities collecting information and using it to create something for life, but still by the SK, KD curriculum (Nakada et al., 2018). According to Abidin (as quoted by Cahyadi et al., 2019) the PjBL model requires students to expand their creativity in thinking, creating, deciding, solving problems, and fostering students ' -confidence.

Project-based learning (PjBL) is a structured learning model that engages students in real-world tasks that are linked to producing work or presentations, enabling them to gain knowledge and skills that improve their lives (Huang et al., 2022). Students who learn through the PjBL model usually work together to solve specific problems, develop products, and evaluate projects and their development processes (Almulla, 2020). The PjBL model prioritizes project assignments that produce products to be presented in front of the class. However, the assessment is not only from the products produced but also from the process (RN Sari, 2023).

Natural science (IPA) plays an important role in human life, students can get provisions to face the challenges of the 21st century which increasingly demands the quality of humans who are technologically competent, think more critically, and creatively, and solve problems. The results of the 2018 PISA survey, Indonesia is in 74th position out of 79 countries with an average science competency still below the OECD average, which is 396. This shows that the HOTS learning outcomes of Indonesian students are still lagging behind other countries. The increasing demands for global competency, make the curriculum always be updated so that it can keep up with the times.

The current curriculum in elementary school is the Independent Curriculum. Science subjects combined with IPS become IPAS, which allows students to deepen and expand their understanding completely and concretely. Students act, decide, and solve everyday problems based on their knowledge (Ministry of Education, 2022). Students are not only smart in theory and memorizing material, but must also be able to practice their knowledge in real terms. This shows that learning in the Independent Curriculum emphasizes HOTS learning patterns that can teach students to think critically and creatively.

The purpose of this study is to determine the effectiveness of the PjBL learning model to improve student collaboration in the learning process. The results of this study are expected so that further researchers can gain real experience, and useful and beneficial information, and can apply the Project Based Learning (PjBL) learning model. Therefore, in compiling this scientific paper, literature is needed which is used as supporting material for scientific papers and related research.

II. METHOD

This research is a literature review that collects theoretical references related to the problems found. According to Creswell (2014), a literature review is a written summary of journal articles, books, and other documents that describe past and current theories and information, organizing the literature into the topics and documents needed. A literature review is also considered important because the literature review is the basis for why researchers decide to choose a particular theme or title. A literature review can also only be considered as the foundation for the scope of work to be reported. In general, a literature review consists of sections that describe theories, findings, and materials that are useful for research which then become the basis for the research carried out (Ridwan., 2021).

The data in this study were obtained through literature studies, namely how to collect data or sources related to research topics from scientific articles searched through Google Scholar over a span of the last 10 years. The data were analyzed using a descriptive analysis method, which describes facts followed by analysis, providing sufficient understanding and explanation.

III. RESULTS AND DISCUSSION

The articles used in the literature review process in this study were 5 articles. The results of the review are written in the form of a table that includes the title of the article and the results of the article review.

Table 1. Results of article review

No	Article Title	Research result
1.	Implementation of Project-Based Learning Model to Improve Collaboration Skills and Student Creativity	The average value of collaboration skills in cycle 1 was 52.31% in the low category and increased in cycle 2 to 85.34% in the very high category. The average value of creativity in cycle 1 was 63.89% in

		the medium category and increased in cycle 2 to 86.42% in the very high category. The results of this study can be concluded that there is a significant increase in collaboration skills and creativity among students at SMAN 2 Semarang with a very high category.
2.	Implementation of Project-Based Learning to Improve Skills Student Collaboration on Solar System Material	The results of the study showed that in cycle I the average percentage score of students' collaboration skills was 54%. In cycle II there was an increase with an average percentage score of students' collaboration skills of 74%. Thus it can be concluded that the use of the Project Based Learning learning model can improve students' collaboration skills.
3.	Implementation of Project-Based Learning Model to Improve Collaboration Skills of Class VII Students of SMP Negeri 18 Sinjai	The results of the study showed that in cycle 1 the average percentage of students' collaboration skills scores was 45%. In cycle II there was an increase with an average score of students' collaboration skills of 75%. Thus it can be concluded that the use of the Project Based Learning learning model can improve students' collaboration skills.
4.	Improving Collaboration Skills through Project Based Learning Model with Independent Flow at SMA Negeri 1 Soppeng	The results of the study showed that the implementation of learning using the Project Based Learning learning model with the MERDEKA flow in physics subjects can improve students' collaboration skills. This can be seen from the average percentage of student collaboration for each cycle increasing from cycle I to cycle II, namely 68.63%, to 79.46%. It is proven that the Project Based Learning learning model with the MERDEKA flow can improve the collaboration skills of class X.1 students at SMA Negeri 1 Soppeng in physics subjects.
5.	Improving Students' Collaboration Skills in Science Subjects of Class VII of SMP Negeri 23 Makassar Through the Application of the Project-Based Learning Model	The results of the study showed that in cycle 1 the highest percentage of students' collaboration skills scores was 61.3% in the good category. In cycle II there was an increase with an average score of the highest student collaboration skills of 67.7% in the good category. Thus it can be concluded that the use of the Project Based Learning learning model can improve students' collaboration skills.

Based on the reviewed studies, Project Based Learning has been proven effective in improving students' collaboration skills. Project Based Learning provides opportunities for students to work in groups, solve problems together, and collaborate in achieving project goals. Research shows that Project Based Learning not only focuses on achieving academic outcomes but also develops students' social and interpersonal skills. Students learn to communicate effectively, lead, and work together in teams. This article found that the implementation of Project Based Learning can vary depending on the context and how it is implemented. For example, several studies showed that the structure and support from teachers greatly affect the effectiveness of PBL in improving collaboration. Several challenges were identified, such as the need for training for teachers, effective time management, and managing group dynamics. These challenges can affect the success of PBL in improving collaboration. Research shows that the method of measuring students' collaboration skills can vary. Several studies used self-assessment, peer assessment, or observation-based assessment to evaluate the effectiveness of collaboration in Project Based Learning.

Based on the research results above, it was found that the project-based learning model can help the process and maximum learning outcomes because through PjBL students can exchange ideas to provide solutions/problem-solving in everyday life with project activities carried out in the learning process.

The 21st century brings a new paradigm in the world of education and new challenges for professional teachers who continue to innovate to achieve a quality teaching and learning system (Simbolon & Koeswanti, 2020). Teachers play an important role in determining student success, especially in the teaching and learning process. Teaching and learning process. In aligning the teaching and learning process with the desired goals, teachers must acquire competence and have good skills in planning and implementing the learning process. Interaction between students and teachers is an important factor in student learning success (Somphol., 2022). Learning models with structured conceptual scenarios are key elements in the teaching and learning process. The ongoing learning process can be adjusted to the goals to be achieved. The use of inappropriate learning models can cause students to become bored in the learning process (Ekselsa., 2023). Many learning models have been developed, ranging from simple models to complex models, because they require many application tools. There are various types of learning models, such as the PjBL (project-based learning) model and the PBL (problem-based learning) model. Problem-based learning (PBL) and project-based learning (PjBL) are two learning models with different approaches (Nizwardi Jalinus, Rahmat Azis Nabawi, 2020). Many people mistakenly think that the two are the same. The difference is that student problems are the driving force behind the PBL approach. In contrast, the PjBL approach is oriented towards the final product of the project, which is achieved through the learning process. Focus on the entire ongoing project process (Zakiyah Ismuwardani., 2019).

Project-based learning (PjBL) is a strategy that can improve various abilities such as academic ability, thinking level, critical thinking, problem-solving ability, creativity, independence, and others, as well as provide the ability to see situations from a better perspective (Mursid., 2022). PjBL projects are created based on students' ideas as an alternative format to solve certain problems in the real world and allow students to experience the problem-solving learning process firsthand (Sari., 2019). Learning using inquiry models and project-based learning developed by teachers is one of the factors that causes an increase in overall collaboration skills. Through inquiry-based and project-based learning, students develop logical, critical, and systematic thinking skills about facts, concepts, and principles (Hairida., 2021). Students who learn using this method can be assigned to a variety of almost unlimited projects, from creating learning portfolios to building models from schematics and blueprints to producing videos and designing websites (Mahasneh & Alwan, 2018). Developing student creativity is very important. Students are said to be creative if they achieve creativity indicators such as fluency, flexibility, originality, and elaboration. (Prajoko., 2023) . The effectiveness of implementing project-based learning in learning depends on the teacher's ability to organize learning effectively by motivating students and supporting and guiding them during learning (Halimatusyadiyah., 2022). Learning with the PJBL model can motivate students to learn through fun discussion activities. Discussions in learning using the PJBL Literacy Model become very interactive and communicative because all students must be active and focused on the problems being discussed (Abidin., 2020). The implementation of PBL not only affects student learning outcomes but also learning motivation in the classroom. If student learning motivation increases, student learning outcomes will also increase. Several studies have also been conducted on the use of PBL to increase student learning motivation (Simbolon & Koeswanti, 2020). When answering open-ended questions, students often express different opinions from other students. Discussions and question-and-answer sessions with teachers always take place during learning activities. In group activities, students tend to express different points of view and add their opinions to clarify the topic of the problem to other students (Ozkan, 2023).

The results of project-based learning on students' communication and collaboration skills are very impactful. In addition, this study also shows that project-based learning helps students succeed in this complex and rapidly changing world by developing a variety of knowledge and skills, not just academic performance.

IV. CONCLUSIONS

Based on the results of the literature review research above, it can be concluded that the Project Based Learning learning model provides solutions/problem-solving in everyday life with project activities carried out in the learning process. Based on the studies reviewed, Project Based Learning has proven effective in improving students' collaboration skills. Research also shows that Project Based Learning does not only focus on achieving academic results but also develops students' social and interpersonal skills. Challenges in using the PjBL model include the need for training for teachers, effective time management, and management of group dynamics. These challenges can affect the success of PBL in improving collaboration.

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