Vol. 1 No. 8 2024 || E-ISSN 2997-7258

The Journal of Academic Science
journal homepage:
https://thejoas.com/index.php/

Implementation of The Project-Based Learning Model on Science Teaching Materials Writing Skills

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KEY WORDS

Project Base Learning, Writing Skills, Science Teaching Materials

ABSTRACT

This paper aims to examine the implementation of the project based learning approach to the skills of writing science teaching materials. It is appropriate that every teacher and teacher candidate has skills in writing and preparing teaching materials. One effort to improve the quality of education is by improving the ability to write teaching materials for teachers so that it will have an impact on the learning process. Teaching and learning is basically a reciprocal relationship between teachers and students. The presence of teachers in the 21st century is very necessary to ensure a learning process that is meaningful, has character, and is oriented towards developing 21st century skills. One of the abilities that a teacher must have in improving his professional competence is the ability to develop written teaching materials. This study aims to see the extent of the relationship and influence of project based learning on the ability to write teaching materials.

1. Introduction

21st century education aims to build students' intelligence skills in learning in order to be able to solve the problems around them. One of the efforts to improve the quality of education is by improving the teaching and learning process. Teaching and learning is basically a reciprocal relationship between teachers and students. The presence of teachers in the 21st century is indispensable to ensure a learning process that is meaningful, characterful, and oriented towards the development of 21st century skills.

The education system cannot function without learning. Training in human existence is needed, especially in the development of boundaries both independently and socially to help students' maturity. Curriculum, environment, communication, learning management, teachers, and students are just a few of the many subsystems that contribute to educational success. Learning, one of the subsystems of the education system, is intended to provide learning opportunities to students (Turdjai, 2016).

One of the abilities that a teacher must have in improving his professional competence is the ability to develop a learning approach. In developing a learning approach, a teacher must be able to adjust the approach he chooses with the conditions of students, subject matter, and existing facilities. Therefore, teachers must master several types of approaches and learning models so that the teaching and learning process runs smoothly and the goals to be achieved can be realized.

The lack of teachers' ability to display teaching materials in the classroom effectively and fun,

supported by the lack of teachers' skills in packaging teaching materials independently. The teaching materials that have been displayed by teachers in the classroom are generally obtained from textbooks that have been provided by the government or from various publishers so that sometimes they are not in accordance with the learning needs of students at their schools. This is because each school has a different culture and characteristics.

Sukerni (2014) in his research stated "Based on the analysis of needs, teachers need textbooks that are in accordance with the characteristics and needs of students in learning". However, many teachers do not have the writing skills as expected. In addition, the results of research conducted by Sinaga (2015) also stated that "the problem identified in the field study is the low ability and skill of teachers in writing teaching materials".

Teachers are a convincing component of a student's educational experience, teachers play an important role in education in the developing experience in schools. Teachers are required not only to understand the theory they will teach, but also to master and demonstrate knowledge and abilities to their students. Teaching and developing experiences should result in connections that educate and encourage growth. Innovative, skilled, and engaging educators must have a variety of ideas and methods to support the nature of learning. Learning exercises are used to teach learning content, but learning also requires educators to be able to involve basic skills that are demonstrated in a coordinated manner and produce a productive setting. Science is one of the remaining disciplines that can be used to carry out realization.

Natural science or science is a science that studies natural conditions and their contents and the events that occur in them developed by experts based on scientific processes (Sudjana, 2013)

Science plays an important role in the teaching and learning process in schools because it can grow students' abilities, increase student potential, and build students' thinking skills. The discipline of science requires a deeper understanding. Science learning should not only provide a wide space for the growth and refinement of logical mentality, train critical thinking processes, and apply them in real-world settings. The purpose of learning science is to equip students to be sensitive to their environment, because learning science allows them to know the natural events that occur around us (Tias, 2019). Science learning that highlights real-life situations related to nature that are associated with the learning material.

The development of science subject matter content has also not been applied by teachers in accordance with the character and needs of students in daily life. Sukerni (2014) revealed that "problems that often occur in schools related to the teaching and learning process are: the study of the material of each textbook varies, the material contained in the textbook is not in accordance with the characteristics of students. This condition spurs the procurement of books that are relevant to the subject and in accordance with the characteristics and needs of students and learning images that are in accordance with the characteristics and needs of students". Therefore, teachers need to have writing skills so that they can compile and develop their ability to write teaching materials so that they can facilitate students to export knowledge with the science process better.

One alternative that can be done to develop teachers' writing skills is to use project-based learning or Project Based Learning (PBL). PBL can facilitate teachers to be able to write teaching materials so that they are in accordance with the expected learning objectives. Tiantong, M & Sumalee Siksen (2013) stated that "PBL has been found to be effective to increase student learning achievement, acquiring knowledge through active learning, gaining interdisciplinary and multidisciplinary knowledge".

The application of the Project Based Learning (PJBL) approach in writing science learning teaching materials. Project-based learning is an innovative learning model, which emphasizes contextual

learning through complex activities and culminates in producing real products. This study tries to apply the Project Based Learning approach in making science teaching materials. Where this model emphasizes contextual problems that may be experienced by students directly, so that students think critically and are able to develop their creativity through real product development.

2. Methodology

The research method that can be used in the implementation of the Project Based Learning (PBL) approach to science teaching material writing skills is the research and development method or often referred to as the R&D (Research and Development) method. Sugiyono (2013) defines research and development methods as research methods used to produce certain products, and test the effectiveness of those products. The analysis in this study is the literature review method. According to Sugiyono (2017), literature review is a research analysis technique that uses data in the form of expert theories recorded in books, journals, and articles, as well as previous investigation findings relevant to the research problem. Based on this, the researcher used data from previous research to implement the Project Based Learning (PBL) Model on the skills of writing science teaching materials.

3. Result and Discussion

A. Model Project Based Learning

Project-based learning is a learning approach that gives students the freedom to plan learning activities, carry out projects collaboratively, and ultimately produce work products that can be presented to others. (Mahendrata 2007 : 109)

The project-based learning model is innovative learning that is student-centered and assigns teachers as motivators and facilitators, where students are given the opportunity to work autonomously to construct their learning. (Al Tabany in Zulfana and Uthman, 2014: 42)

The project-based learning (PJBL) model is a learning model that involves a project in the learning process. One of the objectives of the PJBL model is to improve students' ability to solve project problems, acquire new knowledge and skills in learning and make students more active in solving complex project problems with real product results. (Titritri, 2017)

According to Wahyuni in Sutrisna (2019: 84-85) project-based learning is a learning model that provides opportunities for educators to manage learning in the classroom by involving project work. Project work contains complex tasks based on problems as the first step in collecting and integrating new knowledge based on their experience in real activities and leading students to carry out design activities, solve problems, make decisions, carry out investigation activities, and provide opportunities for students to work independently or in groups. The final result of the project work is a product which is in the form of a written or oral report, presentation or recommendation, among others.

The learning model known as PBL integrates projects into the classroom. without (Puji & Asiyah). The teaching method known as project-based learning demands students to work on tasks that result in the final product. Project-based learning, as described by some of the descriptions given above, is a teaching style in which students complete tasks that lead to tangible results.

B. Writing Skills

Writing skills are one of the language skills that need to be trained by a person in order to be able to display the ideas or ideas intended by the writer. Writing skills according to Mujiono, et al. (2014) are a person's ability to pour out thoughts, ideas, and ideas, by using a series of good and correct written language. A person's skills or abilities are obtained from his ability to hear, speak, and read. This is because the information obtained for writing will come in and out through the process of listening, speaking, and reading.

Writing skills have various benefits for a person. Writing activities involve the process of transforming communication that is processed into writing ideas. This involves a thinking process that is not simple so that students are more creative, skilled, and brave to present the information and ideas they have obtained. Graves (Mujiono, et al: 2014) stated that writing has benefits, namely: (1) writing contributes intelligence, (2) writing develops initiative and creativity, (3) writing fosters courage, and (4) writing encourages the will and ability to collect information.

One of the important factors that affect the success of overall education is the ability and success of teachers to design teaching materials which are an integral part of the syllabus, namely planning, prediction and projection of activities that will be carried out during learning activities. Teaching materials reflect the knowledge, skills and attitudes that must be mastered by students in an effort to meet the set competency standards. Teaching materials occupy an important position in the entire curriculum that must be prepared so that the implementation of learning can achieve goals in accordance with basic competencies, meaning that teaching materials must really support the achievement of learning indicators.

C. Science Teaching Materials

Teaching materials are one of the most important components in a learning activity in the classroom to achieve learning goals. The Ministry of National Education (2006) explained, "Teaching materials are materials that students must learn as a means to achieve competency standards and basic competencies. Instructional materials are knowledge, skills, and attitudes that teachers and students must teach and learn to achieve competency standards and basic competencies. Types of subject matter include facts, concepts, principles, procedures, and attitudes or values." Teaching materials need to be made by teachers to suit the character and needs of students and be relevant to the applicable curriculum.

The development of teaching materials is closely related to pedagogic competence and professional competence. The development of teaching materials must pay attention to the achievement of competency standards, conformity with the main materials taught, support the learning experience and in accordance with assessment indicators. Some of the signs that need to be considered in developing teaching materials include: 1) Analysis of teaching materials to be developed, 2) Managing teaching materials to be developed, 3) Adjusting the teaching materials developed with the assessment indicators. Teachers' knowledge of learning objectives, the depth and breadth of teaching materials developed, the ability to determine references for writing teaching materials, the ability to package teaching materials, and the ability to associate concepts with events in life are needed by teachers when developing teaching materials. Handayani, W(2021 :4-5)

The development of teaching materials must be able to answer or solve problems or difficulties in learning. These difficulties can occur because the subject matter taught is abstract, complicated, foreign, etc. To overcome this difficulty, it is necessary to develop the right teaching materials. If the topic or subject material to be delivered is abstract, then the teaching material must be able to help students describe something abstract, for example by using pictures, photographs, charts, schemes, etc. Similarly, complicated subject matter must be explained in a simple way, according to the level of thinking of students, so that it becomes easier to understand.

Trianto (2015:136-137) explained that science is a systematic collection of theories, its application is generally limited to natural phenomena, born and developed through scientific methods such as observation and experiments and demands scientific attitudes such as curiosity, openness, honesty, and so on.

The essence of science includes four main elements, namely, first, attitude: curiosity about objects, natural phenomena, living things, and causal relationships that cause new problems that can be solved through the correct procedures; Science is open ended;

second, the process: problem-solving procedures through scientific methods; scientific methods include hypothesis preparation, experiment or experiment design, evaluation, measurement, and conclusion drawn; third, products: in the form of facts, principles, theories, and laws; and fourth, application: the application of scientific methods and scientific concepts in daily life. These four elements are integral characteristics of science that are actually inseparable from each other.

The definition of science or science according to the Ministry of National Education (2004) is a science that studies the phenomena of the universe. The universe in a broad sense is the entire continuous space and time where creatures live. Science or science knowledge is obtained based on empirical activities through various laboratory or outdoor experiments. Trianto (2007) explained that science is a systematic collection of theories, its application is generally limited to natural phenomena, born and developed through scientific methods such as observation and experiments and demands scientific attitudes such as curiosity, openness, honesty and so on.

The characteristics of science subjects in BSNP (2006) include three aspects, namely biology, physics, and chemistry. Science subjects on biological aspects with studies in the form of phenomena in living creatures at various levels of organism life (plants, animals and humans) and their interaction with environmental factors in space and time. Meanwhile, in the physical aspect, the study of science is focused on inanimate objects known in daily life such as soil, air, water, rocks and metals, as well as extraterrestrial objects in the arrangement of the solar system and galaxy systems in the universe. In the chemical aspect, science studies various phenomena both in living things and in inanimate objects related to chemical elements in the universe. Science has a very important role in the development of human civilization both in terms of technological development, as well as community civilization in the social, political, economic, and cultural fields.

The teaching of science in schools aims to enable students to learn about themselves and the surrounding environment, so that they are able to apply their knowledge in daily life, based on scientific methods. Science learning emphasizes more on direct experience so that it can develop students' self-potential through the process of finding out and solving problems so that students gain a deeper understanding.

Based on the understanding explained above, teachers may already use a variety of tactics, methods, and cutting-edge approaches, as well as learning models, to help students learn science; They only need to choose the one that best suits the needs of students and the subject matter at hand. If a teacher can design a learning environment that encourages students to be actively involved in the learning process, then every decision regarding teaching strategies from their selection to their implementation in the classroom will be effective. Therefore, every teacher must understand that choosing one teaching strategy is not enough to realize the principles of learning.

The relationship between learning principles and learning techniques includes several factors, such as motivation, active participation, personal approach, phasing, feedback, and learning transfer. In order to provide opportunities for teachers and prospective teachers to predict the direction of changes that will occur, efforts continue to be made and will continue to be made in this regard. These initiatives include methods for engaging students physically and mentally in science lessons, connecting academic content with its practical applications or trying to concretize the topic being discussed.

Efforts to improve the quality of human resources continue to be carried out. One of these efforts is through the field that is active in improving the quality and number of student mentality. In order for a student's talent or skill to grow effectively, the right learning process must be encouraged to improve his or her mentality. 2019 (Rahmawati). It is crucial for teachers to understand the 21st century learning

paradigm and how it can be used as a teaching framework.

In order to achieve the learning objectives of: 1) Critical or creative thinking; 2) Critical or artistic thinking; 3) Critical or creative thinking; 4) Critical or creative thinking; 5) Critical or creative thinking; 6) Critical or creative thinking; 2) Talk to friends or in small groups; 3) Expressing thoughts in writing (scientific); Develop attitudes and values that students have; Send and receive feedback from friends; Reflecting the learning process that has been completed or also the understanding of the subject matter studied. specific instructional or targeted competencies. However, subjects that participate in the learning process must also be students. Because during the learning process, students must feel every learning event.

Students are taught to work independently, feel for themselves the existence of real problems that need to be solved, plan problem-solving activities and choose the sources they need, collect data or information, analyze and discuss them, draw conclusions, and even assess the effectiveness of their problem-solving methods. All of the tasks mentioned above are completed in groups, and the results are shared so that participants can get to know each other and provide suggestions or ideas. By actively participating, each student gains an outstanding experience in the areas of attitude, ability, and knowledge.

If you look closely, the PBL syntax seems to be written with the teacher in mind. But one must understand. Be warned, these words simply hint that the instructor is actually in charge of ensuring that the learning activities in the classroom continue. Under the direction of the instructor, learning will or will not succeed in bringing students to their goals

In line with the statement above, science learning cannot be taught solely by the lecture model. Science learning should be student-centered, where students are actively involved in scientific experiments. This is in line with the Project Based Learning (PJBL) learning model where this learning model is centered on students, teachers as facilitators and motivators and by involving problem-based project work as the first step. Then collect and integrate new knowledge based on their experience in real activities and design problem-solving, making decisions, conducting investigative activities, with the final result of the project work. Project work is a product in the form of a written or oral report, presentation or recommendation. For example, in the food chain material, students produce a project in the form of a picture chart of the food chain ecosystem in the school environment such as garden ecosystems, ponds, and so on.

4. Conclusion

Project Based Learning (PBL) is one of the learning models that can help teachers and prospective teachers to improve the skills of writing science teaching materials needed in the current era of globalization. Through learning using the Project Based Learning model, it is hoped that students can improve their ability to solve project problems, acquire new knowledge and skills in learning and be more active in solving complex project problems with real product results, especially in science learning.

References

Arifianti, Ulfa. 2020. Project Based Learning in Science Learning. National Workshop on Strengthening Elementary School Teacher Competence.

BSNP. 2006. Permendiknas RI No. 22 of 2006 concerning Content Standards for Primary and Secondary Education Units. Jakarta.

Mone. (2006). Guidelines for the Development of Integrated Science Learning for Junior High Schools/Madrasah Tsanawiyah (SMP/MTs). Jakarta: Puskur Balitbang, Ministry of Education.

Diah Melisa, P. et al. (2023). Implementation of the project-based learning (PjBL) model to improve science literacy in science learning in elementary schools. Proceedings of Basic Scientific Conferences. PGRI University of Madiun.

Handayani. W & Revelation. T. Agustina. (2021). Guidelines for Writing Science Teaching

Materials Based on STREM (Science, Technology, Religion, Engineering, and Mathematics)

Mujiono, et al. (2014). Development of Writing Teaching Materials Based on Islamic Character Values for MTs. J-Symbol Journal (Language, Literature, and Learning). Pages 1-18.

Sinaga, P. (2015). Design Learning Model to Improving the Skills of Prospective Physics Teachers in Writing Teaching Materials. Proceedings of the National Seminar on Physics (E-Journal) SNF2015 http://snf-unj.ac.id/kumpulan- proceedings/snf2015/. Volume IV, October 2015 p-ISSN: 2339-0654 e-ISSN: 2476-9398.

Sudjana, Nana. (2013). Basics of the Teaching and Learning Process. Bandung: Sinar Baru Algensindo

Sukerni, P. (2014). Development of Science Education Textbook for Class IV Semester I SD No. 4 Kaliuntu with the Dick and Carey Model. Indonesian Journal of Education. ISSN: 2303-288X Vol. 3, No. 1, April 2014. Pages 386-396.

Susilawati et al. (2018). The Effectiveness of Project-Based Learning on the Writing Skills of Science Teaching Materials for Prospective Teachers of Elementary School EduHumanities: Vol. 10 No. 1, January 2018.

Tiantong, M & Sumalee Siksen. (2013). The Online Project-based Learning Model Based on Student's Multiple Intelligence. International Journal of Humanities and Social Science. Vol. 3 No. 7; April 2013. PP. 204-211.

Tias, I. wulandari utamininh. (2019). The application of the guided discovery model to improve science learning outcomes of elementary school students. September. https://doi.org/10.20961/jdc.v1i1.13060

Tititri Suciani, 2017 Understanding the Project based Learning Model as Field Experience Practice (PPL) Readiness for Culinary Education Study Program Students. University of Education

Trianto. 2010. Integrated Learning Model: Concept, Strategy, and Implementation in the Curriculum at the Education Unit Level (KTSP). Jakarta: PT Bumi Aksara.

Turdjai. (2016). The Effect of Learning Intervention on the Results of the Effect of Learning Approach On Student 15(2), 17–29.