JPPIPA 9(8) (2023)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

The Effectiveness of Problem-Based Learning Model Assisted by Canva-Oriented Pancasila Student Profiles to Improve Scientific Literacy

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Received: May 26, 2023
Revised: July 5, 2023
Accepted: August 25, 2023
Published: August 31, 2023

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DOI: 10.29303/jppipa.v9i8.4022

Abstract: This study aims to describe the effectiveness of the Problem-Based Learning model assisted by Canva oriented to Pancasila Student Profiles and to analyze the effect of its implementation on scientific literacy skills in static electricity material. This research was conducted at SMP Negeri 1 Kwandang with 31 students in class IXA as subjects. This development research uses Research and Development (R & D) research with the ADDIE development model developed by Reiser and Mollenda, which consists of the Analysis, Design, Development, Implementation, and Evaluation stages. The effectiveness test is carried out at the implementation stage. The results showed that the effectiveness of learning devices was seen through student activity data obtained by an average percentage of 93.27% obtained by very good criteria, and students' scientific literacy tests showed an increase in the N-gain score with an average N-gain score of 0.72 with high classification. This research concludes that physics learning tools that use the Problem-Based Learning model assisted by Canva-orientated Pancasila Student Profiles on static electricity effectively increase students' scientific literacy skills.

Keywords: Canva; Pancasila student profiles; Problem-based learning; Scientific literacy; Static electricity

Introduction

Science education is essential in preparing students to enter the world of life. Science is a mix of products and processes. Science products include facts, concepts, principles, theories, and laws (Hestenes, 2013; Gilbert et al., 2007). In contrast, the science process provides ways to acquire, develop and apply knowledge, including working methods, thinking processes, solving problems, and behaving (Chebii et al., 2012; Turiman et al., 2012; Irwanto et al., 2017; Amali et al., 2023). Therefore, science is formulated systematically, mainly based on experimentation and induction (Lapidow et al., 2020; Cakiroğlu et al., 2020). According Hernani et al. (2009) and Hadis et al. (2022) revealed that science education has great potential and a strategic role in preparing quality human resources to face the era of industrialization and globalization. This potential will be realized if science education can form students who are proficient in their fields and succeed in cultivating the ability to think logically, think creatively, have the ability to solve problems, be critical, master technology, and be able to adapt to changes and developments of the times (Arbie et al., 2021; Odja et al., 2014; Buhungo et al., 2021; Chairunnisa et al., 2022).

In dealing with and solving problems in various aspects of life, an understanding and deepening of science or scientific literacy is needed. Scientific literacy, according to the Program for International Student Assessment (PISA), is "the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and help make decisions about the natural world and the changes made to it through human activity" Scientific literacy is the ability to use scientific knowledge, identify questions, and draw conclusions based on evidence, to understand

How to Cite:
Wumu, A., Mursalin, & Buhungo, T. J. (2023). The Effectiveness of Problem-Based Learning Model Assisted by Canva-Oriented Pancasila Student Profiles to Improve Scientific Literacy. *Jurnal Penelitian Pendidikan IPA*, *9*(8), 5892–5898. https://doi.org/10.29303/jppipa.v9i8.4022

and make decisions related to nature and changes made to nature through human activities (OECD, 2015). Khabibah et al. (2019) defines scientific literacy as the ability to think scientifically to solve everyday science-related problems. Therefore, scientific literacy is a must for every individual. Scientific literacy is very important for every individual because the progress of a nation is determined by the quality of human resources who are literate in science and technology (OECD, 2012; Vayssettes, 2016).

The fact that occurs in the field is that the scientific literacy ability of the Indonesian people still needs to be improved. Based on the PISA Survey, which is routinely carried out every three years and serves as a reference for evaluating the quality of education in the world, the literacy, numeracy and science levels of 15-year-old school children in Indonesia are still far behind compared to other countries. the achievements of the Indonesian PISA Index from 2009 to 2018, in general, the scores obtained in the fields of reading, mathematics and science are quite concerning because in each implementation they are always below the international average score and are always ranked in the bottom 10 of all participating countries. Meanwhile, the TIMSS study (Trends in International Mathematics and Science Study), which aims to determine the development of mathematics and natural sciences for students aged 13 years (Class VIII SMP/MTs), is carried out regularly every four years, in mathematical literacy and science, TIMSS study results for 2015 show that Indonesian students have not performed satisfactorily. According to Toharudin et al. (2011), the results of these achievements indicate that the average science ability of Indonesian students has only reached the ability to recognize several basic facts. Still, they have yet to be able to communicate and relate these abilities to various science topics, let alone apply concepts.

Another condition is the National Assessment (AN) score released by the Ministry of Education and Culture in November 2021, especially at SMP Negeri 1 Kwandang education unit level, which shows that the literacy skills of students only get a score of 1.54, which is below the average national score is 1.72 with the definition of achievement of less than 50% of students achieving the minimum competency for literacy, this shows that the literacy skills of students at SMP Negeri 1 Kwandang are still low and have not reached the standard with achievements below the minimum competency. Meanwhile, for the character survey, which is one of the instruments in the National Assessment (AN) which functions to answer the problem of moral degradation and foster the soul of the Pancasila Student Profile, a score of 2 is below the national average score of 2.08 with the definition of achievement needing to be developed.

One of the learning models that supports improving scientific literacy skills and developing 21st-century education and has been stipulated by the Indonesian government through the Ministry of Education, Culture, Research and Technology in the 2013 curriculum is the Problem-Based Learning model or problem-based learning. The Problem-Based Learning model is a learning model that is oriented to contextual problems that are designed in such a way (Payu et al., 2023; Abdjul et al., 2022; Hermanto et al., 2023; Ntobuo et al., 2023; Setiawan et al., 2023). Then students actively deepen their knowledge to solve the problems presented. According to Trianto (2007), in problem-based learning, learning focuses on the selected problem so that students learn concepts related to problems and scientific methods for solving these problems. So that students can formulate problems and design solutions from solving the problem itself. Furthermore, Djou et al. (2022) and Supartin et al. (2022) stated that problem-based and contextual learning could make students concentrate, be comfortable and be effective in the learning process. The Problem-Based Learning model is designed to stimulate students' curiosity and activeness in finding solutions to problems that arise in learning.

The media used to support the success of the Problem-Based Learning model include audio, visual, motion visual, audiovisual media, and others (Damkham et al., 2021). Canva is a learning media that attract students' attention at school because it makes it easier for students to understand a lesson according to the desired appearance. Canva is an application used for making learning media and can make students focus on paying attention to lessons because of its attractive appearance (Nefillia et al., 2022; Saputri et al., 2023; Septiani et al., 2023). In addition, the independent learning curriculum strengthened by Pancasila student profiles. In general, students need to understand the character of Pancasila fully. Various disciplines can be applied to instil Pancasila's character. Pancasila character education in schools is a national goal to improve education, assist students in learning, and have good morals and ethics (Imania et al., 2022; Wulandari et al., 2022; Marsidin, 2022; Susanti et al., 2022). So, based on the description and existing problems, this research aims to describe the effectiveness of the problem-based learning model assisted by Canva orientated on Pancasila student profiles to improve scientific literacy skills.

Method

This research is included in Research and Development (R&D) research, a type of development

research. A learning device is said to be of high quality if it meets the valid, practical, and effective criteria (Fatmawati, 2016). Still, this study only focuses on describing the effectiveness of a physics learning device that uses the Problem-Based Learning model assisted by Canva orientated on Pancasila Student Profiles. This study uses the ADDIE model developed by Reiser and Mollenda, which consists of analysis, design, development, implementation and evaluation stages (Buhungo et al., 2023).

Testing the effectiveness of a product in the form of learning tools is carried out at the implementation stage to see the effectiveness of learning using the developed learning tools. The effectiveness of learning devices was assessed using student activity assessment sheets and learning outcomes on students' scientific literacy abilities. The implementation will be done at SMP Negeri 1 Kwandang in the 2022/2023 academic year. The subjects of this study were 31 students in class IX_A. The research was conducted in three face-to-face meetings in class but utilized internet access to access Canvas learning media.

Test the effectiveness of learning tools developed based on two aspects, namely: analysis of students' activities in learning, using the equation (1), and analysis of student learning outcomes in the form of scientific literacy tests using the equation (2) (Buhungo et al., 2023).

$$Student\ activity = \frac{Total\ score\ obtained}{Maximum\ score}\ x\ 100\% \quad (1)$$

$$Individual\ completeness = \frac{Total\ score\ obtained}{Maximum\ score}\ x\ 100\% \quad (2)$$

Result and Discussion

The effectiveness of learning tools in this study is based on two aspects: the analysis of students' activities in learning and the analysis of learning outcomes in the form of scientific literacy tests. According to Lantowa et al. (2022), the parameters used to see the effectiveness of learning devices are by looking at the activities of students and learning achievement tests that follow the learning model. The results of student activities can be seen in Table 1.

Table 1. Percentage of Student Activity

Meetings	Observer-1 (%)	Observer-2 (%)	Average (%)	Criteria
1	94.23	90.38	92.31	Very Good
2	92.30	94.23	93.27	Very Good
3	96.15	92.30	94.23	Very Good
Average	94.23	92.30	93.27	Very Good

Based on Table 1 Student activity at the first meeting had an average percentage of 92.31% with very good criteria, the second meeting had an average percentage of 93.27% with very good criteria, and the third meeting had an average percentage of student activity of 94.23%. In contrast, the average percentage of student activity for three meetings was 93.27%, with very good criteria based on the criteria, according to Sukardi (2013). This research is also consistent with previous research, which states that the percentage of student activity in participating in learning using problem-based learning model learning tools is included in the very good category (Buhungo et al., 2023). In addition, Chairunisa et al. (2022) state that learning tools are practical if learning objectives can be achieved per specific criteria and affect all student learning outcomes as expected or exceed the Minimum Mastery Criteria.

The effectiveness of learning tools is also seen through data on student learning outcomes in the form of scientific literacy tests on the topic of static electricity. The scientific literacy test consists of several test models: multiple-choice tests, complex multiple-choice tests, matchmaking tests and essay tests. The scientific literacy questions totalled 24 questions covering scientific content or knowledge and scientific competencies or processes. Data on the percentage of students' scientific literacy ability test results per indicator of scientific literacy, both pre-test and post-test, can be shown in Figure 1.

Based on Figure 1, it can be seen that there are differences in test results during the pretest and posttest. The posttest results experienced a significant increase after the treatment was carried out. The results of the content knowledge indicator at the pretest obtained an average percentage of 61.94% and experienced an increase in the posttest of 87.42%. In the procedural knowledge indicator, the pretest score has an average percentage of 44.62%, while the average posttest percentage has increased by 81.72%. For indicators of epistemic knowledge, the pretest value has an average percentage of 44.94%, while the posttest results experience an average percentage increase of 85.98%. Likewise, the average percentage indicator of science skills or processes in this study experienced a significant increase. The average pretest percentage value for the indicator explaining phenomena scientifically were 39.92%, and the posttest score increased to an average percentage of 76.21%. The average pretest score for

indicators evaluating and designing scientific investigations was 38.17%, while the posttest percentage increased by 86.83%. The average percentage of the pretest on the indicator of interpreting scientific data and evidence was 27.16%, and the posttest results increased with an average percentage of 85.74%.

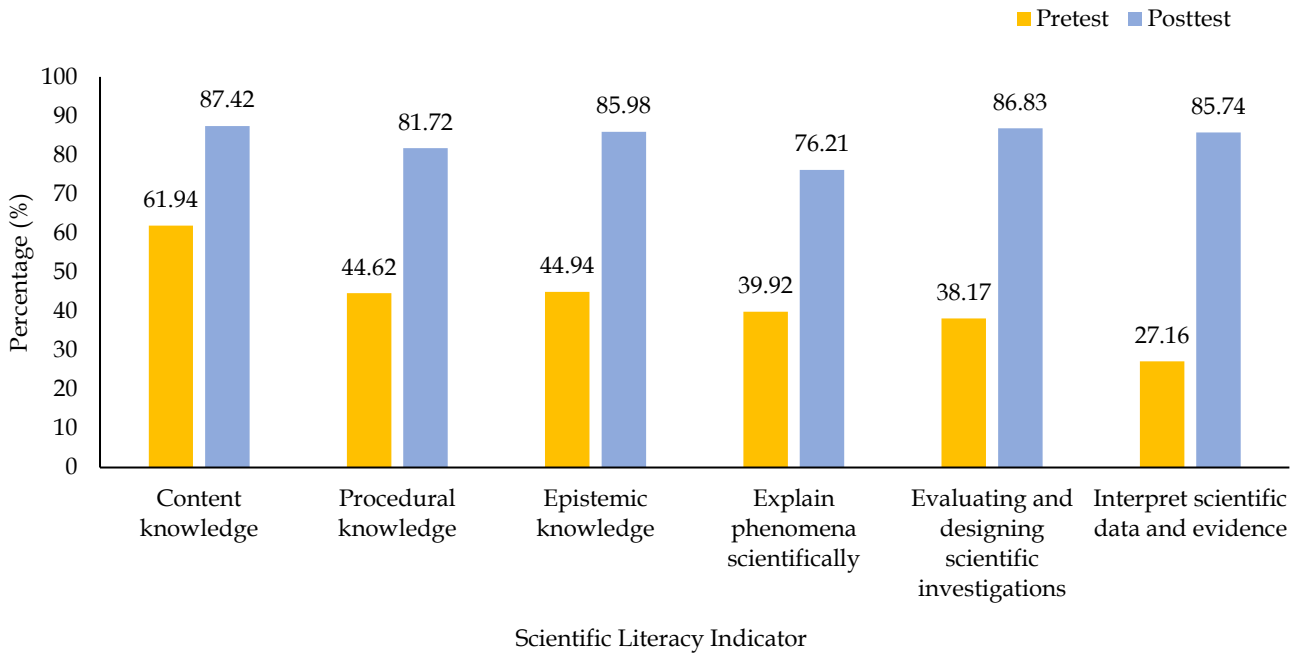

Figure 1. Percentage of indicator scientific literacy ability at pretest and posttest

Trial scientific literacy test using one group Pretest-Posttest Design. N-gain analysis was used to see the increase in students' literacy test results. Data on the average results of the pretest, posttest, the difference between pretest and posttest and the N-gain value can be seen in Table 2.

Table 2. Average Pretest, Posttest, Difference between Pretest and Posttest, N-gain Value.

Respondents	Pretest (%)	Posttest (%)	Interval (%)	N-gain	Criteria
31	41.23	83.56	42.33	0.72	High

Based on Table 2 shows that the pretest value is 41.23% while the posttest value is 83.56% with a difference of 42.33% with an increase in the N-gain value of 0.72 (<g> ≥ 0.7), including criteria N -high gain according to Hake (1999).

Based on comparative data analysis, the average posttest score is greater than the pretest score on the achievement of scientific literacy test results, which has a difference of 42.33. Therefore, there has been a significant increase in the results of scientific literacy tests. Thus, the learning tools are included in the very effective criteria. Likewise, seen from the N-gain value, a score of 0.72 is obtained. According to Hake (1999), learning devices are included in the high category based on the distribution of gain scores. It can be ascertained that the learning tools that use the Canva-assisted PBL model that have been developed are very effective in increasing scientific literacy skills. This is in line with (Erayani et al., 2022; Prihantya, 2016), who concluded in their research that the PBL model could increase students' scientific literacy.

Conclusion

Based on research conducted on the development of learning tools using the Canva-assisted Problem-Based Learning model on static electricity material carried out at SMP Negeri 1 Kwandang, it can be concluded that learning devices using the Canva-assisted Problem-Based Learning model is effectively seen through the activities of students who get the criteria very well, as well as scientific literacy test assessments with a comparison of the average posttest score that is greater than the pretest score. In contrast, the N-gain score includes high criteria, so the Canva-assisted Problem Based Learning model learning tool is effective for implementing static electricity learning material.

Acknowledgments
Thank you to the Dinas Pendidikan Kabupaten Gorontalo Utara, especially the extended family of SMP Negeri 1 Kwandang, for supporting the implementation of this research.

Author Contributions
Agus Wumu: Conceptualization, methodology, writing—original draft preparation, Writing—review and editing; Mursalin: Methodology, validation, data curation; Trisnawaty Junus Buhungo: Formal analysis, Writing—review and editing

Funding
This research received no external funding.

Conflicts of Interest
The authors declare no conflict of interest.

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