Teunuleh Scientific Journal
The International Journal of Social Sciences
Vol. 4, Issues. 4, Dec 2023 P-ISSN: 2807-193X | E-ISSN: 2746-4393

TPACK-BASED LEARNING IMPLEMENTATION THROUGH BASIC SCIENCE BOOKS TO ENHANCE THIRD-GRADE STUDENTS' LEARNING OUTCOMES AT SDN 16 BANDA ACEH

Nurul Zikri Filina
Syiah Kuala University, Banda Aceh, Indonesia
Corresonding authors: nrlzkrfln291000@gmail.com

Nurul Fatehah Binti Norhazaruddin
Universiti Putra Malaysia
212309@student.upm.edu.my

Peteri Telpi Sahrapi
Syiah Kuala University, Banda Aceh, Indonesia

Ota Fitriansyah
Syiah Kuala University, Banda Aceh, Indonesia

Aida Fitri
Syiah Kuala University, Banda Aceh, Indonesia

Nurlina
6SD Negeri 16 Banda Aceh, Jl. T. Nyak Arief No. 310, Indonesia

Abstract

This research aims to determine the improvement in learning outcomes for class III students by implementing TPACK-based learning using basic science books. The research method used in this research is PTK (Classroom Action Research), this research was carried out in 2 cycles with a total of 33 students. Each cycle consists of action planning, observation, and reflection. The data collection technique uses tests, the data analysis technique used uses quantitative descriptive. Increasing student learning outcomes through TPACK-based learning has a positive impact or impact, which is shown by an increase from pre-cycle, cycle I to cycle II. Completeness of student learning outcomes in the pre-cycle was 30% or 10 students out of 33 students, cycle I was 51% or 17 students out of 33 students, cycle II was 91% or 30 students out of 33 students.

Keywords: TPACK Based Learning, Basic Science, Learning Outcomes

A. Introduction

Learning activities are not only limited to collecting knowledge, but also involve a deep understanding of the material presented. Learning is a mental process that occurs in a person, which ultimately results in a change in behavior (Rohmah, 2017). Based on the results of observations at SD Negeri 16 Banda Aceh conducted by researchers, the learning where we teach still uses models, approaches, and methods that tend to be conventional and monotonous. Many teachers only rely on lectures, assignments, and question and answer methods, so students are less interested in following the learning process. Sometimes, the learning model applied by teachers is also not always appropriate. Things like this have a significant impact on the final outcome or student learning achievement. (Slameto, 2013) explained that learning is an individual's effort process to experience holistic behavior change. From this statement, it can be concluded that learning is a means to gain experience through practice. After the learning process is complete, students will obtain learning outcomes.

Learning in elementary schools should adopt an appropriate approach so that learning goals are easily achieved. However, in reality, the approach used is still monotonous and tends to be conventional, which causes low student learning outcomes, even below the KKM (Minimum Completeness Criteria), which only reaches 51%. Therefore, Classroom Action Research is needed to identify problems in learning and efforts to improve student learning outcomes. Based on these problems, the researcher seeks to apply the TPACK approach in learning activities. Based on the results of problem identification, it is known that student learning outcomes are still low (average below KKM), because the conventional learning approach used has not been able to improve student learning outcomes.

In the context of learning, learning objectives are set by educators. After setting learning objectives, educators then compile learning tools and carry out learning activities. In the end, educators conduct assessments to evaluate student learning outcomes. To carry out this process, a good, precise, and quality assessment instrument is needed. At SD Negeri 16 Banda Aceh, there is a Chromebook facility that can encourage the use of TPACK-based learning, which aims to introduce and familiarize students with technology. TPACK (*Technological Pedagogical Content Knowledge*) is one approach that integrates technology, pedagogy, and content in learning. This concept is the knowledge possessed by educators on how to manage student learning from certain content through a pedagogical approach and the use of technology (Filina et al., 2024).

TPACK is a development of a concept introduced by Shulman, known as Pedagogical Content Knowledge (PCK). TPACK is recognized in the field of educational

research as a framework for designing learning models that integrate three main aspects, namely technology, pedagogy, and content. Mishra & Koehler on (Filina et al., 2024) Explaining that quality learning requires a complex and interconnected understanding between the three main sources of knowledge, namely technology, pedagogy, and content. They emphasized that TPACK is the knowledge of the complex interaction between the domains of knowledge principles, namely content, pedagogy, and technology (Koehler et al., 2013). TPACK consists of seven components, namely: 1) Technological knowledge (TK), 2) Pedagogical knowledge (PK), 3) Content knowledge (CK), 4) Technological Content Knowledge (TCK), 5) Pedagogical content knowledge (PCK), 6) Technological Pedagogical Knowledge (TPK), and 7) Technological Pedagogical Content Knowledge (TPACK) (Filina et al., 2024).

Technology Knowledge (TK) is a student's understanding of the types and functions of technology, software, or applications that can be used in the learning process. Kindergarten also includes skills in adapting and learning new technologies (Sari et al., 2021). From this explanation, teachers are expected to improve their abilities and continue to learn and follow the latest technological developments in order to integrate this technology in learning. For example, a teacher can use an engaging PowerPoint presentation to grab students' attention, so students become more enthusiastic about learning.

Content Pedagogical Technology Knowledge (TPACK) is the ability of teachers to organize learning by integrating learning strategies and technology. This is an aspect that distinguishes the depth of mastery of each teacher's competence. TPACK is an effort to optimize Technology Understanding (TK) in learning by combining Content Knowledge (CK), Pedagogical Knowledge (PK), and Content Pedagogical Knowledge (PCK) into an integrated unit, which produces an effective, efficient, and interesting learning process (Roisatun & Nailil, 2022). Rahman emphasized that the learning process not only emphasizes mastery of cognitive aspects, but also the formation of students' attitudes and characters. The overall understanding of TPACK is a prerequisite for a teacher to implement PCK so that learning approaches, strategies, methods, and techniques can be adapted to the content taught. With the TPACK approach, teachers can improve pedagogical practices and conceptual understanding by integrating technology. Various technologies that can be used include laptops, LCD projectors, Microsoft PowerPoint as a learning medium, videos, YouTube, smartphones, and the internet. The TPACK approach aims to develop teachers' creativity and skills in using technology in learning as well as to improve the student learning experience. The purpose of this study is to evaluate the improvement of student learning outcomes through the application of TPACK-based learning using basic science textbooks.

B. Method

This research method uses the Classroom Action Research Approach (PTK), which aims to overcome and find solutions to problems that arise in the classroom context. The purpose of this study is to improve and improve the learning process in the classroom. The design of the PTK follows the stages proposed by Kemmis and Taggart, which includes planning, implementation, observation, and reflection. The cycle used follows the concept presented by Kemmis and Taggart. The model and explanation for each stage are shown in figure 1.

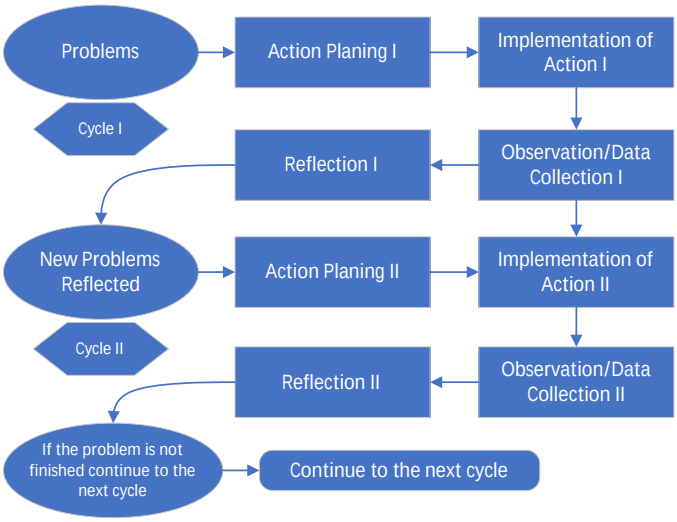

Figure 1. Kemmis & Taggart Model Cycle

C. Finding and Discussions

1. Finding

The percentage of completeness of student learning outcomes in the initial condition is 51%, because teachers still use conventional methods, causing students to have difficulty understanding the material, so that student development is low and has an impact on student learning outcomes. In the pre-cycle stage, teachers carry out learning in a conventional and monotonous manner, without applying the TPACK learning model.

In the first cycle, the percentage of completeness of student learning outcomes increased to 72%, showing an increase of 21% from pre-cycle. This is thanks to the use of TPACK-based learning which makes the classroom atmosphere more fun and students more active. However, there are still some aspects of assessment that are not optimal, such as student attention that is not fully focused on learning materials and videos.

In cycle II, there was a significant increase in the percentage of completeness of student learning outcomes, up by 20% from the previous cycle. Student learning outcomes increased from 71% in cycle I to 91% in cycle II. This is because teachers have successfully carried out all aspects of assessment well, as well as providing more opportunities for students to be actively involved in learning, for example by discussing which is connected to learning videos. As a result, the learning atmosphere becomes more enjoyable, and students' attention is more focused, which is reflected in the significant increase in student observation data. The percentage of student outcome comparison is presented in Table 1.

Table 1. Comparison of Pre-Cycle, Cycle I & Cycle II Grades

No.	Complete & Unfinished	Pre-Cycle		Cycle I		Cycle II	
		∑x	%	∑x	%	∑x	%
1.	Complete	17	(51%)	24	(72%)	30	(91%)
2.	Not Finished	16	(49%)	9	(28%)	3	(9%)

Based on table 1. above, it shows that the learning outcomes of students using TPACK-based learning were obtained data that there was an increase from Pre-Cycle 51% of students completed learning, Cycle I 72% of students completed learning, and Cycle II 91% of students completed learning. The increase in students who completed Pre-Cycle to Cycle I was 21%, and Cycle I to Cycle II was 20%. The following is a picture of learning activities in cycle I and cycle II which can be seen in figure 2.

Figure 2. Cycle I & Cycle II Activities

The results of this study show that TPACK-based learning through basic science books has succeeded in improving the learning outcomes of grade III students of SD Negeri 16 Banda Aceh. Because there is an increase in each cycle, it can be concluded that the use of Content Knowledge Pedagogical Technology (TPACK) in learning is

effective in improving student learning outcomes. Therefore, the action hypothesis is acceptable.

2. Discussion

The results of this study show that there is an increase in student learning outcomes through learning that applies the TPACK model. Therefore, it can be concluded that TPACK-based learning is one of the most effective solutions in the context of learning, as evidenced in this study. TPACK-based learning not only makes it easier for teachers to integrate technology with pedagogical content, but also makes students more interested in participating in learning, so that students can understand the subject matter better, which directly impacts on improving student learning outcomes.

The improvement of student learning outcomes through TPACK-based learning has a positive impact that can be seen from the increase from pre-cycle to cycle I, as well as from cycle I to cycle II. In the pre-cycle, the completeness of student learning outcomes was 51%, or 17 out of 33 students. In the first cycle, it increased to 72%, or as many as 24 students out of 33 students. Meanwhile, in the second cycle, it increased again to 91%, or as many as 30 students out of 33 students. From pre-cycle to cycle I, there was an increase in learning outcomes by 21%, while from cycle I to cycle II there was an increase of 20%. This shows a significant increase in student achievement and completeness. Based on these results, it can be seen that through TPACK-based learning, there has been a significant increase in the learning outcomes of grade III students at SD Negeri 16 Banda Aceh.

D. Conclusion

Improving student learning outcomes with TPACK-based learning through basic science books has a positive effect or impact, namely by showing an increase from pre-cycle, cycle I to cycle II. The completeness of student learning outcomes in the pre-cycle was 51% or 17 students out of 33 students, the first cycle was 72% or as many as 24 students out of 33 students, the second cycle was 91% or as many as 30 students out of 33 students.

Bibliography

Filina, N. Z., Sari, S. M., & Zahraini. (2024). The utilization of Technological Pedagogical Content Knowledge (TPACK) in elementary school learning. *International Journal of Business, Law, and Education*, *5*(1), 260–266.

Koehler, M. J., Mishra, P., & Cain, W. (2013). What is Technological Pedagogical Content

Knowledge (TPACK)? *Journal of Education*. https://doi.org/10.1177/002205741319300303

Rohmah, A. N. (2017). Learning and learning (basic education). *Journal.Stitaf.Ac.Id*, *09*(02), 193–210.

Roisatun, N., & Nailil, F. (2022). Analysis of the Ability to Compile Learning Tools for Qomaruddin University Students Reviewed from TPACK. *Buana Matematika : Scientific Journal of Mathematics and Mathematics Education*, *11*(1), 1–13. https://doi.org/10.36456/buanamatematika.v11i1.2692

Sari, S. M., Sinaga, B., & Suyanti, R. D. (2021). *THE PERSONAL LEARNING ENVIRONMENT SYNERGIZES WITH PEDAGOGIC TECHNOLOGY CONTENT KNOWLEDGE ON SCIENCE PROCESS SKILLS*. *6*(1), 72–81. https://doi.org/10.32832/educate.v6i1.4228

Slameto. (2013). Learning and the Factors That Influence It. *Jakarta: PT Rineka Cipta.*, *20*(5), 40–43. https://books.google.co.id/books?id=D9_YDwAAQBAJ&pg=PA369&lpg=PA369&dq=Prawirohardjo,+Sarwono.+2010.+Buku+Acuan+Nasional+Pelayanan+Kesehatan++Maternal+dan+Neonatal.+Jakarta+:+PT+Bina+Pustaka+Sarwono+Prawirohardjo.&source=bl&ots=riWNmMFyEq&sig=ACfU3U0HyN3I