DIDAKTIKA
Jurnal Penelitian Tindakan Kelas
https://didaktika.lombokinstitute.com/index.php/JPTK

Vol. 2, No. 2 (October 2024)
e-ISSN: 2987-4343
pp. 65-73

The Impact of the SQ3R Method on Physics Concept Understanding and Learning Outcomes in Measurement Material

Rohmatul Aini[1], Lia Koryataini[1], Suprianto[1], Nurul Hidayati[2], Rihana[2]

[1]Physics Education Study Program, Universitas Islam Madura, Madura, Indonesia
[2]SMA Negeri 3 Pamekasan, Jawa Timur, Indonesia
e-mail: rohmatulaini028@gmail.com

Abstract: This study aims to evaluate the effectiveness of the SQ3R method in improving student learning outcomes and understanding of physics concepts related to measurements among class X-I students at SMA Negeri 3 Pamekasan. Conducted as classroom action research (CAR) with 36 participants, data were collected through a five-question test. Prior to implementing the SQ3R method, the average student score was 56.67, with a learning completion rate of 22.22%, indicating that 28 students had not achieved an adequate understanding of the material. Post-implementation, the average score increased to 75.28, with a learning completion rate of 61.11%, signifying successful comprehension for 22 students and an average improvement of 38.89%. In Cycle II, which focused on analyzing single and repeated measurements, the average score rose to 82.22, with an 86.11% completion rate, though five students (13.88%) remained below the required standard. Additionally, the SQ3R method positively impacted student engagement. In Cycle I, physical, mental, and emotional activities were recorded at 50.57%, 35.67%, and 61.11%, respectively. These metrics increased significantly in Cycle II to 86.27%, 92.24%, and 87%. These findings demonstrate the SQ3R method's effectiveness in enhancing learning outcomes, conceptual understanding, and student participation.

Article History
Received : August 28, 2024
Reviewed : October 10, 2024
Published : October 30, 2024

Keywords:
SQ3R method, understanding concepts, physics, learning outcomes

How to Cite: Aini, R., Koryataini, L., Suprianto, S., Hidayati, N., & Rihana, R. (2024). The Impact of the SQ3R Method on Physics Concept Understanding and Learning Outcomes in Measurement Material. *DIDAKTIKA: Jurnal Penelitian Tindakan Kelas*, *2*(2), 65–73.

Introduction

Physics is a fundamental branch of natural science, serves as the basis for various other disciplines, and provides a deep understanding of the natural phenomena around us. Understanding physics starts from everyday life; it can be applied to the technology we use to a basic understanding of how the universe works (Pangestuti et al., 2022). The standard of education in Indonesia, particularly in science and technology, presents significant difficulties. Despite many efforts by the government, such as curriculum changes, increased teacher training, and improved infrastructure, optimal results have not been achieved evenly across regions. Continuous education and training for teachers and the development of more effective and innovative teaching methods are essential to support students' understanding of the material being taught. One way to motivate students to understand physics better is through contextualized and practical teaching, for example, by providing examples of physics applications in everyday life or using media and texts (Hulu et al., 2024).

In learning activities, teachers also need to develop the ability to arouse student motivation because strong motivation will encourage students to learn more actively. Motivation can be built by giving appreciation, providing appropriate challenges, and creating a pleasant learning atmosphere. Thus, the teacher's understanding of relevant teaching techniques and approaches greatly determines the success of the teaching and learning process and student learning outcomes (Maretiana et al., 2022). How to learn and how to teach is indeed a key factor in achieving optimal learning outcomes for students. To be able to carry out this role, teachers need to equip themselves with a variety of effective teaching skills and strategies. Teachers need to understand the characteristics, interests, and needs of students in order to use appropriate and interesting methods. For example, active learning methods such as projects, discussions, and problem-based learning (PBL) can make students more engaged and motivated. Teachers also need to develop the ability to arouse student motivation because strong motivation will encourage students to learn more actively. Motivation can be built by giving appreciation, providing appropriate challenges, and creating a pleasant learning atmosphere. Thus, the teacher's understanding of relevant teaching techniques and approaches greatly determines the success of learning activities and the achievement of results obtained by students (Siboro, 2021).

The SQ3R method is one of the efficient learning strategies to enhance students' learning achievement, especially in understanding reading materials. SQ3R is an acronym for five structured steps to help students read actively and improve their understanding of the text. By following the SQ3R method, students can read more effectively and efficiently and improve their comprehension and recall of the reading. Through this approach, being directly involved in the process, students also become more active in learning. Discovering information and linking understanding to the questions they create. If applied consistently, the SQ3R method can help students achieve comprehension of up to 80% or more, as suggested (Sari et al., 2022).

The SQ3R method, according to Hasanah (2023), has been proven to provide positive results in improving student understanding, especially in chemical bonding materials. The application of this method showed an increase in student learning outcomes by 22.60%, with an impact on student activeness reaching 55%. This finding confirms the importance of learning strategy innovation, especially in physics, as well as the role of teachers in choosing the right method. Based on this, this study is entitled "The Impact of the Application of the SQ3R Method on Understanding Physics Concepts on Measurement Material and Improving Learning Outcomes of Class X-I Students of SMA Negeri 3 Pamekasan".

The observation carried out has the aim of improving learning achievement through skill ability on physics concepts. This goal focuses on increasing students' understanding of measurement material, with the hope that the use of the SQ3R method can make significant changes for students. Increasing student activity during learning: This second objective emphasizes that students can be more involved in the physics learning process by using methods that encourage active participation. By applying this approach, their involvement in learning physics will increase (Zendrato et al., 2022). This researcher conducted observations with the aim of increasing student participation in the learning process, improving collaboration between students, and deepening their understanding of physics concepts, especially on the topic of measurement (Putri et al., 2024). By using the SQ3R method, students are expected to be more focused and involved in the subject matter. For teachers as researchers teachers as researchers can benefit in the form of increased professionalism in managing learning and motivation to carry out further research on more effective learning strategies. For peer teachers, this research provides references to more effective learning models and can motivate other teachers to use the same methods in their teaching. For education in general, this research can have an impact on the quality of learning in the classroom, where classroom action research can be a means to improve the effectiveness of the learning process and create positive changes in the way teachers teach (Ritonga et al., 2024).

Research Method

Classroom Action Research is a method of observation that is structured to improve and increase the quality of learning in the classroom. This approach emphasizes actions taken from the evaluation of the learning process that has been implemented (Oktaviana et al., 2023). research design must be adjusted to the type of research that has been chosen. Therefore, the producers and tools used in the research need to be adjusted to the research method applied. This research aims to improve the learning process by identifying problems, planning corrective actions, implementing these actions, and then evaluating the results to determine whether there is an improvement or not (Daulay et al., 2022).

The observations that educators make in the classroom during the learning process are class action research. They teach to improve the learning process. with steps consisting of planning, implementation, and evaluation of actions in a collaborative and participatory manner (Siahaan et al., 2022). this research has the main objective of wanting to make changes to the quality of teachers in carrying out the learning process. Through it, teachers can identify and apply new learning models or new actions that have proven effective in improving student learning outcomes. This research provides an opportunity for teachers to experiment with proven new approaches so that they can create a better learning atmosphere according to their needs (Sandari, 2021).

This research was conducted at SMA Negeri 3 Pamekasan, in class X-I, with a total of 36 students. In this study, there are two variables evaluated, namely the intervention variable, which uses a constructivist approach applied in two cycles and the problem variable related to the concept of measurement. According to Kunandar, four stages will be carried out in this class action research process, namely planning, action, observation, and reflection. This research only uses two cycles to assess and improve the learning process. Each Cycle aims to improve and maximize learning outcomes by making improvements based on reflections from the previous Cycle (Irwansyah, 2021).

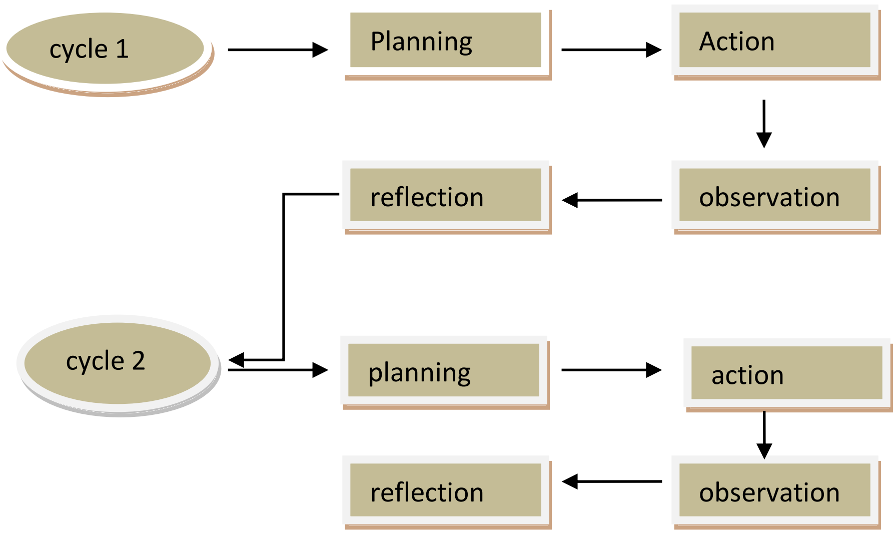

Figure 1. Class Action Research Cycle

In connection with the research variables that have been mentioned, this study collected four types of data. First, physical learning achievement data was collected after each implementation of the SQ3R learning model was assessed through a physics learning outcomes test. Information regarding the implementation of this model was obtained through observations recorded in the classroom observation sheet (Hayuningtyas et al., 2024). In addition, information about student behavior during learning and measurement material learning outcomes tests were also collected. Students' responses to the application of the SQ3R model were taken through direct interviews with students. Based on the type of data collected, this research applies two methods of analysis, namely quantitative analysis, which is applied in processing test result data, and quantitative analysis for observation data on teachers, students, and chaplains that appear during the learning process (Fitriani et al., 2021).

Result and Discussion

This study involves two main types of variables, namely dependent variables and independent variables. The dependent variable in this study refers to students' physics learning achievement, which is evaluated through the use of the Physics Learning Outcomes Test. This variable is influenced by the use of the approach applied during the research process. The independent variable is the application of the constructivist approach in learning. Data for this variable was collected through several instruments, such as: the Classroom Observation Sheet (LOC): Observing student interactions and activities in the classroom when the constructivist approach is applied. Classroom Activity Record (CKK): Documentation of activities that occurred during the learning process. Student Interview Sheet (LWS): Digging deeper into students' understanding and response to the applied approach. These diverse data collection methods aim to provide a thorough understanding of the effect of the constructivist approach on students' physics learning achievement.

This research was carried out using two stages by applying a constructivist approach to physics learning. This approach was arranged in lesson plans designed together with researchers and peers as observers. The study was carried out in the odd semester of the 2024-2025 school year. Before the action was applied, the physics learning achievement of X-i class students at SMA Negeri 3 Pamekasan showed the lowest score of 45, the highest score of 85, and an average of 56.67. Out of a total of 36 students, only eight students achieved mastery, while 28 students did not meet the criteria for mastery.

Cycle 1

Cycle I observation results were used to assess students' understanding of physics concepts, with written test data presented in Table 1.

Table 1. Students Physics Concepts Understanding Before Action and Cycle I

No	Results	Before Action	Cycle 1
1.	Highest score	85	90
2.	Lowest score	45	55
3.	Average	56,67	75,28
4.	Learning completeness (%)	22,22%	61,11%

In Cycle I, the material taught included the application of bookkeeping material. Before using the SQ3R learning method, the evaluation results showed an average score in the class of 56.67, at a learning completeness level of only 22.22%. About 28 students were still not complete in understanding the physics material. However, after the application of the method, the post-test results showed that the class average value increased to 75.28 with a classical learning completeness rate of 61.11%. A total of 22 students, or 61.11%, successfully achieved mastery in mastering physics concepts based on the results of the learning evaluation. Changes in student learning outcomes before and after the application of the SQ3R method in Cycle I are shown in Figure 2.

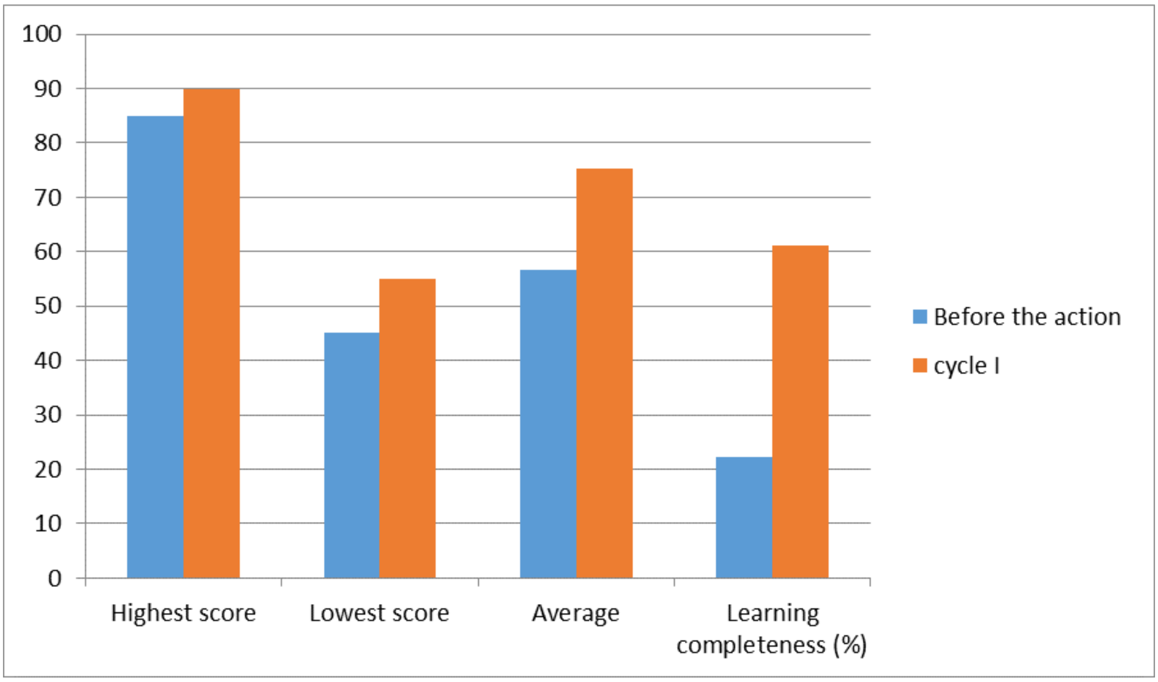

Figure 2. Bar Graph on Student Learning Outcomes

The t-test in Cycle I indicated a notable improvement in student learning outcomes, with a t-value of 8.39, surpassing the t-table value of 2.00 at a 5% significance level. Nevertheless, classical completeness was not reached, as fewer than 85% of students achieved scores of 70 or higher. Data were obtained regarding the percentage of student participation during the learning process. The overall achievement level of physical activity was recorded at 50.57%, with 30.57% of students showing good activity and 25.65% of students with moderately active activity. For mental activity, 35.67% of students showed a level of activeness that could be said to be very good, 53.25% at a good level of activeness, and 16.78% were at the moderately active criteria. Meanwhile, the completeness of emotional activity classically reached 61.11%, with 38.15% of students showing a very good level of activeness, 45% of students with a good level of activeness, and 23.65% of students on moderately active criteria. Although there was an increase, these results showed that students' physical, mental, and emotional activities had not met the success indicators set. Therefore, the class action needed to be continued to cycle II.

Cycle II.

Cycle II observations assessed students' understanding of physics concepts, with written test results presented in Table 2.

Table 2. Students Physics Concepts Understanding Cycle I and Cycle II

No	Results	Cycle I	Cycle II
1.	Highest score	90	95
2.	Lowest score	55	60
3.	Average	75,28	82,22
4.	Learning completeness (%)	61,11%	86,11%

In Cycle II, the material taught included analysis of single and repeated measurement material. Learning results in Cycle II, the average class score reached 82.22 with 86.11% completeness, although 13.88% of students (5 students) were still not complete (Figure 3).

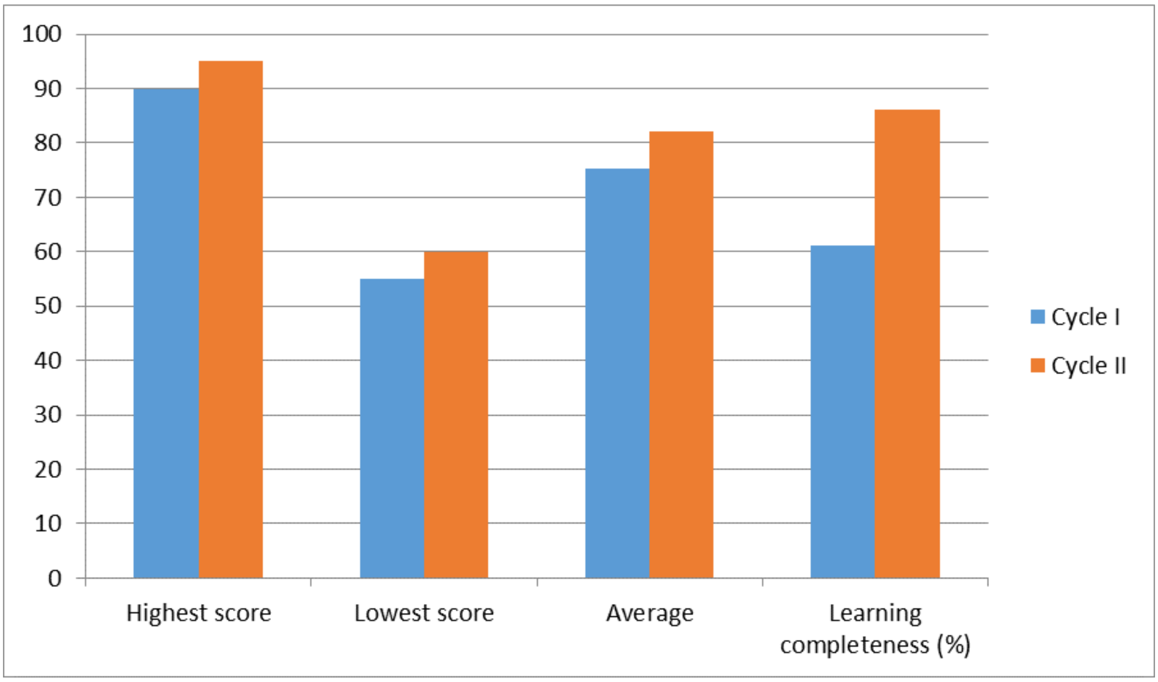

Figure 3. Bar Graph of Student Learning Outcomes Cycle 1 and 2

Cycle II actions showed a significant increase in learning outcomes compared to Cycle I (t-count 2.38 was greater than t-table 2.03, significant 5%). Completeness was achieved because more than 85% of students obtained a score greater than 70. Observations in Cycle II show the percentage of student participation during the learning process. The overall physical activity achievement rate reached 86.27%, with 58.54% of students showing a very good level of activity, 29.65% good, and 15.30% adequate. For mental activities, classical completeness was recorded at 92.24%, with 52.45% of students on the criteria of very good, 42% good, and 9.37% adequate. As for emotional activity, classical completeness reached 87%, with 55% of students being on the criteria of very good, 43% good, and 5% adequate. In this Cycle, physical and emotional activities met the set criteria, with >85% of students achieving a ≥ score of 75, even though mental activity was not optimal. However, the overall improvement from Cycle I makes the success indicator achieved.

In the first Cycle, although there is an increase in learning outcomes, the success indicators have not been fully achieved. Most students still have not adapted to the application of the SQ3R method, so they have difficulty following the steps given. Based on observations, some of the problems found include students' difficulties in carrying out the review stage. In addition, student participation in class and group discussions is still relatively low. Teachers often take over the discussion, while students seem to feel awkward and lack the confidence to express their opinions.

Regarding student activity, in the first Cycle, the expected indicators have not yet been realized. The student's physical activity was quite good because the majority of students were already actively reading texts, listening to presentations from educators, and writing the resulting discussions. Nonetheless, they remained somewhat unenthusiastic during the question and answer session. The student's cognitive engagement demonstrated improvement, as the majority were able to grasp the physics concepts being taught.. However, their involvement in group discussions and conclusion-making is still lacking, and they tend to be shy about speaking in class. Students' emotional activity is starting to be seen, although it needs further improvement. The majority of students showed a polite and enthusiastic attitude in participating in learning. The shortcomings found in the first Cycle are used as the basis for improvement in the second Cycle.

In Cycle II, the learning results showed significant progress, with the achievement of classical completeness reaching 88%, according to the target. Students better understand the SQ3R method and can complete assignments better. The application of this method also increased student activity, with physical activity at 85.71%, mental activity at 91.42%, and emotional 91.42%. The experience of Cycle I has a significant impact on students to understand better and implement the stages of the SQ3R method more effectively. Despite the progress, mental activity in Cycle II has not fully met the expected achievement criteria. Some students are still reluctant to speak in discussions, feel awkward interacting, and lack active participation in groups.

Conclusion

The application of the SQ3R method in teaching measurement concepts in physics has proven effective in enhancing students' understanding and learning outcomes while fostering active engagement in the learning process. The study revealed significant improvements in student performance, with the average class score increasing from 56.71 (30% learning completion) in the pre-implementation phase to 67.29 (68% learning completion) in Cycle I and further to 78.57 (88.57% learning completion) in Cycle II. The method also substantially improved student activity levels, with physical, mental, and emotional engagement rising from 70%, 56%, and 60% in Cycle I to 88%, 80%, and 86% in Cycle II, respectively. These findings demonstrate that the SQ3R method effectively enhances conceptual understanding, learning outcomes, and student participation, aligning with the research objectives and supporting its application in physics education.

Recommendation

Some ideas for further research regarding the application of the SQ3R method to students' conceptual understanding of measurement material include the effectiveness of the SQ3R method in improving problem-solving abilities, a comparison of the effectiveness of the SQ3R method with other methods, and a study of the use of the SQ3R method in various educational contexts.

Acknowledgment

We sincerely thank all those who supported this work, especially the lecturers who patiently guided us, provided unwavering motivation, and generously shared their knowledge, enabling the successful completion of this article.

References

Daulay, R. A., Siregar, D. A., & Siagian, M. (2022). Model pembelajaran inquiry training terhadap hasil belajar fisika materi besaran dan satuan. *Jurnal PhysEdu (Physics Education)*, *3*(1), 1. https://doi.org/10.37081/physedu.v3i1.647

Fitriani, F., Fitriani, L., & Lolita, N. (2021). Analisis pemahaman siswa terhadap materi fisika SMA besaran, satuan, dan pengukuran di MAN 2 Kota Jambi. *Integrated Science Education Journal*, *2*(2), 55–59. https://doi.org/10.37251/isej.v2i2.165

Hasanah, U. (2023). Penerapan metode SQ3R (Survey, Question, Read, Recite, Review) untuk meningkatkan hasil belajar siswa pokok bahasan mengenal negara ASEAN kelas VI SDN Sumberdanti 01. *Jurnal JIPDAS (Jurnal Ilmiah Pendidikan Dasar)*, *3*(1), 142–146. https://doi.org/10.37081/jipdas.v3i1.1302

Hayuningtyas, S., Anggraeni, F. K. A., & Supriadi, B. (2024). Analisis minat dan hasil belajar siswa pada materi pengukuran kelas X SMAN Umbulsari. *Jurnal Pembelajaran Fisika*, *13*(1), 32. https://doi.org/10.19184/jpf.v13i1.47199

Hulu, P., Giawa, D., Panjaitan, J., & Susanto, I. (2024). Pengaruh model project-based learning berbantuan Canva terhadap hasil belajar siswa kelas X MIA SMA Parulian 2 Medan tahun ajaran 2023/2024. *Jurnal Penelitian Fisikawan*, *7*(1), 10. https://doi.org/10.46930/jurnalpenelitianfisikawan.v7i1.4174

Irwansyah, I. (2021). Efektivitas penerapan alat peraga aktual terhadap hasil belajar fisika pada materi pengukuran. *Lensa*, *15*(2), 46–52. https://doi.org/10.58872/lensa.v15i2.14

Maretiana, D. N., Mulyadi, I., & Ruhyanto, A. (2022). Pengaruh model pembelajaran kooperatif tipe contextual teaching and learning (CTL) terhadap hasil belajar siswa. *J-KIP (Jurnal Keguruan dan Ilmu Pendidikan)*, *3*(1), 183. https://doi.org/10.25157/j-kip.v3i1.6289

Oktaviana, T., Hikmah, N., & Syam, H. (2023). Penerapan model discovery learning terhadap keaktifan dan hasil belajar siswa kelas X MIPA SMA Muhammadiyah Pangkajene. *Jurnal Guru Pencerah Semesta*, *1*(3), 332–337. https://doi.org/10.56983/jgps.v1i3.735

Pangestuti, N. H., Prastowo, S. H. B., & Supriadi, B. (2022). Pengaruh media video animasi dalam pembelajaran fisika pokok bahasan pengukuran terhadap hasil belajar siswa SMA. *Karst: Jurnal Pendidikan Fisika dan Terapannya*, *5*(2), 10–15. https://doi.org/10.46918/karst.v5i2.1539

Putri, D. R., Susilawati, S., & Wahyudi, W. (2024). Pengaruh model pembelajaran berbasis masalah melalui metode praktikum terhadap hasil belajar peserta didik pada materi pengukuran. *Jurnal Ilmiah Profesi Pendidikan*, *9*(1), 187–193. https://doi.org/10.29303/jipp.v9i1.1872

Ritonga, L. E., Siregar, R. A. D., & Putra, E. (2024). Efektivitas Model Pembelajaran SQ3R Terhadap Kemampuan Berpikir Kritis Siswa Materi Sistem Respirasi Manusia di Kelas XI MAN Tapanuli Selatan Lokasi Sipange Godang. *Jurnal Edugenesis*, *7*(2), 18-23.

Sandari, T. (2021). Identifikasi pemahaman siswa terhadap hasil belajar fisika pada materi besaran dan satuan di SMA N 1 Batanghari. *Integrated Science Education Journal*, *2*(3), 94–97. https://doi.org/10.37251/isej.v2i3.176

Sari, I. P., Nanto, D., & Putri, A. A. (2022). Pengaruh hasil belajar pendidikan fisika siswa menggunakan teknik meta-analisis dengan model PBL (Problem Based Learning). *Jurnal MENTARI: Manajemen, Pendidikan dan Teknologi Informasi*, *1*(1), 20-28.

Siahaan, D. I., Tafonao, F., & Perangin-angin, A. (2022). Pengaruh Model Cooperative Learning Berbantuan Alat Peraga terhadap Hasil Belajar Fisika Siswa Kelas X MIA

SMA Swasta GKPI Padang Bulan Medan Tahun Ajaran 2021/2022. *Jurnal Penelitian Fisikawan*, *5*(1), 21-32.

Siboro, A. (2021). Pengaruh Model Pembelajaran Inkuiri Berbantuan Project Terhadap Hasil Belajar Fisika Pada Materi Pokok Pengukuran Kelas X Semester I SMAS GKPI Padang Bulan Medan TP 2020/2021. *Jurnal Penelitian Fisikawan*, *4*(1), 10-16.

Zendrato, N., Zebua, Y., & Harefa, E. B. (2022). Penerapan model pembelajaran problem-based learning untuk meningkatkan hasil belajar siswa pada kompetensi dasar menerapkan prinsip-prinsip teknik pengukuran tanah. *Educativo: Jurnal Pendidikan*, *1*(2), 544–551. https://doi.org/10.56248/educativo.v1i2.75