Enhancing Student Learning Outcomes in Science Through The *Contextual Teaching Learning* (CTL) Model: a Case Study on Light and its Properties in Class V

Jamaluddin[1], Rumiris Lumban Gaol[2]

[1] SD Negeri 5 Menggamat
[2] Universitas Katolik Santo Thomas

e-mail: rumiris20lumbangaol@gmail.com

Abstrak

Penelitian ini mengeksplorasi kegunaan paradigma Contextual Teaching Learning (CTL) dalam meningkatkan hasil belajar siswa pada mata pelajaran IPA konsentrasi pada topik cahaya dan sifat-sifatnya di kelas lima. Penelitian ini menggunakan pendekatan metode campuran, yang mengintegrasikan analisis statistik kuantitatif dengan wawancara dan observasi kualitatif. Pendekatan Penelitian Tindakan Kelas (PTK) diadopsi sebagai metodologi penelitian utama, sehingga memungkinkan peneliti terlibat langsung dalam proses penelitian mulai dari inisiasi hingga kesimpulan. Tujuannya adalah untuk meningkatkan hasil belajar IPA siswa dengan menggunakan model CTL. Analisis data awal menunjukkan adanya peningkatan yang cukup besar pada hasil belajar siswa selama tahap penelitian. Pada siklus I, rata-rata nilai individu mencapai 65,37, dan hanya 45% siswa yang mencapai ketuntasan klasikal. Namun pada siklus II rata-rata nilai individu meningkat menjadi 82,25 dan 85% siswa mencapai ketuntasan klasikal. Temuan ini sesuai dengan penelitian sebelumnya mengenai hasil pembelajaran Matematika dan Bahasa Indonesia, yang menunjukkan bahwa paradigma CTL secara positif meningkatkan prestasi siswa. Studi ini menggarisbawahi pentingnya penelitian lebih lanjut untuk mengidentifikasi aspek-aspek yang berkontribusi terhadap efektivitas model CTL, termasuk interaksi guru-siswa, ketersediaan sumber daya, dan motivasi siswa. Kesimpulannya, penelitian ini menggambarkan kegunaan model CTL dalam meningkatkan hasil belajar IPA siswa, khususnya dalam memahami topik rumit tentang cahaya dan sifat-sifatnya. Temuan ini memberikan wawasan yang berguna bagi para pendidik dan pembuat kebijakan yang berupaya meningkatkan kualitas pembelajaran sains di tingkat sekolah dasar.

Kata kunci : *Pembelajaran Kontekstual (CTL), Penelitian Tindakan Kelas (PTK), Pendidikan IPA.*

Abstract

This research explores the usefulness of the Contextual Teaching Learning (CTL) paradigm in enhancing student learning outcomes in science, concentrating on the topic of light and its

properties in a fifth-grade classroom. The study adopts a mixed-methods approach, integrating quantitative statistical analysis with qualitative interviews and observations. The Classroom Action Research (CAR) approach is adopted as the primary research methodology, allowing the researcher to directly engage in the study process from initiation to conclusion. The purpose is to better student learning outcomes in science by using the CTL model. The initial data analysis suggests a considerable boost in student learning outcomes during the research phase. In the first cycle, the average individual score reaches 65.37, with just 45% of pupils reaching classical completion. However, in the second cycle, the average individual score improves to 82.25, and 85% of students attain classical completion. These findings match with earlier studies on Mathematics and Indonesian language learning outcomes, demonstrating that the CTL paradigm positively improves student accomplishment. The study underlines the significance of further research to identify aspects contributing to the effectiveness of the CTL model, including teacher-student interactions, resource availability, and student motivation. In conclusion, the research illustrates the usefulness of the CTL model in enhancing student learning outcomes in science, particularly in understanding the complicated topic of light and its qualities. The findings give useful insights for educators and policymakers striving to boost the quality of scientific learning at the primary school level.

Keywords : *Contextual Teaching Learning (CTL), Classroom Action Research (CAR), Science Education.*

INTRODUCTION

National Education has the fundamental purpose of developing students' ability to become persons who believe, are committed to God Almighty, have noble character, are healthy, creative, independent, and become democratic and responsible citizens. Education is regarded a necessary because humans are born helpless, cannot stand alone, and need instruction to flourish. Education is described as an activity or process that tries to develop the quality of human resources so that they are able to function functionally and optimally in life. This perspective emphasizes that education is a purposeful endeavor by adults to raise the moral responsibility of students. Education in schools is an intentional and purposeful attempt by teachers to make children study actively and enhance their creative thinking. The basic purpose of giving education is to train pupils to be able to process and acquire knowledge, skills and attitudes for themselves (Prameswari, 2019).

Teaching demands enormous moral responsibility, and the success of education depends greatly on the teacher's obligation. Teachers have a particular role in teaching, which comprises interaction with students and the learning environment. Learning is considered as a process of adaptation or progressive adjustment of behavior. Good learning results can drive pupils to study harder. Teachers, as mentors, must be active in helping students attain optimal learning outcomes. In the context of learning light and its qualities in class V of a school, there are obstacles such as limited student recall, lack of student involvement in the learning process, and learning outcomes that have not yet reached the

KKM. Observations suggest that the teacher-centered learning approach and the lack of usage of learning material produce a lack of student interest and motivation (Gerde, 2018).

Contextual Teaching and Learning (CTL) is regarded a learning model that can increase student learning results. CTL integrates learning content to the context of students' daily lives, inspiring them to understand the significance of the information and relate it to real events. By adopting CTL in learning light, students are supposed to be able to understand the concept map of light, discuss the attributes of light, exhibit examples of light refraction events in everyday life, and achieve optimal learning outcomes (Schmidt et al., 2018).

Through the Contextual Teaching and Learning (CTL) learning approach involving light and its qualities, students are supposed to be more active in the learning process. CTL allows students to establish connections between subject matter and their real life experiences, so that the content studied has relevance and significance in the context of everyday life. The implementation of CTL in teaching light can help boost student interest and motivation. By integrating learning material with students' real experiences, it is believed that they will be more enthusiastic in comprehending the notion of light and its qualities. Learning that is fascinating and relevant to everyday life might boost students' interest in the subject topic (Prayuda, Ginting, et al., 2023).

In the CTL learning process, the teacher not only performs a role as a presentation of information, but also as a learning facilitator. Teachers can give opportunity for students to actively participate, discuss, and find answers to problems that are relevant to the context of their life (Prayuda, Juliana, et al., 2023). This can boost student involvement and help them understand the content better. Apart from that, the usage of diverse learning media can also support the implementation of CTL. The usage of media, such as photographs, films, or visual aids, can help visualize the concept of light and make studying more exciting. Learning media can be a useful method for conveying abstract concepts in science, such as the qualities of light.

By enhancing the CTL learning model, it is believed that students will not only be able to obtain superior learning outcomes in light material, but can also gain a deeper and more relevant grasp of scientific topics in everyday life. Implementing CTL is a positive step in improving the quality of learning and providing a more stimulating learning environment for students. The necessity of implementing the CTL learning paradigm is also shown in initiatives to increase students' memory. Through learning relevant to their daily experiences, it is intended that students can make links between the concept of light and the surrounding situation (Efklides & Tsiora, 2002). Student involvement in the learning process helps increase their recollection of learning material, so that they are better able to remember and grasp the topics being taught.

METHOD

In this investigation, the researcher utilized a hybrid method. A mixed approach allows researchers to acquire quantitative statistical data from a sample and then complement it with interviews or observations of a number of individuals (Sofyan et al., 2018). This is done to provide a greater understanding of the statistical results that have

been produced. This research uses the Classroom Action Research method because the researcher is actively involved from the beginning to the completion of the research process. The major purpose of this research is to improve student learning outcomes in science courses by using the Contextual Teaching and Learning (CTL) approach in fifth grade elementary school. This approach allows researchers to discover and execute remedial interventions immediately to improve learning processes and outcomes.

The hybrid strategy in this research permits merging quantitative and qualitative data. Quantitative data was gained through statistical analysis of the sample, while qualitative data was collected through interviews and observations of the persons involved. This approach provides a more complete and in-depth picture of the topic under study, allowing researchers to get a holistic understanding. Classroom Action study was chosen as the study technique because the researcher was actively involved in creating and implementing the action from the beginning to the finish of the research. This approach allows researchers to detect learning difficulties immediately, devise solutions, and evaluate their impact. Thus, this research not only provides an understanding of student learning outcomes but also provides information into the success of the learning tactics utilized (Fernandez, 2017).

Furthermore, this study technique leverages the Contextual Teaching and Learning (CTL) concept. CTL is a learning technique that stresses the relationship between subject matter and the environment of students' daily life. In this setting, teachers not only impart information and concepts, but also create learning experiences that are applicable to real life. The CTL strategy attempts to help students to relate learning material to their own experiences, promote information transfer, and increase understanding of topics. By applying CTL, it is intended that student learning results in science lessons can improve. CTL gives opportunity for students to be more actively involved in the learning process, boost learning motivation, and link abstract concepts to tangible experiences. So, this technique not only increases the cognitive elements but also the affective aspects of students.
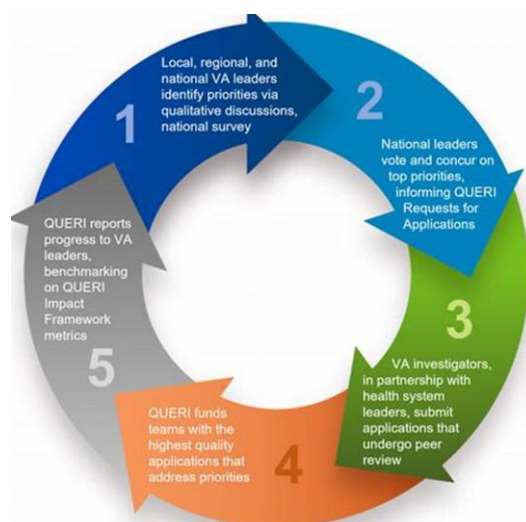

Figure 1. Steps in doing Classroom Action Research

RESULT AND DISCUSSION

Based on data analysis during the learning process, there was an increase in student learning outcomes in science learning about light and its properties in class V. In cycle I, the average individual score reached 65.37, while students' classical completeness only reached 45% of 40 students, with 18 students who completed and 22 who did not complete. Meanwhile in cycle II, the average individual score increased to 82.25, and 85% of students completed it or 34 out of 40 students, while only 15% did not complete it.

The results of this data analysis are in accordance with research on enhancing Mathematics learning outcomes utilizing the Contextual Teaching Learning (CTL) learning model. Before deploying CTL, the level of completeness of student learning outcomes only reached 34.6%. After the actions in cycle I, the level of learning completion climbed to 57.7%, but still did not satisfy the required threshold of 75%. In cycle II, the degree of learning completeness reached 84.6%, showing that pupils as a whole were complete and had attained the minimum threshold of completeness over 75%.

The research is also in line with the findings on enhancing Indonesian language learning outcomes utilizing the Contextual Teaching Learning (CTL) technique. The initial exam showed that most of the students had not finished, but following cycle II, 95% of students had finished with an average class score of 78.37. Thus, the results of data analysis suggest that the use of the CTL learning model is successful in increasing student learning outcomes in science topics in class V. The rise in student learning outcomes in science learning about light and its properties in class V, as indicated by the data from the study of cycles I and II, indicates significant progress. In cycle I, there was an increase in the individual average score from 65.37 to 82.25 in cycle II. Likewise with classical completeness, which improved from 45% in cycle I to 85% in cycle II.

Student learning completeness in cycle II reached 85%, above the minimum threshold for completeness of 75%. This suggests that the adoption of the Contextual Teaching Learning (CTL) learning paradigm has succeeded in having a beneficial impact on boosting students' grasp of the science topic of light and its attributes. The research is in line with earlier studies which suggest that CTL has a favorable influence on enhancing Mathematics learning outcomes. This rise reached 84.6%, suggesting the efficacy of the learning strategy in enhancing student understanding. Likewise, additional research suggests that the application of CTL in Indonesian language teaching can boost students' level of learning completion.

From this investigation, it can be determined that CTL can be employed as an effective learning approach to increase student learning results. The adoption of this paradigm not only promotes conceptual knowledge, but also has a favorable impact on students' affective and psychomotor elements, as demonstrated from the increase in student learning activities in cycle II. Furthermore, further study needs to be carried out to uncover characteristics that contribute to the effectiveness of this learning paradigm, such as teacher-student contact, availability of resources, and student motivation. This can provide a more comprehensive vision for subsequent development in the context of scientific learning at the elementary school level.

In presenting a deeper examination of increasing student learning outcomes by applying the Contextual Teaching Learning (CTL) learning model to science learning about light and its qualities, there are various issues that need to be examined. First of all, the improvement in students' individual average scores from cycle I to cycle II shows that CTL is able to deliver a significant boost to the knowledge of science ideas. This technique allows students to tie learning material to the context of everyday life, explaining the relationship between theory and practice, so that students can assimilate concepts better.

Then, classical completeness which rose from 45% in cycle I to 85% in cycle II was a significant indicator that CTL was effective in reaching learning aims. This percentage indicates that the majority of pupils succeeded in attaining the minimum standards set by the school, showing the efficacy of the teaching tactics utilized. However, it should be emphasized that there are still a tiny number of students who have not reached the level of completion in cycle II. This can be the focus of further attention to determine the cause. For example, individual analysis can be carried out on students who have not yet attained completion to find out the hurdles they may face and devise particular methods to support them.

CONCLUSION

The research findings based on the data analysis reveal a substantial improvement in student learning outcomes in science, specifically in understanding the topic of light and its properties in class V. The data from cycles I and II indicate a noteworthy progress, with an increase in the average individual scores from 65.37 in cycle I to 82.25 in cycle II. Similarly, the classical completeness improved from 45% in cycle I to 85% in cycle II. These results align with prior research on enhancing learning outcomes in Mathematics and Indonesian language using the Contextual Teaching Learning (CTL) model. In the Mathematics study, the initial completeness level of 34.6% increased to 57.7% in cycle I and further improved to 84.6% in cycle II. The Indonesian language study also witnessed a significant rise, with 95% of students completing the cycle II, achieving an average score of 78.37.

The success of the CTL learning model in elevating student learning outcomes is evident. The paradigm not only enhances conceptual understanding but also positively influences students' affective and psychomotor aspects, as demonstrated by increased learning activities in cycle II. However, it is crucial to acknowledge the small percentage of students who did not reach completion in cycle II. Further investigation into the specific challenges faced by these students is necessary to tailor targeted strategies for their improvement. To gain a more comprehensive understanding of the effectiveness of the CTL learning paradigm, future research should explore additional factors such as the quality of teacher-student interactions, the availability of resources, and student motivation. This holistic approach will contribute to the ongoing development of scientific learning at the elementary school level.

REFERENCES

Efklides, A., & Tsiora, A. (2002). Metacognitive experiences, self-concept, and self-regulation. Psychologia, 45(4), 222–236. https://doi.org/10.2117/psysoc.2002.222

Fernandez, F. B. (2017). Action research in the physics classroom: The impact of authentic, inquiry based learning or instruction on the learning of thermal physics. Asia-Pacific Science Education, 3(1), 1–20. https://doi.org/10.1186/S41029-017-0014-Z/TABLES/4

Gerde, H. K. (2018). Early Childhood Educators' Self-Efficacy in Science, Math, and Literacy Instruction and Science Practice in the Classroom. Early Education and Development, 29(1), 70–90. https://doi.org/10.1080/10409289.2017.1360127

Prameswari, S. W. (2019). Implementation of ARIAS Learning Models on Thematic Learning for Elementary School Students. … Challenges for Humanity Education in Digital …. https://www.atlantis-press.com/proceedings/steach-18/55912008

Prayuda, M. S., Ginting, Y. A., Afrilia, D., & Dharma, W. (2023). THE The Effect of Extensive Reading Strategy on Students' Reading Comprehension at Smp Dharma Wanita In The Academic Year Of 2023/2024. Journal of English Language Learning, 7(2), 421–431. https://www.ejournal.unma.ac.id/index.php/jell/article/view/6581

Prayuda, M. S., Juliana, J., Ambarwati, N. F., Ginting, F. Y. A., & Gultom, C. R. (2023). Students' Writing Error in Parts of Speech: A Case Study of EFL Students. Jurnal Educatio FKIP UNMA, 9(2), 659–665. https://doi.org/10.31949/EDUCATIO.V9I2.4419

Schmidt, J. A., Rosenberg, J. M., & Beymer, P. N. (2018). A person-in-context approach to student engagement in science: Examining learning activities and choice. Journal of Research in Science Teaching, 55(1), 19–43. https://doi.org/10.1002/TEA.21409

Sofyan, N., Buaja, T., & Rahman, O. R. (2018). The Implementation Of Role Play Method In Improving Students' Speaking Skill: A Classroom Action Research At Grade IX Students Of SMP Muhammadiyah 1 Ternate. INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH, 7. www.ijstr.org