Game Based Learning, 1(2), 2025, 67-70

The effect of concrete media on elementary school students' understanding of heat energy concepts

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Article History
Received: 17 October 2025
Revised: 20 November 2025
Accepted: 23 December 2025
Published: 30 December 2025

Keywords
Concept understanding
Concrete media
Elementary school
Science learning
Thermal energy

Abstract
This study aims to determine the influence of the use of concrete media on the understanding of the concept of thermal energy in elementary school students. The background of this research is based on students' low understanding of the concept of thermal energy which is abstract if it is only taught through lectures and textbooks, students will not understand the actual situation. The research method used is a descriptive qualitative method with data collection techniques through observation, interviews, and documentation. The subjects of the study were 20 grade IV students in one of the elementary schools in Central Lampung Regency. The results of the study show that the use of concrete media such as thermoses, metal spoons, candles, and water can improve students' understanding of the concept of heat transfer. Students have an easier time understanding the difference between conduction, convection, and radiation after conducting a hands-on experiment. Thus, it can be concluded that concrete media has a positive influence on improving the understanding of the concept of thermal energy in elementary school students.

1. Introduction

Elementary school education is the most basic level of formal education and has a big role in the sustainability of the next educational process. Elementary school education is also often referred to as the foundation or gate of higher formal education, because the quality of the next level of education is greatly influenced by the quality of basic education (Prabowo & Hafid, 2024). In other words, the better the quality of basic education, the better the quality of education at the next level. In this regard, students need to be equipped with sufficient personality, knowledge and basic skills to prepare for their experience at the next level of education (Ganti et al., 2025). This aims to ensure that learning can be achieved well, so learning in this elementary school should be educational, intelligent, arouse students' activities and creativity, effective, democratic, challenging and fun, especially in science subject matter. Science material lessons are one of the main lessons in the education curriculum in Indonesia, including at the elementary school level. Natural science, often referred to as science education, abbreviated to science is the science that studies natural phenomena (Istidah et al., 2022; Junitasari et al., 2024).

According to Junitasari et al (2024), said that Natural Sciences comes from the word natural science. Natural means natural and related to nature, while science means science. According to Aprina et al (2024), science is one of the learning in elementary schools that is carried out by researching or observing natural phenomena to ensure that students understand scientific concepts, not guiding students to memorize science. One of the subjects taught is heat energy, which involves the concept of heat transfer through conduction, convection, and radiation. However, in practice, many students have difficulty understanding this concept because it is rarely associated with everyday experience. The use of concrete media can be a solution to overcome difficulties from students who do not understand the concept of concrete media.

Concrete objects are objects that exist in the surrounding environment, are easy to obtain, harmless, colorful and displayed in an attractive form and can be used in learning (Verawati et al., 2025). Concrete learning media according to Shoimah and Syafi'aturrosyidah (2021) is any real tool or object that helps achieve learning goals. This means that concrete media is a real tangible object that can be directly felt by students in the learning process with the aim of providing real experiences, able to attract students' interest and enthusiasm.

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The results of the research conducted in grade IV of elementary school state that there are still many grade IV students who have difficulties in understanding the concepts of science material on the transfer of heat energy. With the learning outcomes of students who are still below the value of learning completeness in science subjects, especially in the material of heat energy transfer in objects, and inseparable from the role of teachers who still rarely use media in teaching and learning process activities and still use conventional methods with lectures followed by practice questions, so that sometimes it is difficult for students to understand. Therefore, students consider that science subjects are boring, and there is a lack of student activity in the learning process (Masriani et al., 2019). According to Nelyza and Attriani (2022), the lecture method is less effective and taught to students, where the teacher is more active, while the student is only a listener in the classroom.

Based on research conducted by Widiatmi et al (2023) with the title "The Influence of Guided Inquiry Learning Models Assisted by Concrete Learning Media on Material Changes in Object Forms". It shows more effective and fairly high results, that the group of students who participated in learning with a guided inquiry model assisted by concrete media had more satisfactory learning outcomes when compared to the group of students who participated in learning using conventional methods.

2. Method

This study uses a qualitative approach with a descriptive method, which aims to gain an in-depth understanding of the phenomenon being researched based on empirical data in the field (Waruwu et al., 2024). The qualitative approach was chosen because it allows researchers to examine reality naturally and interpret meaning based on the perspective of the research subject (Haki & Prahastiwi., 2024).

Data collection techniques include observation, interviews, and documentation. Observations are carried out to obtain a direct picture of the learning process, interviews are used to dig up information in depth from the research subjects, while documentation is used as supporting data in the form of photos, notes, and documents related to learning activities.

Data analysis is carried out using qualitative analysis techniques, which include the process of data reduction, data presentation, and conclusion drawn. Data are analyzed descriptively by associating field findings with relevant concepts and theories in order to obtain a complete and systematic picture of the research focus.

3. Results and Discussion

3.1. Result

This research was carried out by applying descriptive methods and demonstrations in experimental classes using concrete media in the form of metal spoons, boiling water, pots/cans, and candles to explain the concept of heat energy transfer through conduction, convection, and radiation. Learning is designed so that students can make observations and experiments directly so that the concepts learned are easier to understand.

Based on the results of the final test given after learning, the difference in students' understanding between before and after the use of concrete media was obtained. The data shows a significant improvement in the understanding of the concept of thermal energy. The average percentage of student understanding increased from 42.5% before learning to 85% after learning using concrete media.

In detail, the improvement in student understanding can be seen in Table 1 which shows that all aspects of assessment have increased. The aspect explains the definition of heat energy increased from 45% to 85%, identifies heat sources from 55% to 90%, explains how heat transfer from 30% to 80%, and provides examples of heat transfer events from 40% to 85%. These results show that the use of concrete media is able to help students understand abstract concepts to be more real and easy to understand.

Table 1. Results Before and After Using Concrete Media.

No	Aspects assessed	Before (%)	After (%)
1	Explaining the meaning of thermal energy	45	85
2	Identifying heat sources	55	90
3	Explaining how heat transfer	30	80

3.2. Discussion

The results of the study show that the application of the demonstration method with concrete media has a positive impact on students' understanding of the concept of heat energy transfer. Through the use of real objects such as metal, boiling water, and fire, students can observe firsthand the processes of conduction, convection, and radiation. This allows students to relate the theories learned to real-life experiences in the surrounding environment.

Increased student understanding occurs because learning is not only verbal, but also involves direct observation and experimentation activities (Handayani., 2018). Students become more active in the learning process, able to construct their own knowledge, and more easily understand concepts that were previously abstract. These findings are in line with science learning principles that emphasize the importance of hands-on experience to improve conceptual understanding (Juwairiah et al., 2025). In addition, the results of the interviews showed that 85% of students gave positive responses to the use of concrete media. Students stated that learning became more interesting, fun, and easy to understand because they could see and feel the process of transferring heat energy firsthand. This positive response also contributes to increased student motivation and involvement during learning.

Thus, it can be concluded that the use of concrete media through demonstration methods is effective in increasing students' understanding of the concept of heat energy transfer, as well as creating a more active and meaningful learning atmosphere.

4. Conclusion

Based on the results of the research and discussion, it can be concluded that the use of concrete media through the demonstration method has a positive influence on the understanding of the concept of thermal energy in elementary school students. Learning that involves direct experience with real objects can help students understand the concepts of heat energy transfer, namely conduction, convection, and radiation, more easily and meaningfully. The increase in student understanding can be seen from the test results which show an increase in the percentage of understanding in all aspects assessed after the application of concrete media. In addition, positive student responses show that learning with concrete media not only improves conceptual understanding, but also encourages students' involvement and interest in learning in the learning process. Thus, the use of concrete media can be used as an alternative effective learning strategy in science learning in elementary schools, especially in hot energy materials, to create a more active and contextual learning process.

Author Contributions

All authors have equal contributions to the paper. All the authors have read and approved the final manuscript.

Funding

No funding support was received.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Aprina, E. A., Fatmawati, E., & Suhardi, A. (2024). Penerapan model problem-based learning untuk mengembangkan keterampilan berpikir kritis pada muatan IPA sekolah dasar. *Didaktika: Jurnal Kependidikan, 13*(1), 981-990.

Ganti, N., Dinnia, A. N., Rahmawati, A., & Irma, A. (2025). Ekplorasi Nilai Kepribadian Guru Berdasarkan Tingkat Pengalaman. *JIMU: Jurnal Ilmiah Multidisipliner, 3*(3), 1427-1438. https://ojs.smkmerahputih.com/index.php/jimu/article/view/793

Haki, U., & Prahastiwi, E. D. (2024). Strategi pengumpulan dan analisis data dalam penelitian kualitatif pendidikan. *Jurnal Inovasi Dan Teknologi Pendidikan, 3*(1), 1-19.

Handayani, T. W. (2018). Peningkatan pemahaman konsep IPA menggunakan model pembelajaran inkuiri terbimbing di SD. *Edutainment, 6*(2), 130-153.

Istidah, A., Suherman, U., & Holik, A. (2022). Peningkatan hasil belajar IPA tentang materi sifat-sifat cahaya melalui metode discovery learning. *Jurnal Pendidikan Indonesia: Teori, Penelitian, dan Inovasi, 2*(1). https://doi.org/10.59818/jpi.v2i1.187

Junitasari, E., Heryanto, A., & Sunedi, S. (2024). Pengaruh media konkret terhadap hasil belajar ipa pada materi perubahan wujud benda kelas V di Sekolah Dasar. *NUSRA: Jurnal Penelitian Dan Ilmu Pendidikan, 5*(3), 1253-1260.

Junitasari, E., Heryanto, A., & Sunedi, S. (2024). Pengaruh Media Konkret Terhadap Hasil Belajar IPA Pada Materi Perubahan Wujud Benda Kelas V di Sekolah Dasar. *NUSR: Jurnal Penelitian Dan Ilmu Pendidikan, 5*(3), 1253–1260. https://doi.org/10.55681/nusra.v5i3.3151

Juwairiah, J., Lubis, M. S. A., Rizki, M. Y., Aminuddin, R., Darwata, S. R., & Zainudin, M. (2025). Peran Augmented Reality (AR) dalam Meningkatkan Pemahaman Konsep Sains Siswa. *Indonesian Research Journal on Education, 5*(4), 602-608.

Masriani, Dhafir, F., & Masrianih. (2019). Peningkatan Hasil Belajar Siswa Melalui Metode Eksperimen Pada Materi Perubahan Wujud Benda Dalam Mata Pelajaran IPA Kelas V SDN Lenju. *Jurnal Kreatif Tadulako, 5*(5), 33-44.

Nelyza, F., & Attriani. (2022). Penerapan Model Pembelajaran Inquiri Terbimbing Pada materi Pecahan Untuk Meningkatkan Kemampuan Pemecahan Masalah Siswa. *Jurnal Pendidikan Matematika dan Sains (Jurnal DikMas), 1*(1), 42-50.

Prabowo, G., & Hafid, A. N. (2024). Analisis Kebijakan Pendidikan Sekolah Dasar Prespektif Lingkungan Pendidikan Sekolah. *Innovative: Journal of Social Science Research, 4*(4), 8324-8334. https://doi.org/10.31004/innovative.v4i4.13890

Shoimah, R. N., Syafi'aturrosyidah, M., & Hadya, S. (2021). Penggunaan media pembelajaran konkrit untuk meningkatkan aktifitas belajar dan pemahaman konsep pecahan mata pelajaran Matematika siswa kelas III MI Ma'arif Nu Sukodadi-Lamongan. MIDA: Jurnal Pendidikan Dasar Islam, 4(2), 1-18.

Verawati, V., Rahmadani, S., & Sari, T. P. (2025). Penggunaan Media Benda Konkret Pada Pembelajaran Matematika di Madrasah Ibtidaiyah atau Sekolah Dasar. *Journal of Teacher Education Al-Abawaini, 1*(1), 41-51.

Waruwu, M. (2024). Pendekatan penelitian kualitatif: Konsep, prosedur, kelebihan dan peran di bidang pendidikan. *Afeksi: Jurnal Penelitian Dan Evaluasi Pendidikan, 5*(2), 198-211.

Widiatmi, A., Fitriyadi, S., & Anitra, R. (2023). Pengaruh Model Pembelajaran Inkuiri Terbimbing Berbantuan Media Pembelajaran Konkret Terhadap Materi Perubahan Wujud Benda. *Jurnal Pendidikan dan Ilmu Fisika, 9*(2), 341-345.