JPPIPA 9(1) (2023)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

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

Student Response Conceptual Change Text (CCT) As A Media for Learning Energy Concepts in Elementary School Students

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Received: September 23, 2022
Revised: January 25, 2023
Accepted: January 30, 2023
Published: January 31, 2023

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DOI: 10.29303/jppipa.v9i1.2187

Abstract: This study is a qualitative descriptive study aimed at determining student responses to the use of concept-changed text (CCT)-based materials in science to learn the concept of energy. The data collection technique used was stratified sampling with 114 students in grades IV and V as research subjects. Data were collected using non-testing equipment in the form of questionnaires with Likert scales, distributed after students participated in the learning process, and processed using percentage statistical formulas. The results showed that class IV was 82.13% and class V was 80.63%, both of which were included in the very decent category. Effectively use Conceptual Change Text (CCT) to overcome student misconceptions based on data collection results. In learning using CCT students can independently correct mistakes and difficulties in understanding the concepts they have experienced so far. This research can be a recommendation for other researchers in using CCT-based teaching materials to help students learn.

Keywords: Student responses; Conceptual Change Text (CCT); Energy concept

Introduction

Studying natural sciences is a provision that must be owned by elementary school students. Science has the concept of natural learning, which has a very broad and close relationship with human life (Hulaimi, 2018). Research in science requires students' critical thinking skills to deal with the scientific concept problems they face. Critical thinking skills that are continuously trained will ensure the success of learning. Another thing that needs to be considered in teaching science is building students' conceptual mastery of the material to be taught. Successful Learning Requires Mastery of Concepts. Because the initial conception of students affects their learning process, this is in line with research (Lestari, 2018; Ihsan, 2019; Jatmiko, 2019) It states that mastering concepts allow students to manage their cognitive abilities so that further learning can lead to improvements. A student's ability to think critically and master concepts are very important. The fact is that this is not in line with the current state of science learning. One of Indonesia's problems is the weakness of the learning process. Students are not encouraged to develop thinking skills to understand concepts, and classroom learning activities are aimed solely at information retention (Ramdani et al., 2020). This makes it difficult for students to understand the material and affects the potential for misunderstandings (Sa'diyah, 2021).

Misconceptions are conceptual errors that are caused when learning occurs when there is a discrepancy with the scientific concept. Students who experience misconceptions must be immediately reduced so that they do not have a negative impact on learning outcomes and do not affect further understanding of concepts (Mandasari & Sukarmin, 2020). Natural science concepts have a connected character, if there is a wrong understanding of the concept, it will affect other concepts.

According to (Wiyoko, 2019), there are many things that cause misconceptions themselves, including; (1) From students, such as initial pre-conceptions, abilities, developmental stages, interests, ways of thinking, and friends. (2) From the teacher in the form of the teacher's incompetence, lack of mastery of the material, the way of teaching is not right, or the attitude of the teacher is

How to Cite:
Aisyah, W.N., Novianti, R., Sukmawati, W., & Fikriyah, A.N. (2023). Student Response Conceptual Change Text (CCT) As A Media for Learning Energy Concepts in Elementary School Students. *Jurnal Penelitian Pendidikan IPA*, *9*(1), 417–421. https://doi.org/10.29303/jppipa.v9i1.2187

not good in dealing with students. (3) From textbooks, in the form of incorrect explanations or descriptions in books, the difficulty level of writing books is too high, science fiction books sometimes deviate concepts to attract readers, and cartoons often create misconceptions. (4) From the context, such as culture, religion, everyday language and the context of students' lives. (5) The teaching method only emphasizes one aspect of truth, does not reveal students' misconceptions, only contains lectures or writing, does not correct wrong homework, narrows the demonstration model and has non-multiple intelligence.

The above misconception problems require proper handling, so that misconceptions are reduced in a sustainable manner. There is a method that is believed to be able to overcome misconceptions including the text-based method, namely concept change text (CCT). Concept change text (CCT) is a scientific text designed to overcome and reduce students' misconceptions. CCT is different from ordinary textbooks because it can make students reflect on their thinking and realize their preconceptions are wrong (McKenna, 2014). CCT is designed to help students recognize their prejudiced flaws and translate these misconceptions into new scientific knowledge (Hesti, 2020). Cognitive conflict strategies that exist in CCT make students finally experience changes in conceptions and new knowledge gained in science (Özkan, 2015).

It is believed that the use of concept-changing texts can help students correct their mistakes in understanding the concept of energy. In the Conceptual Change Text, misconceptions about energy material experienced by students are presented and then refuted with scientific explanations and accompanied by facts that exist in everyday life (Dwidianti et al., 2017; Metal et al., 2018; Utami et al., 2017). Then with the explanation in the book students more easily understand the concept of energy. Understanding student concepts is very important to note because if students misunderstand a concept it will be difficult to learn the next concept (Mandasari & Sukarmin, 2020; Sukmawati et al., 2020). Therefore, using CCT in the learning process is very important (Fajriani et al., 2019). The correct concept for elementary school children is very important as a provision to understand the concept at the next level, so the researchers tested students' responses to learning using CCT.

Method

The method used in this study is a qualitative descriptive method aimed at determining student responses to Concept Change Texts (CCTs) in science learning about the concept of energy. The data collection technique used stratified sampling. Researchers use stratified or stratified sampling when there are groups of subjects in the population and strata or levels exist between one group and another (Sunaryo, 2017). Data collection was performed using a questionnaire-style, non-test device using a Likert scale of 1 to 5 (Suliyanto, 2017). The subjects of this study were 114 students in classes IV and V of SDN Susukan 02. Collected data were evaluated using a statistical percentage formula. The results were then adjusted for the rating scale measurements as they were obtained. Percentage Calculation Formula 1.

$$p = \frac{f}{N}\ x\ 100\% \quad (1)$$

Information:
p: Percentage of Answer Score
f: Frequency of answers
N: Number of respondents
Sugiyono, (2016)

Table 1. Rating Scale Criteria

Percentage (%)	Criteria
0-25	Veery Inappropriate
26-50	Less Eligible
51-75	Fairy Eligible
76-100	Very Eligible

Fikriyah & Sukmawati, (2022)

Result and Discussion

Result

The results of student responses were divided into two classes, namely class IV and class V, where each class was taken 57 people. The following are the results of student responses to CCT learning.

Table 2. Results of Class IV Response Responses

Aspect	Percentage (%)	Category
Management of Learning	84.50	Very Eligible
Implementation Communicative Learning Process	82.67	Very Eligible
Student Response	78.89	Very Eligible
Learning Activities	81.11	Very Eligible
Learning Outcomes	83.50	Very Eligible
Average	82.13	Very Eligible

Table 3. Results of Class V Response

Aspect	Percentage (%)	Category
Management of Learning Implementation	84.16	Very Eligible
Communicative Learning Process	81.11	Very Eligible
Student Response	76.00	Very Eligible
Learning Activities	78.56	Very Eligible
Learning Outcomes	83.33	Very Eligible
Average	80.63	Very Eligible

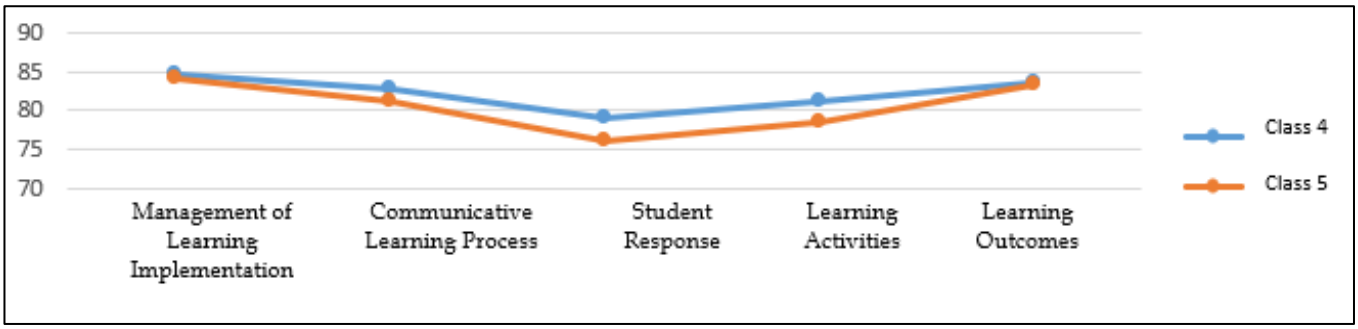

Figure 1. Graph of Student Responses for Class IV and V

Based on the research questionnaire, the acquisition of student response data can be viewed from five aspects. From the overall average, it is known that the "very feasible" CCT model is used as a learning support to reduce misconceptions.

Discussion

Based on the results of data analysis during the study, we find that the Conceptual Change Text (CCT) is a very good learning aid for breaking down students' misconceptions about the concept of energy. (Nadelson et al., 2018; Sevim & Tarım, 2017). This can be seen from the results of the questionnaire responses presented to grade IV and V students. The questionnaire covers managing learning practices, communicative learning, learning activities, and student learning outcomes on energy concepts. Class IV had an average result of 82.13% and Class V was 80.63%, therefore Conceptual Change Text (CCT) was considered very feasible to be applied to these two classes.

This research is highly feasible because student interest and success in activities occur in the learning process (Mandasari & Sukarmin, 2020; Yumuşak et al., 2015). This is evident from the reading material using simple, concise, and straightforward language. In addition, the reading material provided also explains examples of energy changes related to students' daily activities. The example also includes appropriate diagrams to arouse students' interest and facilitate understanding of the material. This corresponds to research (Aprilia, 2022; Purwani, 2020) which explains that books with illustrations and pictures can generate positive responses, make learning more interactive and attract students' attention so that learning will run effectively.

Through the explanation above it is proven that there is no difference between the results of class IV and V, meaning that Conceptual Change Text (CCT) is equally well received by the class. In general, Conceptual Change Text (CCT) can reduce students' misconceptions because good communication is formed in the learning process (Maryana & Sukmawati, 2021; Sukmawati, 2017). This is in line with research (Sukmawati et al., 2022) which shows that 28 out of 30 students get good results when the Conceptual Change Text (CCT) model is applied to their learning, which shows that this model is feasible and effective in overcoming student misconceptions.

The study found that using text to change the concept helped students understand the concept of energy. Overall students liked the learning process using CCT (Gani et al., 2017; Nadelson et al., 2018). Some students already have a conception according to a scientific conception but are still inconsistent in answering other questions with a similar concept (Sevim & Tarım, 2017; Yumuşak et al., 2015). In the text that explains the concept of energy presented in the CCT text, it aims to help students realize that their conception when answering in the first part is wrong so that dissatisfaction with the initial conception appears. This stage is the dissatisfaction stage (Korganci et al., 2015; Ültay et al., 2015). In the next part of the intelligibility and plausibility stages, students are given a text that explains the scientific concept of a problem so that it is easy to understand (Jong et al., 2015; Trevors & Muis, 2015), so students will achieve maximum learning outcomes through reading activities. In other words, students will gain maximum learning understanding if they are actively involved. In the last part conceptual change text (fruitfulness) (Gulcan et al., 2015; Makiyah et al., 2019; Posner et al., 1982), students are given follow-up questions to ensure students maintain the correct conception and experience a change in conception to a scientific conception (Aslan & Demircioğlu, 2014; Lehtinen et al., 2020). The results of the study show that the scientific conceptions received by students can indeed last a certain time. This proved that the treatment given increased students' abilities.

Conclusion

The concept-changed-text (CCT) model in scientific learning of energy concepts achieved results of 82.13% in class IV and 80.63% in class V. Based on this score, Conceptual Change Text (CCT) is very feasible to use

and can be an inspiration and innovation for teachers to reduce students' misconceptions in science learning.

Acknowledgments

Universitas Muhammadiyah Prof. DR. HAMKA, Indonesia who have funded this research, and Susukan 02 State Elementary School which has helped with the process of collecting research data.

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