

Application of Cognitive Conflict Learning Strategies to Reduce misconception on High School Students

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Abstract

The purpose of this study is to find out student's conception profile after cognitive conflict teaching strategy has been applied through learning model guided inquiry. Pre-test showed that misconception level of student in a high level, that is 61,02%. The effort to reduce student's misconception is by given cognitive conflict strategy to the student's with expectation that student will be aware of their wrong conception so that they decided to change their wrong conception. Conflict Cognitive is given through learning model guided inquiry. CRI (certainty of response index) is used to identify student's conception. Conflict cognitive strategy can reduce the level of student's misconception according to the outcome. Post-test result showed that misconception percentage is downgrade to 20,00%.

Key Word: Misconception, Cognitive Conflict, CRI

Abstrak

Penelitian ini bertujuan untuk mengetahui profil konsepsi siswa setelah dilakukan penerapan strategi belajar konflik kognitif untuk mereduksi miskonsepsi siswa SMA dengan menerapkan model pembelajaran *Guided Inquiry*. Pada saat *pre test* diketahui tingkat miskonsepsi mencapai 61,02%. Upaya untuk mereduksi miskonsepsi yang dialami oleh siswa adalah dengan memberikan strategi belajar konflik kognitif kepada siswa dengan harapan siswa akan sadar atas pengetahuan yang telah dibentuk diluar pembelajaran formal tidak sesuai dengan kebenaran yang disepakati para ahli sehingga memunculkan keinginan pada diri siswa untuk mengubah konsep yang salah tersebut. Konflik kognitif yang diberikan ada pada model pembelajaran *Guided Inquiry*. Identifikasi miskonsepsi yang digunakan adalah CRI (*certainty of response index*) yang menunjukkan bahwa penerapan strategi belajar konflik kognitif untuk mereduksi miskonsepsi siswa SMA mampu mereduksi miskonsepsi siswa pada materi usaha dan energi. Hasil *post test* menunjukkan persentase miskonsepsi yang dialami siswa hanya 20,00%.

Kata Kunci : Miskonsepsi, Konflik Kognitif, CRI

INTRODUCTION

One of the main problems in education today is the misconception that occur universally in almost all over the world with the environmental, social and any language (Andyani, et al, 2013). Students at any level has the potential to misconceptions, especially in the subjects of Physics (Mosik, 2010). Physics is a subject that requires a lot of understanding of the concept of capability is not simple and requires a high intellect so that students who have difficulty in studying physics comparatively quite a lot. In fact students often ignore the whole concept of understanding and focus more on the process mathematically. So that learning physics is almost always raised the question of the difficulties students understand the concepts of Physics and impact on learning outcomes which are incompatible or less than expectations (Lusiana, 2016). Physics Education should emphasize the understanding of physics concepts related to real life are far more important than learning achievement as measured by test scores.

Constructivist approach emphasizes that knowledge is not something that is already there then someone just accept what is already there, but the knowledge is as a result of the understanding of an information network construction knowledge and experience. Constructivist learning theory states that students are able to think to solve problems related to the discovery of ideas and decision making. When students are directly involved in the process of learning new knowledge, they will be easier to understanding and applying so they will be remembered about the concepts acquired.

According to Ibrahim (2012), one of the methods to overcome the misconceptions of students is to provide a cognitive cognitive in students. Cognitive conflict is a situation where there is a mismatch between the cognitive structures that have been formed in a person with newly received information. According to Effendy (2002), the cognitive conflict strategy is a strategy that can make students' minds in conflict with the understanding that has been owned by the students beforehand. This strategy is developed from Piaget's theory that learning is a process of changing the concept.

One of the forms of learning model is guided inquiry learning model that requires students to try to find a complete understanding of the concept under the guidance of a teacher. Guided inquiry learning model helps students prepare or construct knowledge acquired so that students have knowledge not only of remembering only (Rahmatina, 2016). According Arends (2012), guided inquiry learning model is a model of learning that focuses on developing students' thinking.

METHOD

Data obtained from this study a number that will be explained in descriptive qualitative. The methods used are pre experimental design to the type of study one group pretest post test design.

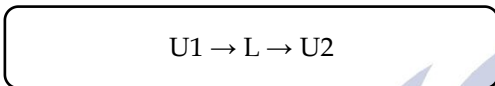


Figure 1 Chart of the study design (Prabowo, 2011).

Information :

- U1 : Results of the pre test misconceptions
- U2 : Results post test misconceptions
- L : treatment

This study was conducted in Class XI IPA 4 in the second semester of the academic year 2018/2019 and the data collection was done during the month of April 2019.

Data collection was performed using the test method. The test method in this study is used to determine the student misconceptions reduction in materials and energy businesses.

RESULT AND DISCUSSION

Most students misconceptions rate decreased after the implementation of cognitive conflict learning strategies for reducing the student's misconception

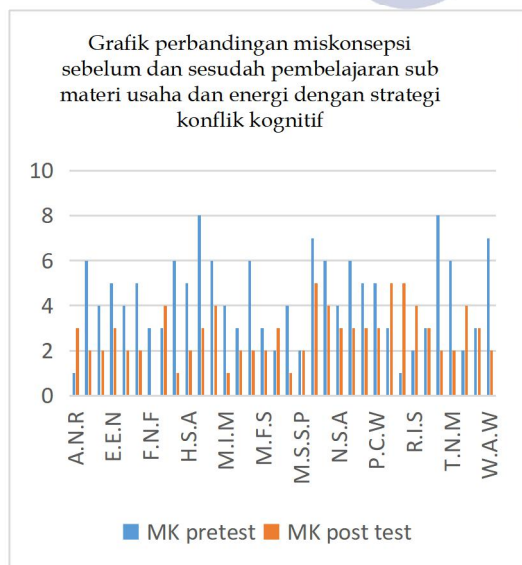


Figure 2 Graph decreased levels of misconceptions

But there are some students who have permanent misconceptions on one or two questions. This is because of misconceptions tend to be permanent and very difficult to change (Alfiani, 2015). And misconceptions will continue to cling to the students if not promptly treated (Pham, 2018). There are also some students who are experiencing changes in the concept of understanding the concept into misconceptions. This could be due to difficult to correct misconceptions and occur repeatedly and disruption to other conceptions which has been formed appropriately (Sari, 2018). As a result, the concept should be understood not understand or misconceptions (Shen, 2013).

Table 1 Permanent misconceptions and misconceptions after understanding the concept.

Students conception	Student's name
permanent misconceptions	AUM, DLS, EEN, EN, FRF, FN, HKQ, JNB, KN, MA, MS, M.Sy, NSA, NRA, PCW, RE, RIS, SA, VAN, WAW
Misconception after understanding the concept	DLS, FRF, HSA, JNB, KN, MFS, MS, NSA, N, TNM

In addition, application on cognitive conflict learning strategies can be done well. A total of 67.65% of students grade XI 4 agree that learning with cognitive conflict is very interesting and not boring. 72.06% of students agreed that their lessons can help students more active in participating in learning. As well as 76.47% of students agreed that their lessons can help students understand the concept of work and energy as well as the relation in real life.

Average percentage of student response was 71.85%, which means agree if the terms of the Likert scale assessment so that it can be concluded that cognitive conflict instructional strategies to reduce misconceptions high school students classified as good (Sugiyono, 2014).

CONCLUSION

Based on the results and discussion, application of cognitive conflict learning strategies for reducing misconceptions successful high school students conducted by Average percentage of student response was 71.85% agree, On average misconceptions experienced by each student in the class XI IPA 4 before learning the cognitive conflict strategy was 61.02%, while after learning the strategy becomes 20.00%.

After being given a lesson on the material and energy businesses to implement strategies cognitive conflict, most of the students who initially had misconceptions come to understand the concept. While there are some students who are beginning to understand

the concept and do not know the concept be misconception.

Students' response to learning with cognitive conflict strategy is that learning has been able to attract student interest and motivate students to study hard, to build confidence of students.

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