

## LITERATURE REVIEW: COGNITIVE CONFLICT APPROACH IN PHYSICS LEARNING TO OVERCOME THE MISCONCEPTION OF PHYSICS

Siti Aniatu Sa'adah<sup>1)</sup>, Rudi Haryadi<sup>2)</sup>

<sup>1,2</sup>FKIP Universitas Sultan Ageng Tirtayasa

Email: 2280200032@untirta.ac.id

### Abstract

*Misconception is one of the problems in learning physics at school. From several studies that have been done, it is found that many students have misconceptions that affect students in learning and understanding the concepts of physics. This study aims to collect data and analyze articles related to approach efforts. Cognitive conflict in physics learning to overcome misconceptions of physics. The design used is literature review. The articles were collected using a search engine, namely Google Scholar. Based on the articles collected, the results showed that the students' failure to connect a physics concept that had been studied was a factor of physics my conception. This ultimately affects student learning outcomes. The role of the teacher in this learning is that students are used as learning objects as passive recipients of information who only listen and take notes. And try to explore development. envision the ability of students to think critically which leads to the formation of a more independent student character.*

**Keywords:** *physics learning, cognitive conflict approach, concept understanding, cognitive learning achievement, critical thinking ability.*

### 1. INTRODUCTION

Education is one thing that is very important for every individual. Education is carried out which aims to develop and educate individual lives so that they have knowledge, skills, character building, morality and independence so that they are able to compete in the general public. With education, each individual can have an understanding of something and shape a person in critical and creative thinking.

Along with the times, education must be able to provide qualified facilities so that it can compete according to the times. The learning model is one of the things that must be considered in the learning process. To make students think critically, the learning process is no longer just focusing students as passive recipients of information, which will make it difficult for students to develop thinking skills, communication skills, and adapt well. For this reason, learning models that are only centered on the teacher as information provider must be avoided.

KTSP 2006 (Education Unit Level Curriculum) is a curriculum that is compiled and set in each education unit which measures students' ability in thinking skills, creates new things and communicates

something in the learning process. Meanwhile, the teacher only becomes a facilitator in building student creativity. In KTSP, physics is one of the subjects that really needs understanding. Wiyato, *et al.* (2007) stated that generally physics learning tends to be monotonous with low scientific activity. The most dominant activity carried out by the teacher is lecturing or explaining, while students are listening and taking notes.

Physics is a subject that is closely related between concepts and the environment. Generally, students find it difficult to learn physics. This is due to the inability of students to connect the concept of material that has been studied with the knowledge they have without applying it directly in everyday life. In learning physics, students are expected to pay attention to the concepts of a certain subject, not just memorizing equations without understanding them. This causes problems that are quite difficult to interpret a concept in learning.

Van Den Berg (1991) states that students do not enter lessons with an empty head that can be filled with knowledge, but instead the head of students is full of experience and knowledge related to the lesson being taught. Students' intuition about

the difference in a concept is called a misconception. In other words, the conceptions of students who have just been studied are contrary to the concepts of physics scientists who have developed for a long time. Misconceptions arise because of the adjustment of students' thinking about new information and experiences into pre-existing structures. Van Den Berg (1991) Piaget, states that by assimilation and accommodation, new information entering the brain is changed until it matches the structure of the brain. In his research. Van Den Berg (1991) states that the cognitive conflict approach in learning physics is effective enough to overcome misconceptions in students in order to form a higher balance of knowledge. Stimulation of cognitive conflict in physics learning will greatly help the assimilation process to be more effective and meaningful in students' intellectual struggles.

With the cognitive conflict approach model, students will be able to find and change the information obtained about a knowledge so that an overall understanding is formed.

Based on the above background, the authors are interested in discussing "conflict cognitive approaches to overcome misconceptions of physics in physics learning"

## 2. RESEARCH METHOD

The method used in writing this article is a literature review, namely the search for several national literature using the keyword "Cognitive conflict approach to overcome misconceptions in physics learning". There are only 3 articles that are considered relevant of medium quality.

## 3. RESULT AND DISCUSSION

Based on the results of the articles that were collected and analyzed by the author, it was found that the cognitive conflict approach had an influence on the misconceptions of physics. Through the evaluation test the average learning outcomes with a cognitive conflict approach is higher than the conventional learning process.

According to Lee and Kwon in Maulana, (2009) the cognitive conflict process includes three stages, namely:

1. Preliminary, namely the presentation of cognitive conflict.
2. Conflict, namely the creation of conflict with the help of demonstrations or experiments that involve assimilation and accommodation
3. Resolution, namely discussion activities and concluding the results of the discussion.

Suparno (2007) explains that there are two stages in the learning process for concept change. The first stage is assimilation and the second stage is accommodation. By assimilating students using the concepts they already have to deal with new phenomena. With accommodation, students change their concept, which no longer fits the new phenomena they face.

Student orientation to the problem is the presentation of a conflict, so that students get stimulation to increase curiosity, the ability to analyze and also the initiative to solve problems that occur. Furthermore, students can conclude a conflict from the results of analysis and evaluation related to their own findings. Through the cognitive conflict approach, students find new unstructured knowledge and experiences in their previous thought processes, something that is in contrast to the concepts they already have.

Van Den Berg (1991) explains the cognitive conflict process that the concept network is actually a theory or model that students use to solve physics problems and problems. Like the theory of scientists in physics, students' theories can also be tested. For example, students are faced with a problem, students are asked to predict solving the problem. Then after the prediction, the teacher or student tests the prediction in a demonstration in front of the class or in a practicum. If the results do not match the prediction, students face cognitive conflicts that can result in changes in the conceptual network in the student's brain (changes in cognitive structure).

Van Den Berg (1991) explains that misconception is a pattern of thinking that is consistent in a situation or different problem

but that thinking pattern is wrong. Or in other words, students 'conceptions contradict physicists' concepts, usually involving the relationship between concepts.

#### 4. CONCLUSION

Pendekatan konflik kognitif dalam pembelajaran fisika mempunyai pengaruh yang signifikan terhadap miskonsepsi fisika. Berdasarkan hipotesis literatur rata-rata proses konflik kognitif lebih tinggi daripada proses pembelajaran secara konvensional, serta adanya pengaruh terhadap hasil belajar siswa.

Pendekatan konflik kognitif dapat menjadi alternatif dalam proses pembelajaran fisika. Disamping itu agar tidak terjadi miskonsepsi fisika, guru diharapkan lebih memahami penguasaan konsep siswa serta lebih kreatif dalam memilih model pembelajaran.

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