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Physics Teacher's Misconceptions About Direct Current Material

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ABSTRACT

The teacher's conception is one of the misconceptions that students encounter, so it is critical to uncover the status of the teacher's conception to improve the students' conception. The purpose of this research is to identify physics teachers' misconceptions about direct current material. There were 16 Physics Teachers in one of the districts in East Java, including 7 (seven) teachers from the Public High School (*Negeri*) and 9 (nine) teachers from private schools (*Swasta*). This research is quantitative descriptive analysis research. A three-tier diagnostic test was used to analyze the data, revealing that teachers' average percentage of misconceptions was 58% in a medium category. The results also showed that physics teachers had the highest rate of misconceptions in the Potential Difference sub-concepts (94%), while the Series Circuit concept had the lowest proportion of misconceptions (25,50%). Misconceptions experienced by physics teachers must be addressed immediately because they will impact students' conceptions. The results of this study are very important for policy makers, especially the Education Office to find solutions in breaking the chain of physics misconceptions.

INTRODUCTION

Students will develop their knowledge while interacting with the environment; this knowledge is a naive concept or preconception. Students will assimilate their initial thought with new knowledge after completing the learning processes. However, students' original concepts are frequently different from the concepts taught by their teachers, resulting in misconceptions. Beliefs that contradict well-accepted scientific theories are called misconceptions (Kuczmann, 2017).

Misconceptions exist in the natural sciences, including all physics concepts (Suprapto, 2020). The concept of direct electric current is one of the many physics topics that is widely misunderstood. Misconceptions regarding direct electric current are second only to those concerning mechanics (Zulvita, 2017). It is because the direct current is an abstract concept. Many students and prospective physics teachers struggle to grasp the concept of electricity (Yunita, 2017).

Among the many misconceptions about direct current material are: In the Direct Current concept, the current flowing steadily declines as the resistance consumes it goes through (Ergin and Atasoy, 2013). The further the light is from the power supply (battery) in the concept of a series electrical circuit, the dimmer the bulb will be (Halim, 2019). The current is divided equally at each branch in the concept of a parallel electric circuit, with no consideration for the value of each resistance (Urban, 2017)

Students might get the main sources of misconceptions from personal experience, textbooks, the language used, and the teacher (Herman, 2016). Teachers have a significant influence on the rate of students' misconceptions. There is significant evidence that teachers are the main source of student misconceptions (Kaltakci-Gurel et al., 2016). A teacher who does not master or understand a concept incorrectly will cause

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