Analysis of Problem Solving Skills in the Vocational High School Using Direct Current Electricity as A Case Study

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ABSTRACT

This study examines problem-solving as one of fundamental cognitive processes required for the 21st century skills. In this context, physics learning is generally directed to focusing on how students in schools attain this ability, which include analyzing, evaluating, and reflecting activities to find solutions to a problem based on student's own knowledge and experience. The aim of the current study is to determine student's profiles on problem-solving skills at the initial stage for a given subject of electric circuits in a classroom setting. Students of Muhammadiyah 3 Vocational High School, Gresik, Indonesia specialized in electrical engineering were sampled as targetted people. The method used was a descriptive approach, where instruments for data collection were developed using Polya's steps. Research findings were derived from student performance indicators, namely understanding a given problem which scored 55.9%, planning strategy for a solution to the problem which achieved 48.7%, implementing the strategy which obtained 7.7%, and checking the solution which marked 13.85%. In conclusion, the results showed that students' skills on problem-solving was found to be at a very low level.

INTRODUCTION

The rapid development of science and technology is impacting all areas of human life and is inevitable in the 21st century and one of them is the field of education. Efforts to overcome this is to train a person to adapt to the development of science and technology and be able to compete globally in order to have sufficient scientific skills. Science is a process of seeking and collecting knowledge about natural phenomena, concepts, and principles and applying them in daily life (Tursinawati, 2013). Science learning is learning about natural object and phenomena, so that learning is always linked to thinking skills (Fitriyati, 2017). Thinking skills can be developed with one of them through problem solving. Skill to solve problems requires students to think critically, systematically, logically, and have a resigned attitude in finding solutions to problems faced (Nengsih, 2019). Problem-solving skills is an intellectual activity in analyzing, translating, logical, predicting, evaluating, and reflecting to find problem-solving solutions from the students 'own knowledge and experience (Ulya, 2016; Citra et al., 2021).

Problem solving is one of the important skills in science teaching (Yuliati et al., 2018). Problem solving is one of the goals in the learning process in terms of curriculum aspects that are important for students in physics learning (Cahyani et al., 2016; Ida et al., 2017). In addition, problem solving is used as a mechanism for learning physics and evaluating concepts that have been taught (Docktor et al., 2016). Problem-solving skills are becoming a major focus in physics learning in the 21st century (Jayadi et al., 2020).

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