



Analysis of Effectiveness Argument-Driven Inquiry to Improve Students' Argumentation Skill and Conceptual Understanding

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ABSTRACT

Objective: This study examined the effectiveness of the Argument-Driven Inquiry learning model in science learning in improving students' argumentation skills and conceptual understanding. **Method:** The techniques used are 1) searching articles on Scopus and Google Scholar using the keyword Argument-Driven Inquiry in science learning, 2) articles were selected focus on increasing conceptual understanding and argumentation skills, 3) the metadata was selected limited to 2015-2023, and 4) conducting the in-depth review. **Results:** The ADI model was able to improve students' argumentation skills. In general, students' argumentation levels are in levels 3-4. The quality of the arguments developed by students shows the understanding of the concepts possessed by students. Students can reach the cognitive level created (C6) by writing scientific reports. **Novelty:** This study reinforces previous research regarding the effectiveness of the ADI model in improving argumentation skills and conceptual understanding taken from recent articles. Therefore, this article can be the basis for developing learning tools for the ADI model.

INTRODUCTION

Learning science is essential in preparing future generations for various aspects of life, such as thinking logically, making decisions about their choices, and engaging in social communication. For this reason, science learning is currently expected to be packaged in an inquiry process so that students can be directly involved in the process of obtaining information. The goal is to facilitate students in understanding science concepts as a whole and strengthen process skills. Communication skills are one of the process skills required in learning the new paradigm. Communication skills, including argumentation skills, are essential points that students must have as basic skills in learning and socializing.

Argumentation skills become essential competencies for students in understanding science concepts. This skill explains the nature of scientific processes often carried out by scientists (Grooms et al., 2015). Students learn to acquire knowledge by observing, collecting data, evaluating, and making decisions as a scientific process, like what scientists do (Christenson et al., 2014; Faize & Dabar, 2018). It aligns with Fadly & Miaturohmah (2021) and Walker & Sampson (2013). Learning by building arguments trains students to identify several opinions and analyze the truth of opinions rationally and critically (Felton et al., 2015). So that students learn how to build a valid and robust argumentation structure by evidence and theory (Foutz, 2013; Kulatunga et al., 2013). Through argumentation, students learn to build on their knowledge so that it can be assumed that student arguments describe their understanding of concepts (Hasnunidah et al., 2015). According to the statement of Walker & Sampson (2013), when student learning science with a lack of argumentation skills usually reflect their misunderstanding of science concepts.

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