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Implementation of Project Based Learning (PjBL) Model with Differentiation Approach to Improve Critical Thinking Ability

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ABSTRACT

Objective: This study aims to determine the improvement of students' critical thinking skills on solar system material in the project-based learning (PjBL) learning model with a differentiated approach. According to PISA, the results of observations in class VII State JHS 13 Madiun and interviews with several science teachers, Indonesian students' science skills are in a low category. Therefore, an appropriate learning model is needed to facilitate students to improve their critical thinking skills. **Methode**: This research is classified as a type of quantitative research. The subjects in this study were 30 students of class VII A at State JHS 13 Madiun city and science teachers at JHS 13 Madiun city. **Results:** The analysis showed that this study's increase in pretest and posttest scores was high, with an N-gain value of 0.72. This study also shows that PjBL learning intensely impacts the critical thinking skills of junior high school students in solar system material with a d-effect size value of 0.79. **Novelty:** The novelty of this research is to collaborate the PjBL learning model with a differentiated approach. In this study, the syntax of PjBL learning collaborates with a differentiation approach that can facilitate all student characteristics. Project creation in this learning is done based on students' learning style characteristics.

INTRODUCTION

Natural Science is a branch of science in the form of principles, concepts, facts, and laws whose truth has been tested through the scientific process. Learning about knowledge in the form of facts, principles, and concepts, science learning also learns about the process of finding out about nature systematically. Science learning is learning that can provide sufficient space as a place to train the problem-solving process, develop scientific attitudes, and relate it to life in the real world. Science is one of the basic sciences that is important for the development of science and technology as a provision for facing the 21st century (Gamage et al., 2020; Icela, 2022; Khairani Astri et al., 2022; Novitra et al., 2021; Valladares, 2021). Skills in learning and innovating in 21st-century science learning have goals with 4C characteristics, namely critical thinking and problem-solving, collaboration, creativity, and communication (Arifin, 2017). Cahyono (2017) states that critical thinking skills are essential for successful learning, working, and living during the 21st century.

Critical thinking skills are one of the essential goals of education. One of the skills expected to be output in the ongoing learning process is critical thinking skills (Kemendikbud, 2016). Maulana (2017) argues that there are four reasons for the need for critical thinking skills, namely (a) The demands of the times require that each individual be able to search, select, and use information for their lives, (b) Everyone is constantly faced with various problems and choices so that everyone is required to be able to think critically in looking at various problems faced, (c) Critical thinking is an aspect that can help in solving problems so that each individual can compete pretty and

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