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The Effectiveness of Innovative Blended Learning Through Meaning (IBLTM) Model to Improve Students' Science Literacy

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ABSTRACT

Objective: This study aims to determine the effectiveness of the Innovative Blended Learning Through Meaning Model (IBLTM) in improving students' scientific literacy at Muhammadiyah 2 High School Sidoarjo. **Method:** This study used an experimental method with a one-group pretest and posttest design. The subjects of this study were 22 students of class X-1 who participated in learning using the IBLTM Model. Data was collected through a science literacy test instrument in 12 descriptive questions covering six indicators of science literacy. **Results:** The results of the data analysis showed that the implementation of the IBLTM Model was effective in improving students' scientific literacy. This is indicated by a significant increase in science literacy scores from pretest to posttest, with an average N-Gain of high category. The paired t-test showed a significant difference between the pretest and posttest. In addition, all indicators of science literacy increased, with several indicators reaching the high N-Gain category. **Novelty:** The IBLTM model applied in this study is an innovative learning approach that integrates the process of meaning in blended learning. This model has been proven to significantly improve scientific literacy, especially in science learning at the secondary school level, and shows that an interactive and meaning-based approach can positively impact students' scientific understanding.

INTRODUCTION

This may include reference to the scientific literacy required to comprehend the scope of global challenges, like climate change, new technologies, and public health. Scientific literacy encompasses more than just understanding science terminology; it also includes critical thinking, problem-solving, and making decisions based on existing scientific evidence (Rubini et al., 2019; Jackson et al., 2021). They are easily transferable to real-life contexts that empower individuals to participate in informed discussions and make decisions otherwise expected from societies (Jamil, 2021; Ashraf, 2021; Iringan, 2021). Various studies of various designs demonstrate that scientific literacy levels among Indonesia's students are still notably low (Simbolon et al., 2019; Jufrida et al., 2019; Sutrisna & Anhar, 2020). Thus, it is known that a few factors are students' lack of exposure to interactive and meaningful learning and the infrequent use of effective models to grasp scientific concepts (Windyariani & Amalia, 2019; Firdausy & Prasetyo, 2020; Purwati et al., 2021).

According to Iwuanyanwu (2019) and Rahmiwati et al. (2020), memorization is insufficient, meaning it is the core of advancing scientific literacy. Hence, students should grasp the concepts and relate them to practical experiences Thus, meaning implies internalization of active knowledge construction by learners through interaction, reflection, and application of concepts to real-life situations (Musdalifah, 2021).

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