ABSTRACT

Cinta Amanda Nainggolan, 4213141019 (2026). Development of Global Warming E-Booklet Based on Environmental Literacy as Learning Resource for Grade X Students of SMAN 1 Dolok Batu Nanggar.

This study aimed to develop an environmental literacy–based e-booklet on global warming material. The research employed a development research design using the 4D model (Define, Design, Develop, and Disseminate). Data were collected through teacher interviews, environmental literacy tests, student needs analysis questionnaires, pretests and posttests, expert validation questionnaires, teacher response questionnaires, and student response questionnaires. The effectiveness of the e-booklet was evaluated at the dissemination stage by implementing it with 30 students of SMAN 1 Dolok Batu Nanggar. The results showed that the e-booklet obtained a validity score of 97.08% (perfectly valid category) from material experts, 93.74% (perfectly valid category) from learning experts, and 80.83% (valid category) from design experts. Teacher responses reached 100% (very good category), while student responses were 81.84% (good category) in individual trials, 80% (good category) in small group trials, and 89.84% (very good category) in large group trials. The effectiveness analysis based on Wilcoxon Signed-Rank Test and N-gain Test. The Wilcoxon Signed-Rank Test results indicated a significant difference between students' pretest and posttest scores after using the e-booklet ($p < 0.001$). N-Gain Test yielded a value of 0.67, which falls into the medium category. Based on these results, the environmental literacy–based global warming e-booklet is quite effective in improving students' learning outcomes, as indicated by a significant difference between pretest and posttest scores and a medium N-gain value.

Keywords: E-Booklet, Environmental Literacy, Global Warming