



Validity of Empati STEM Learning Model to Increase Scientific Literacy and Technology Literacy

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ABSTRACT

Objective: Based on previous research, there is evidence that science literacy and technological literacy in various regions of Indonesia still need improvement, especially vocational high schools. Science literacy and technological literacy in science learning are combined with socioemotional abilities, one of which is the ability to empathize students. Learning interventions are needed to produce competitive graduates who are able to compete in facing challenges in the world of work. This study aims to validate the STEM Empathy learning model. **Method:** The educational development research design used is a validation study design that tests two criteria, namely testing content validity (also called relevance) and construct validity (also called consistency). This validation involved three experts in the field of Science Education, and the validation instrument used a validation sheet. **Result:** The research results and data analysis showed that the Empathy STEM learning model consistently provided highly relevant results and met strict validity and reliability standards (with a percentage of agreement $\geq 75\%$). **Novelty:** Validation of learning support devices includes lesson plans, student textbooks, learner worksheets, science literacy and technological literacy tests. Empathy STEM learning can be applied to improve students' science literacy and technological literacy. The empathy stem learning model can train scientific literacy and technological literacy while fostering students' socio-emotional abilities. STEM learners are well-suited to teaching empathy, social emotional learning into science education creating a holistic STEM that s the potential to increase students' interest and appreciation of science and its applications.

INTRODUCTION

The era of society 5.0 brings changes in the field of education including science literacy and technological literacy. These changes have improved the quality of human life along with the development of science and technology (Asih et al., 2022). Education aims to shape students to become agents of change with fundamental values in facing future challenges and increase students' understanding. The school environment, one of the learning centers in the community, must provide an environment that can develop their character through various activities in the learning process. Developments in science and technology cause new problems related to global issues, morals and ethics that can threaten human dignity and survival.

Industry requires qualifications for prospective workers to have hard skills (ability to master science and technology, theory), but must have soft skill characters (communication, empathy, and collaboration) (Prasetyo et al., 2020). Schools in Indonesia are still weak in teaching soft skills to students. Vocational High School is currently designed to produce graduates who are skilled, competent, and competitive, but there is still a gap between the material taught in Vocational High School and what

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