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TOSLS Cognitive Instrument to Measure Students' Scientific Literacy Abilities

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ABSTRACT

Objective: This research is for the development of the TOSLS scientific literacy assessment instrument to determine the scientific literacy abilities of undergraduate science education students. Scientific literacy skills need to be known as a form of evaluation in learning. Scientific literacy skills are one of the abilities students must have after graduating from college and facing the work environment. **Method:** The quantitative method used in this research uses a Rasch model approach from 29 Bachelor of Science Education program students. Indicators of item suitability with Rasch model analysis measure this quality. The questions consist of 9 multiple choice questions with a correct score of 1 and an incorrect score of 0. Data processing uses MS Excel and SPSS 25 software. **Results:** The results show that all fit items, according to Rasch analysis, can be maintained without revision and used as a question instrument to measure the level of science literacy ability science for students with moderate scientific literacy abilities. **Novelty:** The research contribution of this question instrument can be used as reference material for evaluating the lecture process in biophysics courses on fermentation topics based on the level of scientific literacy ability.

INTRODUCTION

Science literacy is understanding, interpreting, and using scientific information daily. Scientific solid skills are essential in the increasingly complex and demanding modern world, particularly in science and technology (Rini et al., 2021). The evaluation of Indonesia's science literacy skills conducted by the Programme for International Student Assessment (PISA) shows that Indonesian students' science literacy skills are deficient (Hasan et al., 2018). In 2018, Indonesia ranked 74th out of 79 countries participating in the PISA test (OECD, 2019). One factor affecting students' science literacy skills is more familiarity with standardized science literacy evaluation tests (Suparya et al., 2022). Two main aspects need to be considered to measure the level of science literacy competence: 1) understanding research methods that lead to scientific knowledge; this includes the ability to understand and apply scientific concepts such as hypotheses, variables, and research methods used in science; 2) organizing, analyzing, and interpreting quantitative data and scientific information; measuring skill proficiency aims to diagnose learning difficulties, measure long-term improvements, and gather information to improve performance (Azizah et al., 2020).

Research conducted by Anna in 2023 states that evaluating the Interdisciplinary Science Threshold Experience (InSciTE) results on students' experiences in science using the TOSLS test instrument is more effective in measuring students' science literacy skills in science. Research conducted by Putra et al. (2023) developed a science literacy test instrument that refers to TOSLS specifically for physics education students. As a form of literacy science ability test, in this study, the researchers wanted to know the quality of the instrument designed to measure or determine students' scientific

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