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EXPLORING THE EFFECT OF ATTITUDE TOWARDS SCIENCE AND SCIENCE MOTIVATION IN COMPLEX PROBLEM SOLVING

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Complex problem-solving is defined as the successful interaction with a dynamic task environment and the integration of information during that process. It presents ill-defined problems that demand a solution with complex operations, highly interconnected, and changing over time (Funke, 2010; Wüstenberg et al., 2012). Successful interaction in complex problem-solving is supported by personal and situational variables, such as motivation, self-regulation, and social skills, require further research (Funke et al., 2018). Previous findings indicate that there is a relationship between motivation and problem-solving (e.g. Shin et al., 2003), but a detailed exploration of the effects is needed. The present study aims to investigate the effect of attitude and motivation on complex problem-solving in the context of science learning. The sample consists of 1243 Indonesian 10th-grade students (36.8% male and 63.2% female, average age of 16.78 years (SD = 0.98) are voluntarily participated in the survey. Complex problem solving was measured with the MicroDYN test 20 items divided into two main phases, knowledge acquisition and knowledge application (Greiff, 2012; Schweizer et al., 2013). In addition, the Attitude Towards Science Questionnaire (ATSQ) with four latent variables, including enjoyment (8 items), anxiety and difficulty (7 items), participation in science learning (8 items), and the value of science (4 items) with a total of 27 items (Wicaksono & Korom, 2023) and the SMQ II consists of five latent variables, such as intrinsic motivation, career motivation, self-determination, self-efficacy, and grade motivation with a total of 25 items (5 items in each variable) (Glynn et al., 2011) is included. The scoring for the questionnaire follows the Likert scale from 1 point (strongly disagree) to 5 point (strongly agree). Data analysis was performed with multiple regression analysis. The results showed that the MicroDYN test has a good reliability value ($\alpha = 0.85$, $\omega = 0.86$) as well as the ATSQ ($\alpha = 0.83$, $\omega = 0.83$) and SMQ ($\alpha = 0.95$, $\omega = 0.95$). The results indicated that attitude and motivation have a low effect to the knowledge acquisition phase ($F(1242) = 5.491$, $p < .01$) with a total of 3.85% variance explained. Among the variables, the higher variance is explained by grade motivation (1.99%), and value of science (1.07%). In the knowledge application phase, attitude and motivation also have a significant effect ($F(1242) = 3.887$, $p < .01$) with a total of 2.76% variance explained. The higher variance is explained by grade motivation (0.91%), and self-efficacy (0.08%). If, students understand the value of science, it also encourages them to perform better in solving complex problems. In addition, students' performance in complex problem-solving is supported by external motivation such as grades. Thus, further studies in exploring the influence of affective factors on problem-solving performance with different samples and contexts is suggested