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EXPLORING THE RELATIONSHIP OF REPRESENTATIONAL COMPETENCE FORMS WITH VIEWS ON REPRESENTATIONAL PRACTICE IN SCIENCE LEARNING

Fitria Arifiyanti, Soeharto Soeharto

University of Szeged, Doctoral School of Education

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Representational competence refers to skills related to generating and using multiple representations and making connections across multiple representations (Kozma & Russel, 2005). To obtain benefits from using representations, students must learn how to interpret representations, relate to reality, and relate to other representations of the same concept. Science concepts can be communicated visually in graphs, tables, models, diagrams, or simulations (Griffard, 2013). However, there are no studies that investigate the relationship between representational competence with student perceptions of, or views on, representational competence practices in Science learning. Therefore, this study aims to investigate the relationship of representational competence with views on representational practice in Science learning. 584 pre-service Science teachers participated in the study from 10 Indonesian universities, 279 (47.8%) males and 305 (52.2%) females. The VRPSL questionnaire with 28 items in Indonesian was produced in the final adaptation stage, consisting of emotional and cognitive engagement items. The Representational Competence Test (RCT) consists of 13 items that measure four different representations: pictorial representation (PR), Science representation (SR), Mathematics representation (MR), and verbal representation (VR). SmartPLS 3 was used to perform data analysis to explore the relationship between the two constructs. The Cronbach's alpha values for the VRPSL questionnaire are .903 for cognitive engagement and .950 for emotional engagement. The Cronbach's alpha value of RCT is .713. The Cronbach's alpha values are above .7, revealing appropriate internal consistency and reliability. The Pearson correlation values among latent factors are ranging from .14 to .821. The findings indicate that PR and SR have significant effects on cognitive engagement and emotional engagement ($p < .05$). However, no significant effect of MR and VR on cognitive engagement and emotional engagement was found. All forms of representational competence can explain 7.2% of variance in emotional engagement and 8% of variance in cognitive engagement. These effects are still considered essential because we only used representational competence as the dependent variable to target views on representational practice. The limitation of this current study is the focus on assessing pre-service teachers at universities. In addition, the participants could not demonstrate how they interpret, construct, and transform their understanding in the form of drawing and writing. Future studies are needed to investigate students' representational competence at other levels of education, how they demonstrate their competence through drawing and writing, and how to improve their competence to help them understand Science concepts and solve Science problems.