Taiwanese High School Students' Conceptions of and Approaches to Learning Science: A SEM analysis

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Abstract

Previous research has established a close link between students' conceptions of learning and approaches to learning. Until recently, few quantitative studies have investigated students' conceptions of learning science in high school level and their relationship with approaches to learning science. This study aimed to develop a questionnaire, named the Conceptions of Learning Science (COLS) questionnaire, to assess high school students' conceptions of learning science, and to explore the relationship between students' conceptions of and approaches to learning science. Four hundred and seventy-four Taiwanese high school students were administered the COLS questionnaire and the Approaches to Learning Science (ALS) questionnaire. Results were entered into a structural equation model to elicit causal relations between students' conceptions of and their approaches to learning science. The overall findings revealed that students holding constructivist conceptions of learning science tended to employ deep approaches to learn science. In this study, the conceptions of learning science such as "testing", "calculate and practice" had effects on the surface approaches to learning science; however, the conceptions of learning science as "applying" and "understanding and seeing in a new way" had noticeable effects on deep approaches to learning science. This study further confirmed the causal relations between conceptions of learning science and the motive and strategy of learning science via quantitative methods. Implications for implementing the studies findings into the real-world classroom and into Earth Science learning are discussed.