Yaowares Chaiyen 2007: Teaching and Learning about Chemical Equilibrium: Constructivist-Based Perspectives. Doctor of Philosophy (Science Education), Major Field: Science Education, Department of Education. Thesis Advisor: Assistant Professor Naruemon Yutakom, Ph.D. 282 pages.

This interpretive research aims to improve teaching and learning about chemical equilibrium through constructivist-based perspectives in a manner consistent with the National Education Act B.E. 2542 (Revised in B.E. 2545). The study is divided into 2 phases: an Exploratory Phase, and a Development and Implementation of the Learning Unit Phase. In Phase I, 125 high school students from three schools in Chanthaburi Province were asked to complete a survey, and a questionnaire to find out their learning outcomes which were conceptions, science process skills, and attitudes toward chemical equilibrium concepts and teaching and learning. These data informed the development of the learning unit. In phase II, the Chemical Equilibrium Learning Unit (CELU) was developed and implemented in the classroom to improve teaching and learning about chemical equilibrium concepts for Thai Grade-11 students. Three teachers and 148 students from three schools participated in this study phase. Data collection through classroom observations, interviews, and documents were analyzed to investigate the effects of the CELU on teaching and learning.

Findings from Phase I showed that most of the Thai high school students' learning outcomes seemed to be far from meaningful learning about chemical equilibrium concepts as this was described in the National Science Curriculum Standard. These findings suggested that teaching and learning about chemical equilibrium needed to be improved. The CELU took into account the findings of Phase I and was developed to prompt students to be active and to develop their learning outcomes. The findings of Phase II on the implementation of the CELU suggest that giving opportunities for the teachers to work collaboratively with a researcher is important to the success of an innovation. The findings from Phase II showed that each teacher had their own way of implementing the CELU based on their beliefs about teaching and learning. When teachers emphasized students' existing ideas, active learning, and social processes such as discussion in groups or in the whole class, they tended to be successful in promoting students' learning outcomes about chemical equilibrium. Providing opportunities for students to engage with hands-on and minds-on activities positively impacted on students' learning outcomes across the range of abilities. It could be concluded that the constructivist-based learning unit of the CELU was generally effective for improving students' learning outcomes about chemical equilibrium in Chanthaburi Province.

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