SITUATING SUSTAINABLE DEVELOPMENT WITHIN SECONDARY CHEMISTRY EDUCATION VIA SYSTEMS THINKING – A DEPTH STUDY APPROACH

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We report here a teacher action research project, as outlined in the Journal of Chemical Education (in press), in which a Systems Thinking approach was implemented into a 15 hour Depth Study for students in their final year of secondary chemistry. Students were introduced to the concept of Systems Thinking and the use of systems maps, along with the United Nations Global Goals for Sustainability Development (SDGs). Integrating these ideas, students created their own systems maps for specific chemical processes. Specifically, they represented their chemistry curriculum content knowledge in the context of the SDGs, by considering whether the impact of each aspect of the chemical process is positive, negative, or neutral for each SDG. The purpose of the approach was to give students the opportunity to situate their knowledge of sustainability in the context of the sourcing, uses and other intended and unintended consequences for a variety of chemical processes, and how these processes impact the wider global community. The teacher action research was in the development and evaluation of the teaching materials as part of an iterative cycle of improvement. This project is described here in the context of how Systems Thinking influenced the inclusion of sustainability as a cross-curriculum priority in Australia, making it mandatory for all teachers to find ways to incorporate sustainability principles within their teaching. The teaching and assessment approach was evaluated utilizing reflections of the teacher in an action research cycle. This report gives secondary teachers tools to implement Systems Thinking in their own classrooms in a way that integrates it within the chemistry curriculum, is sustainable and is achievable without requiring additional time or resources.

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