

STUDENT DEVELOPMENT OF PROBLEM-SOLVING SKILLS USING METACOGNITIVE SCAFFOLDING

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KEYWORDS: metacognition, development, engagement, problem-solving scaffold

Despite problem solving being a core skill in chemistry, students struggle to solve chemistry problems. This difficulty may be the result of students trying to solve problems through memorising algorithms. Our research group developed a metacognitive scaffold, known as Goldilocks Help, to support students through structured problem solving and its phases, such as planning and evaluation (Yuriev et al., 2017). This study investigated how first-year chemistry students engaged with the scaffold and how that engagement affected their learning. Data was collected from the assignments, which involved students solving an allocated problem and reflectively comparing their effort to an expert solution. This qualitative study was underpinned by a social constructionist epistemology. A mixed-method approach of frequency and thematic analyses was used. Initially, students did not engage with the scaffold due to viewing it as extra work and time, that needed to be done in addition to solving a problem. Over repeated assignment cycles, students showed greater engagement with the scaffold and became more metacognitively self-aware. Scaffold use and observing the expert solution, helped students to reflect and articulate their problem-solving processes. Students were able to identify improvement strategies and potential points of error that could be avoided.

REFERENCE

Yuriev, E., Naidu, S., Schembri, L., Short, J. (2017). Scaffolding the development of problem-solving skills in chemistry: guiding novice students out of dead ends and false starts. *Chemistry Education Research and Practice*, 18, 486-504.

Proceedings of the Australian Conference on Science and Mathematics Education, 29 September - 1 October 2021, page 53, ISSN 2653-0481