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Complex Learning Tasks and Their Impact on Cognitive Engagement for Undergraduate Engineering Students

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Abstract : This paper presents preliminary results from a two-year funded research program looking to analyze and understand the relationship between high cognitive engagement, higher order cognitive processes employed in situations of complex learning tasks, and the use of active learning pedagogies in engineering undergraduate programs. A mixed method approach was used to gauge student engagement and their cognitive processes when accomplishing complex tasks. Quantitative data collected from the self-report cognitive engagement scale shows that deep learning approach is positively correlated with high levels of complex learning tasks and the level of student engagement, in the context of classroom active learning pedagogies. Qualitative analyses of in depth face-to-face interviews reveal insights into the mechanisms influencing students' cognitive processes when confronted with open-ended problem resolution. Findings also support evidence that students will adjust their level of cognitive engagement according to the specific didactic environment.

Keywords : cognitive engagement, deep and shallow strategies, engineering programs, higher order cognitive processes
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