World Academy of Science, Engineering and Technology
International Journal of Educational and Pedagogical Sciences
Vol:15, No:10, 2021

Research on Community-Based Engineering Learning and Undergraduate Students' Creativity in China: The Moderate Effect of Engineering Identity

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Abstract : There have been some existing researches on design-based engineering learning (DBEL) and project-based or problem-based engineering learning (PBEL). Those findings have greatly promoted the reform of engineering education in China. However, the engineering with a big E means that more and more engineering activities are designed and operated by communities of practice (CoPs), namely community-based engineering learning. However, whether community-based engineering learning can promote students' innovation has not been verified in published articles. This study fills this gap by investigating the relationship between community-based learning approach and students' creativity, using engineering identity as an intermediary variable. The goal of this study is to discover the core features of community-based engineering learning, and make the features more beneficial for students' creativity. The study created and adapted open survey items from previously published studies and a scale on learning community, students' creativity and engineering identity. Firstly, qualitative content analysis methods by MAXQDA were used to analyze 32 open-ended questionnaires. Then the authors collected data (n=322) from undergraduate students in engineering competition teams and engineering laboratories in Zhejiang University, and structural equation modelling (SEM) was used to understand the relationship between different factors. The study finds: (a) community-based engineering learning has four main elements like real-task context, self-inquiry learning, deeply-consulted cooperation and circularly-iterated design, (b) community-based engineering learning can significantly enhance the engineering undergraduate students' creativity, and (c) engineering identity partially moderated the relationship between community-based engineering learning and undergraduate students' creativity. The findings further illustrate the value of community-based engineering learning for undergraduate students. In the future research, the authors should further clarify the core mechanism of community-based engineering learning, and pay attention to the cultivation of undergraduate students' engineer identity in learning community.

Keywords : community-based engineering learning, students' creativity, engineering identity, moderate effect
Conference Title : ICEET 2021 : International Conference on Engineering Education and Teaching
Conference Location : Tokyo, Japan
Conference Dates : October 07-08, 2021