Training Undergraduate Engineering Students in Robotics and Automation through Model-Based Design Training: A Case Study at Assumption University of Thailand

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Abstract : Problem-based learning (PBL) is a student-centered pedagogy that originated in the medical field and has also been used extensively in other knowledge disciplines with recognized advantages and limitations. PBL has been used in various undergraduate engineering programs with mixed outcomes. The current fourth industrial revolution (digital era or Industry 4.0) has made it essential for many science and engineering students to receive effective training in advanced courses such as industrial automation and robotics. This paper presents a case study at Assumption University of Thailand, where a PBL-like approach was used to teach some aspects of automation and robotics to selected groups of undergraduate engineering students. These students were given some basic level training in automation prior to participating in a subsequent training session in order to solve technical problems with increased complexity. The participating students' evaluation of the training sessions in terms of learning effectiveness, skills enhancement, and incremental knowledge following the problem-solving session was captured through a follow-up survey consisting of 14 questions and a 5-point scoring system. From the most recent training event, an overall 70% of the respondents indicated that their skill levels were enhanced to a much greater level than they had had before the training, whereas 60.4% of the respondents from the same event indicated that their incremental knowledge following the session was much greater than what they had prior to the training. The instructor-facilitator involved in the training events suggested that this method of learning was more suitable for senior/advanced level students than those at the freshmen level as certain skills to effectively participate in such problem-solving sessions are acquired over a period of time, and not instantly.
Keywords : automation, industry 4.0, model-based design training, problem-based learning

Conference Title : ICSEMW 2020 : International Conference on Self-Education in Modern World
Conference Location : Kuala Lumpur, Malaysia
Conference Dates : February 10-11, 2020