

Assessing conceptual knowledge in three online engineering courses: theory of computation and compiler construction, operating systems, and signal and systems

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ABSTRACT

In the current decade understanding conceptual knowledge should be an important area of engineering science. However, it is not as widespread in this field as it is in the areas of education and psychology. Learning conceptual knowledge in engineering science could help instructors to adapt their lectures in order to overcome student misconceptions, to reinforce the learning process, and to check whether students are able to identify key features of a problem. Different methods are provided by authors to assess conceptual knowledge. One is to design and develop a concept inventory with the objective of identifying possible student misconceptions through multiple-choice questions. Another method consists of asking each student to answer a question by submitting a written explanation. This study provides two procedures for the assessment of conceptual knowledge based on the latter method. The first procedure is applied to online computer science students enrolled on an Operating Systems course. The second procedure is applied to online communication students enrolled on a Signals and Systems course. Both procedures are focused not only on assessing but also on searching for causes of potential student misconceptions. These procedures could help other instructors to assess conceptual knowledge on other engineering courses.