Concept of the Active Flipped Learning in Engineering Mechanics

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Abstract : The flipped classroom has been introduced to promote collaborative learning and higher-order learning objectives. In contrast to the traditional classroom, the flipped classroom has students watch prerecorded lecture videos before coming to class and then "class becomes the place to work through problems, advance concepts, and engage in collaborative learning". In this paper, the active flipped learning combines flipped classroom with active learning that is to establish an active flipped learning (AFL) model, aiming to promote active learning, stress deep learning, encourage student engagement and highlight data-driven personalized learning. Because students have watched the lecture prior to class, contact hours can be devoted to problem-solving and gain a deeper understanding of the subject matter. The instructor is able to provide students with a wide range of learner-centered opportunities in class for greater mentoring and collaboration, increasing the possibility to engage students. Currently, little is known about the extent to which AFL improves engineering students' performance. This paper presents the preliminary study on the core course of sophomore students in Engineering Mechanics. A series of survey and interviews have been conducted to compare students' learning engagement, empowerment, self-efficacy, and satisfaction with the AFL. It was found that the AFL model taking advantage of advanced technology is a convenient and professional avenue for engineering students to strengthen their academic confidence and self-efficacy in the Engineering Mechanics by actively participating in learning and fostering their deep understanding of engineering statics and dynamics