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Integrating traditional lecturing with active learning approaches for engineering instruction

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Abstract

Relying solely on traditional lecturing, or conducting a course session with monotonous powerpoint presentation of the course content is often tedious and usually does not result in the expected learning outcome. In order to increase learning in the classroom, many approaches have been proposed in the past few decades. Almost all of those approaches are student-centered and based on student activity and interaction in the instruction and learning processes. Active learning is any approach that happens in the classroom to engage students with the presented material and increase their learning. Active learning approaches are very diverse and include a broad range of activities from simply asking students questions to more complex writing activities, discussion and debate, and other collaborative and cooperative activities. Knowledge of active learning approaches that are used in world's advanced educational institutions enables engineering instructors to select the suitable approach for their course and apply it in classroom. Application of active learning approaches makes classes more vibrant, increases students' interest in class, and makes course outcomes more perceptible. In the present articles, the most important active learning approaches are summarized and the advantages and disadvantages of each approach are discussed. In addition, the application method for each approach is presented.

Keywords: lecturing in classroom, active learning, experiential learning, collaborative learning, student-centered education, engineering education.