An Integrated e-Learning Platform for Learning-by-Doing in a Large Class

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Abstract

Traditionally most of the engineering courses are conducted in two steps: classroom lecturing followed by laboratory experimenting. As an Educator, we hope that this two-step approach will allow the students to transfer what they have learnt in the classroom into their own knowledge by doing a given set of experiments. However, such an approach does not work very efficient because it separates learning and doing into two processes. Our experience shows that the best way to learn how to do something is to do it. This requires us to provide doing in the every step of learning process including in the classroom and after classroom. The learning is enhanced by constantly gaining new experiences and integrating them into our existing memory structures. This process puts doing as a first step in the learning process. This prompts us that learning will be enhanced if we can integrate learning and doing into every step of learning process. This is the motivation of the development of the integrated e-Learning platform, e-Learning Hub, for learning-by-doing. The e-Learning Hub integrates conceptual learning, adaptive learning, and experiential learning into the teaching and learning process in a large class. The combination of various teaching and learning strategies allows the e-Learning Hub to achieve the following educational objectives. 1. To enhance student comprehension on the concepts so that their thinking ability is enhanced. 2. To stimulate deep thinking and enhance student's capabilities of transferring what they have learnt to new situations so that transfer of learning takes place. 3. To develop and foster independence of learning in which student develops the ability to discover and reconstruct knowledge for themselves. 4. To make learning more effective, efficient, meaningful, and joyful in a large class. On the way to achieve these objectives, student is guided through Bloom's six levels of learning, leading from lower-order acquisition of knowledge through comprehension to the higher order skills of analysis, synthesis, and evaluation. In order to fulfill the objectives, the following goals are set for the e-Learning Hub. 1. To maintain student curiosity in the subject throughout the course. 2. To interpret the course material clearly and to encourage student to think critically during the class. 3. To encourage student to relate the new concepts to their own experience. 4. To stimulate student to think and to learn more about the subject. The e-Learning Hub provides multimedia demonstrations to visualize difficult concepts, in-class and after-class feedback systems to support adaptive learning, virtual laboratories and simulation tools to enhance the transfer of learning. It facilitates active learning in a learner-centered environment and makes learning more effective, efficient, meaningful, and joyful in a large class.