

Multi-Board (Multimedia-Blackboard) Approach for Engineering Education

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Abstract: The rapid advances in computers have led to the implementation of advanced computer-based methods and new opportunities for the delivery of instruction in engineering education and practice. It is anticipated that the technology will continually change the way of which instruction is imparted throughout the educational system. This study is based on the assumption that students can better understand the difficult subjects by using animated lessons in addition to instructors' explanations called here as multi-board approach. Several modules on selected engineering freshmen courses based on perceptual and conceptual difficulties of the students are prepared. The main features of the developed courseware are (i) animated interactive learning materials, (ii) virtual and real video recording of lab experiments, and (iii) a web based learning environment. The courseware was tested and evaluated at different institutions. Student assessments of the instructional materials and the multi-board approach were obtained using quantitative evaluation questionnaires. The initial results indicated that this approach was helpful for learning and teaching.

Key-Words: internet, interactivity, multimedia, modular learning, courseware, visualization.

1 Introduction

The use of computers has been widely recognized as an effective and efficient tool in delivering course materials. Through computer software interactive and visually appealing media, such as, animations, graphics, simulations, and sounds can be incorporated to illustrate the engineering theories and concepts. The possibility of developing programs with superior graphic quality and efficient interactivity is very likely on raising student interest. Besides, the development of such media will perhaps have a positive impact on the quality of education [1].

Early research comparing graphics to text-only instruction had shown that graphics increased the amount of learning [2, 3]. Similarly, the learning experiences of groups using text only, text plus graphics, and text plus animation showed less study time and more learning for the animation group [4, 5]. In some other research, however, it was found that the animation did not result in a greater quantity learnt after comparing the animation-based instruction with carefully designed verbal presentations [6]. It was shown also that students in mathematical learning were able to learn more from

the animated lesson and scored significantly higher than those using the graphics lesson [7].

There has been not much research into the use of animation in the early days of computers, because the required skills and equipment were scarce. Fortunately nowadays, animation can be created more easily with the help of inexpensive user-friendly software for introducing the technology into courses and laboratories [8]. Most universities and higher learning institutions are now using interactive tools and associated learning and teaching technologies to improve their educational system and update their curricula accordingly [9-15].

The technological advancements have made it relatively inexpensive and easy to use and develop multimedia. Effective educational multimedia development, however, is still very difficult and expensive. The main concerns in the development of educational materials can be summarized as; aesthetics, interactivity, user-friendliness, and cost [16-18]. Additionally, the developed course material should be used both on the web and as a standalone program. The software to develop educational materials should not be too complex, to be easily used on web browsers, and to be programmable.

