Chapter VI

Technology Assisted Problem Solving Packages for Engineering

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ABSTRACT

This chapter presents the development of technology-assisted problem solving (TAPS) packages at University Tenaga Nasional (UNITEN). This project is the further work of the development of interactive multimedia-based packages targeted for students having problems in understanding the subject of engineering mechanics dynamics. One facet of the project is the development of engineering mechanics dynamics problems for core undergraduate engineering courses. This chapter discusses the development of an interactive multimedia environment for solving relative motion of a rigid body using rotating axes. More specifically this chapter outlines the framework used to develop the multimedia package, highlighting our multimedia design process and philosophy.

INTRODUCTION

The influence of the computer is best seen in its multimedia configuration which includes an integration of multiple media elements that is, text, graphics, images, audio, video and animation into a coherent learning environment which in turn transform student learning and problem solving approach (Janson, 1992). Previous studies have shown that traditional learning (classroom teaching) could not engage the learners in visualization tasks and perform virtual experiments
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Field have taken place. Although VR has been used for educational purposes (Bell & Scott, 1995, Dede et al., 1996; Kim et al., 2001), the potential of VR is just beginning to be exploited by a few science and engineering educators (Manseur, 2005).

The long-term objective of this work is to develop realistic 2D and 3D virtual TAPS packages where a user could learn-by-discovery and gain better knowledge by doing meaningful tasks. Our present research aimed to improve and define new patterns of interactions by adding interactivity to realistic 2D and 3D environment. It is believed that interactivity could enhance user learning by giving the virtual environment the capability to coach and provide feedback.

**CURRENT STATE OF TEACHING AND LEARNING ENGINEERING COURSES**

In general, education, in higher learning institutions in Malaysia still focuses on older educational models of linear progression or surface learning, whereas counterparts from other nations provide predominantly high-impact audio-visual perception.

The western countries, particularly the UK and USA, have used computers and CAL packages to motivate students of higher learning institutions since the 1960s (Ismail, 2001). Although encouraged by the government’s policy towards the use of new technology in teaching, several academicians in Malaysia commented that they do not have the experience in developing multimedia-learning materials (Julia et al., 2002).

However, since the emergence of newer hardware and software technologies for multimedia and VR, educational practitioners began to study on the pedagogical effectiveness of these technologies. In a developing country such as Malaysia, multimedia technology was first briefly introduced in the late 1990s and became popular with the launch of Multimedia Super Corridor.
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