

Visual Interactive Learning of Engineering Concepts



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Introduction

The proposal seeks to develop three-dimensional visual interactive learning software to help engineering students to understand some fundamental concepts. Many students withdrew their interests in further study of engineering subjects because of the learning obstacles. Some fundamental concepts are not easy to understand under the traditional teaching method. However, the progresses in modelling and computational researches provide many possibilities to enable the students to observe the phenomena in a virtual environment and to build up in-depth feeling and knowledge about the fundamental mechanism using an interactive learning manner by means of visual computing and online toolkits. The proposed work will use the state-of-the-art science and technology to convert this capability to learning software. The toolkit will enable students to simulate the engineering environments, to choose various parameters to affect the system, to record the evolution of properties and to compare the observation with the description in teaching materials.

Methodology

The toolkit will be developed using JAVA3D computing language. We intend to identify 3 representative but correlative examples from OU materials modules T176, T276 and T357, and to develop the visual interactive learning toolkits to help students understanding those concepts. Each toolkit, after the development and passing of our preliminary trial, will be passed to students for volunteer trial. The toolkits and user instructions will be available at a website and the links to the webpage will be provided to students for volunteer trial. Demonstration and practical session will be available at residential school as one of the night activities. Feedback will be collected from the users via questionnaires. Modification will be made according to feedbacks. The method will be promoted for wider application by various dissemination ways.

Expectation

The project will develop such toolkits to help OU students to enjoy the low-stages courses, excite their further learning interests and go through the high stage courses toward a degree. In summary, we hope to contribute to the improvement of successful rate of OU students registered for engineering discipline degrees. Improving of learning experience would certainly attract more students to OU via online learning demonstration. The proposal fits to OU's strategy and eSTeEM's Learning Design, Innovations in STEM and Supporting Students portfolio.

