Web-based E-Tutorials Development for Engineering Visualization and Modeling Course

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ABSTRACT

This project aims to develop tutorials for students learning how to use SolidWorks 2001 for the first time to do design and modeling of engineering drawings. The programme was first introduced to students in July 2001. This paper documents the process for coming up with such an environment and the tools employed. It also outlines some of the rational for using the E-learning environment unlike conventional means.

RESULTS

Webpages were designed to document the step by step process of modeling a given drawing. This was to enable students to find out how to translate a 2D drawing into a 3D model. The software used in to generate still pictures of the screen is the normal print screen function and TechSmith’s Camtasia 3.01\(^3\) was used to record the avis. Windows Media Tools 4.1 was required for its codec, MPEG-4 V2 to make it compatible with the school’s systems. Microsoft Frontpage 2000 was used to create the webpages.

The drawback of using the print screen function without the step of importing into another vector drawing programme is that the pictures have noise as detail on the model increases making pictures slightly grainy. Due to the limitations of time this was sacrificed as it did not significantly compromise the ability of the details to be clearly visible.

Two main models and a series of fifteen smaller ones were done in total.

Of the 2 larger ones, one was an assembly to introduce students to the techniques involved in such a model (Figure 1 and 2) and the other one that required more of an eye to appreciate and interpret drawings accurately as the model was more complicated in design. They were documented through to the drawing stage and the various techniques required are explicitly laid out in detail. Major pitfalls are highlighted wherever possible.

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1 Undergraduate student
2 Associate Professor
3 Downloaded from www.techsmith.com
Figure 1 Modeling of Assembly Part

1.1 Click on New and create a new part document.

1.2 In the Front plane, sketch a circle diameter 64mm, centered at the origin. Exit the sketch by clicking on the button shown.

1.3 In the Front plane again insert plane \( \rightarrow \) Offset 228mm behind the front plane.

Figure 2 Assembly Steps

1.5 Click on the head of the screw and the back plate to mate the surfaces so that it lies flush against the back plate. Make sure the option is now coincident. Repeat for all 4 countersunk screws.

Note that it is important for you to be able to keep track of which countersunk screw you are mating to the back plate as confusion will result in over defining some mates or under defining, both problems at later stages. Make sure to be systematic in the way you go about your mating.
The smaller ones were to serve as practice models that students can access and try on their own which require much less time and are generally less complicated. They serve to hone their skills in interpreting drawings and allow students to put into practice what they pick up along the way. They are usually short and require on average 10 to 12 steps to complete a model compared to the assembly which requires many times more.
DISCUSSION

This platform serves to allow students to learn at their own pace in a non-threatening environment. They can access the help from these webpages when they encounter difficulty in their modeling over and over again. The time in class that is allocated is certainly not enough to allow individual attention for extended periods of time and thus this is a force multiplier in the sense that only those who truly need help and encounter something out of the ordinary can get the help that they need from the tutor whilst the common problems can be dealt with through the steps outlined in each page. In this way they can absorb better and try new things without being afraid to have to ask for help again.

This project has served to familiarize me again with the software and I have a greater appreciation for its versatility and ease of use. I have been challenged to see modeling in new ways and to learn new techniques through it.

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