Multimedia in Technology Education: Who is Going to Pay?

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ABSTRACT

Multimedia is soon to be the way of the world in higher education. With almost all personal computers today utilizing CD ROMs, sound cards and improved graphics, comes the opportunity to include multimedia applications in many facets of technology education. Multimedia is currently being used in the classroom, by many faculty, to improve the student's comprehension of difficult material. Since multimedia is an effective tool in the classroom, then why not develop applications that will allow the student to effectively utilize this tool outside the classroom, for educational purposes.

The problem is how to find the development and distribution of such applications, not whether or not they would serve as an effective aid to the overall learning process for students. Compared to the market size for most personal computer software applications, the technology education market is an extremely small one. This fact coupled with the high cost of developing multimedia tools raises the question if such a venture would be financially feasible. However, as with all challenges there is a solution, it is just a matter of finding and implementing it. One possible approach to solving this problem is presented.

INTRODUCTION

Multimedia seems to be the "buzz" word of the day. With the addition of CD ROM's, sound cards, and improved graphics to almost all personal computers sold today, comes the opportunity to include multimedia applications in many facets of technology education. Multimedia is currently being used in education, from Power'Point lectures[1] to virtual classrooms to improve the student's comprehension of difficult material. Since multimedia is an effective tool in the classroom, then why not develop applications engineering technology that will allow the student to effectively utilize this tool outside the classroom for educational purposes. Support for this notion is derived from the favorable experience of several multimedia products in engineering courses. Multimedia Engineering Statics (MES) and Multimedia Engineering Dynamics (MED)[3] are two titles that are currently available for undergraduate engineering students. These are self-contained multimedia programs that were developed to serve as a supplement to lectures and textbooks, illustrating topics befitting the audio and visual capabilities of multimedia. They are in no way intended to replace lectures and textbooks, but they do provide a type of information that is not available from either. Lectures (traditionally performed with chalk and a blackboard) and textbooks can be useful for providing information on almost any topic, but from a pedagogical standpoint, both are lacking in three areas: a) both are constrained to two dimensions, b) both are static, and c) neither allows the student to interact with the material. With any field of education it is advantageous to allow the student to interact with the material, but the ability to effectively present dynamic material and material in three dimensions is paramount to engineering education.[4] With an emphasis interactivity, visualization, and simulation, MES and MED provide a type of information that is not available to the student via lectures and : textbooks. Professor's inclusion of these products into their courses has ranged from recommending it to the students, to making it available to the students in a computer lab, to requiring the students to purchase individual copies. In addition, professors have also used MED in the classroom as a presentation tool. Although the text and equations are too small to be read from a distance, the visual aspects are large enough to be used for demonstration purposes. Professors have expressed confidence in the ability of the software to enhance the students intuitive comprehension of difficult material, and students have expressed enthusiasm for the products as a truly interactive and engaging tool for learning. With engineering technology being less equation intensive than engineering curriculums, the visual and interactive aspects of multimedia would be particularly applicable to the learning process of the technology student.

THE CHALLENGE

As technological advances continue to soar into the21 st century, the need for technically qualified personnel will also expand. It is estimated that during this decade alone the demand for technicians, in industrialized economies, will surpass other occupational groups[5]. With the expanding need for better trained workers; comes the need for improved or alternate methods for training these individuals.

The question then is not whether multimedia programs would serve as an effective aid to the overall learning process for engineering technology students, but how to find the development and distribution of such programs. As its name implies, a multimedia program for engineering or technology is a conglomerate of different media; text, video, computer-generated animation, sound, equations, and simulations. Consequently, a host of different skills is required to produce a quality multimedia program; video expertise is required for quality video, programming expertise is required for interactivity and navigation, graphic-art expertise is required to produce a quality interface, professional voice talent is required for quality narration, expertise in three-dimensional modeling is required to produce computer-generated animations, and an editor is required to ensure the quality of the text. Perhaps the most daunting requirement is that of a content expert; a multimedia product for engineering or technology needs to be developed by an engineer.[4]

In the traditional model for publishing in engineering or technology education, a professor will develop a manuscript on a particular topic over a period of years (even decades). When it is finished, he or she will approach (or be approached by) a publishing company. When publishing multimedia products however, this model is not feasible. Even in an ideal situation, where an engineer or professor (the content expert) also embodies some of the other required skills (such as video expertise), he or she is unlikely to have all the required skills. Further, the development process is far too laborious for one person to complete in his or her spare time. Lastly, because computer technology evolves so rapidly, multimedia developers do not have the luxury of developing products over long periods of time, or the products maybe out-dated before they are even released. In reality, a two to five person team is required to provide all the skills needed for development, and the development process requires their full-time attention. This translates into a comparatively high cost for development before the product is even released (whereas with the traditional model, the professors time to develop the manuscript is donated). In addition, the resources of a publishing company may be required for editing, marketing, sales, and distribution. As a result, the development and distribution of multimedia products for engineering education can be a costly endeavor.

To further fuel this fire, the technology education market size is an extremely small one compared to most personal computer software programs. Further, these products are not yet capable of replacing the textbook hence they must be sold at a price that is reasonable for the budget of a student that has already invested up to $80 in a textbook. This raises the question if such a venture would be financially feasible. Is it possible for a development team and a publishing company to recover the cost of development, editing, marketing, sales, and distribution for a multimedia product that is sold in the engineering technology market? Again, the experience of multimedia in engineering courses provides a barometer to gauge the feasibility of multimedia in engineering technology. Financial support for the development of MED and MES was provided by a publishing company. In order for the publishing company to recover their costs, the budget for development had to be constrained. Because MED and MES are still young, it is not yet known whether or not they will be a financial success. Drawing a comparison the possibilities for a reasonable return in the engineering technology market, which is significantly smaller than the engineering market, become very questionable.

WHAT CAN BE DONE?

One possibility for increasing the financial return on products sold in the engineering technology market would be to re-package materials that were developed for the engineering market, modifying their content so that it is appropriate for the engineering technology market. The practice of repackaging or re-purposing has long been used in many industries, including the music, auto, and aerospace industries. In the auto and aerospace industries, the same components are used in many different models. In the music industry artists and producers will record and market several versions of a popular song. Similarly with multimedia in engineering, the visual components, which are the most costly and time consuming to produce yet are vitally important could be re-purposed for the engineering technology market. The text and other supporting materials could be modified to be less equation-intensive. This could greatly reduce the cost of development, thus increasing the return to a level that justifies the effort. Perhaps the best way to test the feasibility of re-purposing for the engineering technology market would be to develop a prototype from a product that currently exists for the engineering market, then evaluate its effectiveness in the technology education world.

CONCLUSION

Traditional methods of instruction are often faced with difficulty in breaking certain conceptual roadblocks where a high level of visualization is required. It has already been shown, through programs like the one developed by the Queensborough Community College of The City University of New York, utilizing varied facets of multimedia to increase student comprehension of difficult material, that this approach does work[6]. However, we are indeed still faced with the development cost dilemma; “Who is Going to Pay?”. In the case of Queensborough Community College it was the National Science Foundation. However, this money will only be available for developing and proving concepts.

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