

DEVELOPMENT OF A RECRUITMENT CD-ROM

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Student recruitment is an essential activity critical to the long-term success and viability of any degree program. The continuous effort that is necessary to attract the best and brightest individuals to study engineering technology must be a high priority to all universities and faculty. It is important that the latest technological tools be used in this recruiting effort. The Department of Manufacturing Technology, Purdue School of Engineering and Technology at IUPUI, has undertaken a project to make use of modern marketing technology by developing an interactive CD-ROM aimed specifically at recruitment. The development of this recruiting tool is being partially funded by a grant from the Society of Manufacturing Engineers Education Foundation.

The objective of this project is to develop an interactive CD-ROM. This tool will allow the viewer to: learn about engineering technology careers; learn about IUPUI's campus; investigate degree programs and curricula; tour the department's laboratories; meet the department faculty and students; and have frequently asked questions answered. The obvious benefit to the development of this CD-ROM will be the ability to place a comprehensive recruiting tool into the high school, industrial plant, or home setting.

This paper discusses the development of the CD-ROM. The various hardware components used in this process are identified along with the numerous software packages necessary to construct and integrate the digital images with sound, text, and animation. Also discussed are the project's secondary benefits of assisting faculty in maintaining technical currency.

SCHOOL BACKGROUND

The Purdue University School of Engineering and Technology is located on the combined campus of Indiana University and Purdue University at Indianapolis (IUPUI). The school offers undergraduate degree programs in: Mechanical Engineering Technology, Electrical Engineering Technology, Biomedical Electronics Technology, Electronics Manufacturing Technology, Computer Integrated Manufacturing Technology, Technical Graphics, Computer Technology, Civil Engineering Technology, Architectural Technology, Construction Technology, and Organization Leadership and Supervision. The school also offers undergraduate and graduate degree programs in Mechanical, Electrical, and Biomedical Engineering. The school has an enrollment of more than 2000 full and part-time students. The IUPUI campus has an enrollment of 27,000 students in 18 schools and is the third largest university in Indiana.

PROJECT BACKGROUND

The Department of Manufacturing Technology offers three undergraduate degree programs: Associate and Bachelor's degrees in Mechanical Engineering Technology (MET) and Computer Integrated Manufacturing Technology (CIMT); and an Associate degree in Technical Graphics (TG). The Technical Graphics program was introduced in the fall 1997, replacing the Mechanical Drafting-Design Technology program. Coursework in multimedia will be a part of the TG curriculum.

The department received partial funding from the Society of Manufacturing Engineers (SME) Education Foundation for the development of a CD-ROM based recruitment tool. The funding provided by SME through its Student Development program was used for the acquisition of multimedia software and to offset the CD's production costs. The CD-ROM will be distributed to high schools and other interested parties at no cost.

To develop the CD-ROM, a project team of three faculty and five students was formed. The three faculty represent each of the three degree programs offered by department. All five student team members are pursuing an Engineering Technology degree from the department, three in MET and two in CIMT. Three of the students were paid from departmental funds for their involvement in the project as undergraduate research associates. The other two students were enrolled in their capstone, senior design course and received credit toward their degree.

INTRODUCTION

Most of today's prospective college students are fascinated with computers. For this reason, the development of a marketing tool that makes use of a computer's unique features just makes sense. Appealing to the expectations of an eighteen year old that has been bombarded with state-of-the-art graphics on television presents a lofty challenge. However, with improvements in the graphical display performance of PCs during the past several years, along with the development of multimedia authoring tools, it is now possible to develop and deliver a fairly sophisticated CD-ROM based interactive graphical marketing tool. By using computer animations, sounds,

morphing and other special effects, the CD-ROM delivers insight that will never be possible with the passive marketing tool of a standard paper brochure.

The overall goal of the project was to convey the type of environment and subject materials that a student is exposed to in the classroom, laboratory, and the overall campus at IUPUI. In addition, material describing the three degree programs that the department is responsible for also presented. The largest challenge facing the team of faculty and students who were involved in this project was in learning the tools-of-the-trade.

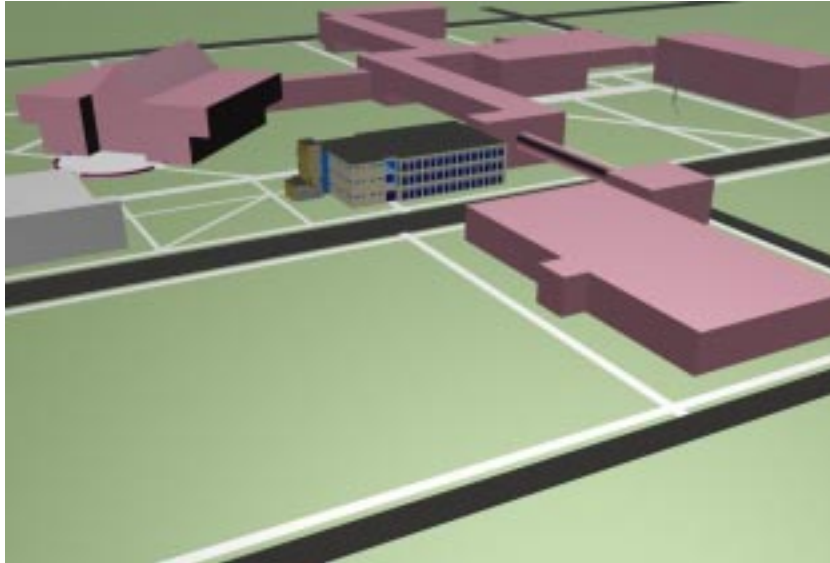


Figure 1. Snapshot view of the computer model of the campus that is viewed during a virtual “flyby” on the CD-ROM

Although computers have been used extensively within the department for the past ten years or so, most of the software products that were used to compose the end product were not part of any course previously taught within the department. However, an old degree program (Mechanical Design and Drafting Technology) was in the process of being upgraded to the Technical Graphics program. Part of this new program has a multimedia component that will benefit from the work undertaken in this project. Many of the software and hardware tools that were used in this project will be used in the courses in the Technical Graphics program.

The project began with the development of a “flowchart” of the overall project. This provided an overall map of the project. It also provided a mechanism for brainstorming during project meetings. Besides just presenting digital pictures of buildings, classrooms, and laboratories, the project team felt the computer animations would be a valuable tool. These animations would involve displaying images that cannot physically be done in real-life. It was felt that this type of animation correctly conveys the material covered in courses dealing with CAD, CAM and computer modeling.

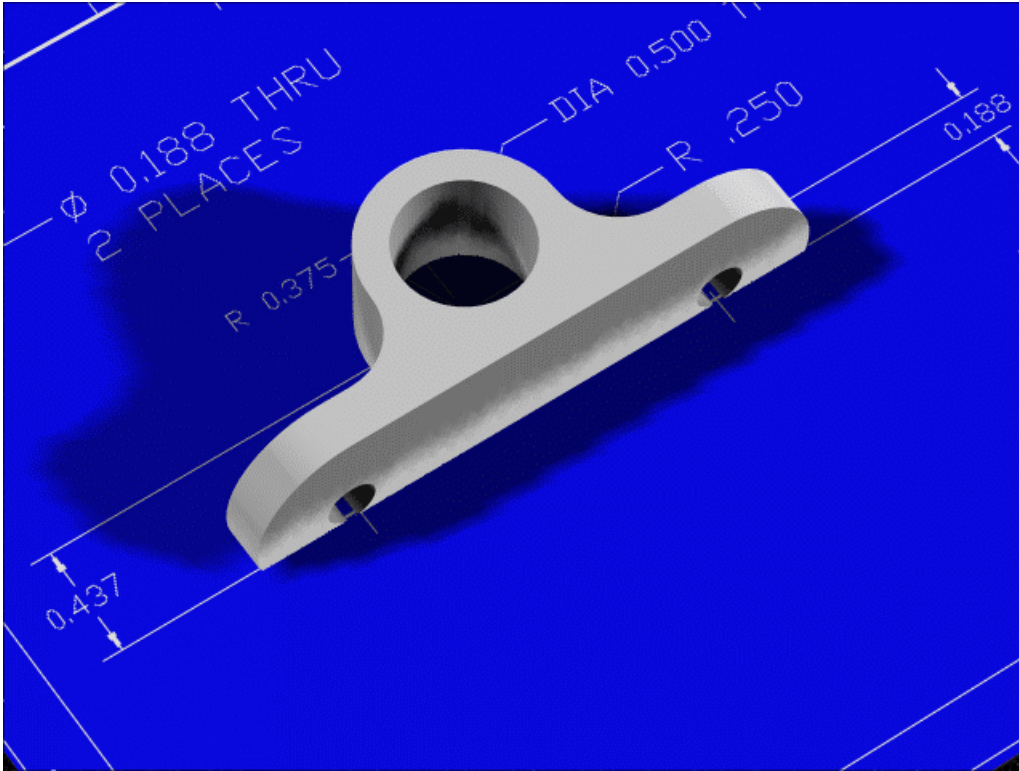


Figure 2. Sample image from an animation sequence in which three-dimensional model emerges from a blueprint.

SOFTWARE UTILIZED

In order to produce the CD-ROM, numerous software packages were used. Many of these, like AutoCAD[®], ProENGINEER[®], and other CAD related packages are used regularly by students and faculty during various classes. However, in order to produce the CD-ROM, numerous multimedia software tools were used. The resulting output from the numerous programs used was some type of multimedia file: either a bit-mapped graphic image (such as .bmp, .gif, or .tif file), an audio track (such as a .wav file), or a video track (such as an .avi file). The program that was used to “piece together” all of these individual multimedia files was MacroMedia[®] Director[®] 6.01. This program allowed the project to be broken down in a manner similar to a large computer program. A Director[®] “movie file” was developed that controlled the top-level interactive flow of the user by allowing them to choose between different options. This top level Director[®] “movie” handled this by branching to other Director[®] movies in a manner similar to how a main program calls subroutines in higher level programming languages.

The majority of the effort involved the production of the individual graphic, audio and video files. Most computer animations were done with the aid of the following CAD and animation software packages: AutoCAD[®], ProENGINEER[®], Trispectives[®], and 3D Studio Max[™]. Both AutoCAD[®] and ProENGINEER[®] were used to build CAD models that were imported into Trispectives[®] and 3D Studio Max[™]. These latter two programs were then used to produce the

video files (.avi files) or in some cases a collection of .bmp files that were converted into an .avi file.

Special effects, such as morphing and moving titles were produced with the programs: Morph[®], by Gryphon Software Corporation[®] and Flying Fonts Pro[®], by CrystalGraphics[®]. Manipulation of bit-mapped graphic files was done with Photoshop[®] by Adobe Systems[®] Inc. Compositing and 2D animation was accomplished using Adobe[®] After Effects[®]. Capturing of analog video was done with software that was packaged with the MiroVIDEO board. Similarly, the capturing of digital video was accomplished with software supplied with the digital video firewire board. Manipulation of sound files was done with the Sound Forge[®] program from Sonic Foundry[®].

During several occasions it became necessary to edit and splice various .avi files. This type of editing was done using Adobe[®] Premiere[®]. The integration of sound with various graphical images proved to be another challenge. A background soundtrack was used in most portions of the CD-ROM tour. The Director[®] program allows a second soundtrack to be played simultaneously along with this background soundtrack. This feature was taken advantage of to play a narrative description of the various labs, classrooms, and other parts of campus. The Sound Forge[®] program, by Sonic Foundry[®], was used to do the appropriate fade-ins and outs of the various tracks as well as control the volume of the background soundtrack so that the narrators voice would not be lost.

HARDWARE UTILIZED

A majority of the various hardware components used to complete the project are housed in the Department of Manufacturing Technology's Advanced Development / Rapid Prototyping lab. In addition to supplemental work completed on individual faculty office and home computers, four machines were configured to aid in the completion of this project. A Pentium[®] Pro/200 w/64 Mb of memory and dual hard drives (4.2 Gb/3.1Gb), a Pentium[®] Pro/200 w/128 Mb of memory and 3.8Gb hard drive, a Pentium[®] 266 w/128 Mb of memory and 4.2Gb SCSI hard drive w/internal JAZ drive and CD-RW, and a dual 300 MHz Pentium[®] II w/128 Mb of memory and 9.0Gb SCSI hard drive and internal ZIP drive. Portable storage was accomplished with an external ZIP drive and CD-R. Capture of both analog and digital images was attained with a HP 4C flatbed scanner, a Kodak DC120 digital still camera, a Snappy video still frame capture device, and a Canon XL1 digital video camcorder. A MiroVIDEO DC30 board was used to capture audio and video data from analog VCR tape decks and camcorders. An intranet connected the machines housed in the development lab and the CD's web links were tested via connection to the internet.

CONCLUSIONS

Several significant benefits of this CD-ROM development project have been realized. First, a start-of-the-art, recruiting tool has been developed to aid in the recruitment of students to the Department of Manufacturing Technology. Since distribution of the CD-ROM will occur during the latter half of 1998, no quantitative evaluation of its affect is presently available. However, the focus groups who have reviewed the CD-ROM have responded with very positive evaluations. Since it is anticipated that department recruiting efforts will center around this tool,

plans are in place for a continuing effort to kept the CD-ROM current and incorporate new multimedia technology as it becomes available.

The five students involved in this project have benefited substantially. They have been able to gain valuable experience with elements of the latest multimedia technology, knowledge they could not have gained elsewhere in the current curriculum. Because of his involvement in the project, one student has expressed interest in pursuing graduate education in Technical Graphics. Two students are completing capstone course projects through their participation in this project and all the project team members benefited from the close student, faculty interaction. Another benefit has been in the area of faculty currency. Much like the students, the faculty involved in this project has gained valuable knowledge and experience with current multimedia software and methods.

The last benefit to the department has been the development of multimedia technology, both software and hardware, for future classes. The Technical Graphics curriculum is currently a two-year program only, however, the department hopes to extend the degree program to the bachelor's level in the near future. Multimedia coursework will represent an important component of the curriculum.

BIOGRAPHIES

DOUGLAS ACHESON is an Assistant Professor of Technical Graphics at IUPUI developing the new Technical Graphics program. He earned an A.A.S. in Industrial Illustration Technology from Purdue in 1980, a B.S. in Technical Graphics in 1993, and a M.S. in Educational Computing in 1995. He teaches advanced CAD and parametric modeling as well as other graphics courses within the School of Engineering and Technology. In addition to his course work, Douglas is actively involved in developing courses for distribution on the WWW and serves on the Faculty Web Enablers Group and the Dean's *Engineering and Technology On-Line* (ETON) committee.

KENNETH RENNELS, P.E. is an Associate Professor of Computer Integrated Manufacturing Technology, Purdue School of Engineering and Technology at IUPUI. He earned an M.S. degree in Business Administration in 1979 from Indiana University and an B.S. degree in Industrial Engineering in 1975 from Purdue University. He is a registered Professional Engineer in Indiana. Prof. Rennels worked in the aerospace industry for eleven years in a variety of manufacturing and management capacities before joining the Purdue University faculty. Mr. Rennels is a senior member of ASEE, SME, and SAE.

JACK ZECHER, P.E. is a Professor of Mechanical Engineering Technology at IUPUI and has been with the University since 1983. Professor Zecher teaches courses in the mechanical design field as well as CAD related subjects. He has authored the book Computer Graphics for CAD/CAM Systems, published by Marcel Dekker Publishers as well as several workbooks that are used in courses he teaches. He has developed commercial software products in the CAD and finite element areas and has developed educationally related software tools that are used in Statics and Strength of Materials courses. He holds a Master of Science degree in Mechanical Engineering Technology from Western Michigan University and is a registered Professional Engineer in the state of Indiana. His current activities include being the coordinator of a rapid prototyping lab (for which he obtained partial funding from NSF), as well as acting as project director of a multimedia development project, and continuing to enhance the teaching materials in his courses.