

University and Industry Partnerships: Creating Multimedia Solutions to Solve Unique Industry Problems

James L. Mohler

Purdue University
jlmohler@tech.purdue.edu

The goal of communication is for a message to be conveyed, comprehended, and either applied or acted upon. The ramifications of this sequence include not only the communication process (information – sender – channel – receiver), but also retention and application of information in various situations, which signifies that a transfer of knowledge has successfully occurred. Information presentation without cognitive incorporation, comprehension, or application is meaningless.

Planned interactions are known to have a very positive effect on learning and retention. Learning theorists proclaim that to reach an objective it must be practiced to help the learner cognitively incorporate it. The interaction, or “doing the objective,” helps the learner reach the objective and recall the information, skill, or behavior that was practiced. Similarly, retention increases when receivers of information are able to interact with the information, particularly when the information is presented visually. Interactive multimedia requires internal user processing and focuses on the needs of the user, thereby requiring the user to actively think about the information being presented, make predetermined decisions, and presumably acquire the information or skills being presented.

Information becomes powerful, becomes knowledge, when it gains personal interpretation, comprehension, meaning, retention, and use. The purpose of interactive multimedia is to personally transfer a meaning or message from one individual to another. Traditional information distribution has

been insufficient in this area – transferring the real message behind the abstract letters and data through interaction. It is through interaction that information is internalized and becomes knowledge that is alive and useful within the individual. This makes interactive multimedia a powerful medium for education and training. It is also a very adaptive tool in marketing situations, where persuasive flair helps change an attitude or belief.

Educators and presenters alike have known for a long time that information is much more readily comprehended and assimilated when it is tailored to the audience. In traditional media, a linear progression from simple to complex normally used to accomplish this purpose. However, traditional communication media cannot be everything to everyone. Writers and educators alike must cognitively organize and structure information according to their own constructs, leading the reader from what they deem “simple” to what they deem “complex.” Therefore, books or other devices may be too difficult or too basic for certain individuals.

Interactive multimedia, on the other hand, provides an avenue for creation of materials that may reduce the author’s need to assume certain characteristics of the audience. Multiple levels of depth can be provided to satisfy various skill levels of students. If the student has no background knowledge, the lowest level of entry may be used as the starting point. If some requisite knowledge already exists, the student may begin at an intermediate or advanced level as appropriate. Interactive multimedia improves the

possibility of matching the needs of the user with the available content, allowing the communication tool to be several things to several people.

Using this paradigm, over the past two years the Department of Technical Graphics at Purdue University has been developing interactive materials for several national and international companies with relative success. Products have ranged from educational and training products to marketing CD-ROMs. Many companies are requesting the department’s assistance in developing multimedia- and hypermedia-based solutions that emphasize interaction.

Basic Fluid Power

Bethlehem Steel Corporation’s 80-inch hot steel rolling mill training facility wanted to integrate interactive media into its fluid power training materials for employees, to improve training efficiency, effectiveness, and impact. As more and more employees quickly approached retirement, materials were needed to pass the existing employee knowledge base from one generation to the next, as well as to document newly upgraded equipment in the Burns Harbor plant. Interactive multimedia materials on CD-ROM were identified as the means to ensure the transfer of this knowledge.

CD-ROM development extended from April 1995 to December 1996. The immediate need was centered on educational materials that describe the functioning and maintenance of newly installed fluid power controls and equipment. The first CD-ROM focused on basic fluid power theory, to present the underlying conceptual information.

Content developed by the School of Technology's Mechanical Engineering Technology department was combined with the multimedia skills of the Technical Graphics Department to create the final CD-ROM.

The interactive multimedia training project provides Bethlehem Steel employees with multimedia-based informational materials that include text, sound, animation, and video to efficiently and effectively train employees in applied fluid power. Through the CD-ROM's graphical user interface, users can easily access the information and graphics, animation, and video that document and describe the system. Because interactivity is key to maintaining interest, motivation, and understanding, several of the components include interactive exercises.

SOP Interactive

As a direct result of earlier work, the Department of Technical Graphics was contracted to create interactive multimedia training materials for another plant within the Bethlehem Steel Corporation Burns Harbor facility. This project focused on the plant's Standard Operating Procedures (SOPs) and Job Work Instructions (JWIs). The existing training system was composed of text-based, step-by-step instructions that described specific processes for mill operation and functioning, as well as the order in which tasks were to be performed. Using the existing system's content, the new training materials included both text-based instruction and graphical representations of the text. Using static and dynamic graphics, the new training system provides instruction that is accessible to both readers and non-readers.

The project began with a prototype of the system, which included three SOP's. Text from the existing database system was extracted and story-boarded, and technologies for visual representation were selected: three-dimensional animations, digital video clips, virtual reality video clips, and static images.

Black Cultural Center Virtual Visit

In addition to training and educational materials for external corporations, the department has also created several interactive programs for various departments and organizations within Purdue University.

As a resource for African-American students on the Purdue campus, the Black Cultural Center (BCC) was originally designed to provide students with functional and meaningful linkages with the academic components of Purdue's comprehensive educational programs. The original BCC building was a residential dwelling built in 1905. Over time, the center outgrew that building's confines, and plans for a new building were created by an external architectural firm. To help secure funds for construction, BCC representatives needed a way to show potential donors the new building. The department of Technical Graphics was asked to produce an interactive program that could be used to market the new building before it was built.

Using three-dimensional animations, digital video, and interactive multimedia technology, the department created a presentation that included a unique graphical user interface to present both the cultural aspects of the project and the majestic architectural structure

that would soon house the center. The program successfully links digital video clips of the center's current activities with digitally rendered scenes of the new building, to provide a glimpse of what the new building would look like and how it would function. The program also includes dynamic media elements that show nine of the various rooms, including a reception area, art gallery, ornate balcony, and auditorium. Current feedback indicates that the product has been the biggest single factor in the amount and number of contributions.

Conclusions

Through various industry-university partnerships, many students in the Technical Graphics Department have received real-world experience in developing interactive multimedia materials and media assets. Undertaking externally and internally funded projects provides innumerable advantages to students. It solidifies the education they receive through application, regardless of the institution they are attending. Faculty involvement in such projects increases faculty experience and real-world concepts that are conveyed in the classroom and has a direct effect on the quality of education and students.