Barbara Hewit

Henry Sabaj

Computer Science 101

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Computer Gaming Curriculum

Sales of video games in the United States currently top $10 billion a year. It is a rapidly growing product sector and is expected to grow more than 60 percent by 2012. The field is new, and job growth statistics are not readily available. It is clear that highly trained and creative individuals will be needed to develop new products. Many community and four-year colleges are adding gaming curricula to their course offerings.[[1]](#footnote-1) *Boston City College*, with a reputation for being on the cutting edge of new technology training, is also considering this addition.

The initial focus of the *Boston City College* program is expected to be computer role-playing games (RPGs), which are often developed for use beyond the entertainment sector as training products in business, medicine, engineering, highway safety, and the sciences. To understand the importance of computers in training applications, it is helpful to look at the history.

In the 1950s computers were mostly seen as hulking number crunchers, but a few scientists saw their potential for visual displays of digital information. In the 1960s the use of transistors to replace vacuum tubes made computers friendlier and eventually led to the development of personal computers, computer graphics, and virtual reality. The first use of real time simulation of data was a military application—a radar system that processed large amounts of data and immediately displayed it in a form that humans could understand. Aircraft designers used the technology to model air flow data, which resulted in improved designs. The first computer-aided design program, Sketchpad, was developed in the 1960s and paved the way for designers to use computers to create blueprints and designs. It was a precursor of powerful programs such as AutoCad®.

One of the most important uses of graphic simulation has been in the field of flight training and military simulations. After World War II the US military poured millions of dollars into more realistic and more efficient training methods. Video displays added to model cockpits that pitched and rolled improved the ability of pilots to respond to situations in flight while protecting lives and preserving equipment. By the 1980s, improvements in hardware, software, and graphics allowed pilots and other military personnel to navigate through highly detailed virtual worlds.

One key element still missing from the high-tech simulations, however, was interactivity. In the early 1980s computers were able to achieve a high level of scientific visualization of data, but making changes to the data to create a new visual was still costly and time consuming. It was impossible to instantly change the simulation by simply entering new data. So while all the technical elements necessary for virtual reality were available, it was not until extremely high powered computers were developed in the mid 1980s that virtual reality became truly useful. These computers were able to not only manipulate numerical data quickly, but they were also able to quickly render images and display them on newly developed high resolution work stations.

Various types of computer simulations are now used in many of the sciences, including cosmology (the study of the structure of the universe), fluid dynamics, electrical engineering, biochemistry, genetics, and ecology.[[2]](#footnote-2)

The use of computer modeling and simulation in medicine also developed from the needs of the military. During the Gulf War in the 1990s, many of the medical personnel called to duty did not have experience treating the kinds of wounds that resulted from battle. Military planners believed that the same sort of simulations and virtual reality used to train pilots could be used to train medical personnel. The starting point was the development of complete three-dimensional simulation models of human bodies and a classification of all their tissues and organs. The resulting data is available for public use and has been incorporated into numerous training programs and anatomical studies. Some of the medical skills that have been successfully trained and improved using simulators include spatial skills, eye-hand coordination, knowledge of anatomy, and complication management. Some of the advantages of this type of training include unbiased feedback/assessment and the ability to repeat procedures as needed without risking patient lives.

In business, the uses for computer modeling and simulation are almost endless. Sales forecasting, brand management, pricing, supply and demand forecasting, and quality control are just a few of the areas where studies using simulations and game playing can effect improved decision making in a real world situation. In addition, role playing training games can be used to enhance leadership, time management, and personnel management skills.

With the growth of computer simulations/virtual reality/gaming in both the entertainment and training arenas, it is clear that college-level course work can provide needed skills in the marketplace and attract and retain students (Parberry 5). BCC’s position as a leading provider of technology-oriented education to a major business hub positions us to be a leader in this growing, dynamic field.

Works Cited

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Crosbie, Roy E., John J. Zenor, and Dale Word. "Fast Real-Time DSP Simulations for On-Line Testing of Hardware and Software." *Modeling & Simulation* 3 (2004): 5-8.

Parberry, Ian. *Learn Computer Game Programming with DirectX 7.0*. Plano, TX: Wordware Publishing, 2000.

1. Some schools, such as Shawnee State University in Ohio, are offering gaming-focused degrees in the Arts and Engineering schools. The BFA program focuses on design, art, and production, while the engineering program focuses on technical design and graphics programming. [↑](#footnote-ref-1)
2. Crosbie, Zenor, and Word state that there are increasing needs in industry for high-speed real-time simulations (HRST), primarily in the automotive and power electronic systems industries. [↑](#footnote-ref-2)