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1994 INFORMATION SYSTEMS EDUCATORS CONFERENCE

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Corporate Multimedia and the MIS Course

ABSTRACT: Pacing, branching, and interaction are three unique characteristics that multimedia brings to education. As costs decrease and the advantages of multimedia are documented, corporations are rapidly adopting this new instructional method. Major benefits to the individual and organization include instructional flexibility, increased retention, decreased instructional costs, improved performance monitoring, and record keeping. These benefits provide support for using multimedia as a method to enhance the typical college of business junior level management information systems (MIS) course.

KEYWORDS: *Multimedia, Business, MIS, Education, Training, CBT*

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PURPOSE

The purposes of this paper are (1) to identify unique characteristics multimedia brings to the educational process; (2) to explore and provide examples of the use of multimedia technology in corporate education programs; (3) to investigate benefits that corporations have identified in using multimedia; and (4) to investigate the potential value of using multimedia technology as part of the junior level management information systems (MIS) course.

MULTIMEDIA DEFINED

Multimedia is primarily associated with the characteristics of sound, music, graphics, animation, and full-motion video. These are the same sights, sounds, color, and motion that we have all become accustomed to through our one-way interaction with television. The unique qualities that set multimedia apart from television and many other methods of communication are its pacing, branching and interaction capabilities (MacNelly, 1993).

Pacing

Multimedia training allows students to begin at the appropriate learning level and progress at their own rate. The pace of the program can be controlled entirely by the individual or, if required by the organization or external regulations, can be computer controlled. The program can advance rather slowly or more rapidly depending upon the student's interest and capabilities. A student can begin or end a program at any time or location, and can repeat sections at will or as dictated by the system. One can spend as little as a few minutes focused on a specific task or as long as needed.
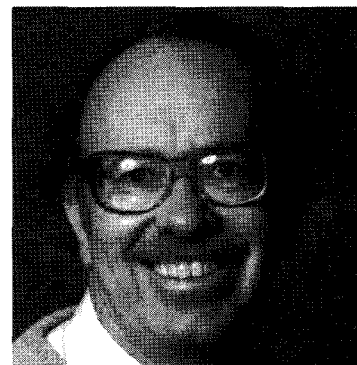
Branching

A student can determine the order of progression or path through the training program. In addition, one can design the system to branch or change direction automatically based upon the student's choice(s). Students can skip sections, return later, or follow a path that is particularly relevant to them at the moment. Likewise, the instructor can design educational modules that are especially appropriate for each person or for a specific job description.

Branching greatly increases educational options when compared with traditional linear learning methods like books, videos, and lectures.

Interaction

Perhaps the greatest potential use of computer-assisted multimedia methods is student interaction with a pro-

gram. The student and the program can actually influence each other in determining outcomes, as well as the next decision point. This interaction can be such that the individual becomes more involved, intellectually and emotionally, in the educational process.

Interaction physically takes place between the program and student with keyboards, mouse, joy sticks, touch screens, voice, sound, and wireless pointers. More complex sensory experiences, the future of multimedia, are imminent with 3-D programs and virtual reality systems.

Multimedia is becoming so common within the computing industry that new microcomputer systems come complete with sound, CD-ROM drives, and almost enough memory to make them really work. Many types of general purpose software incorporate multimedia characteristics without particularly emphasizing the multimedia concept. The most commonly used types include presentation (Compel), word processing (WordPerfect), database (Oracle), expert system (KnowledgePro), and graphics (Color Wheel). Software developers are adding capabilities to integrate sound, animation, and video to their current products as they market new versions.

CORPORATE MULTIMEDIA

A recent survey of 304 information systems executives shows that multimedia is currently being used extensively for training and presentations (Multimedia, now and then, 1993). Predictions for 1995 are that these uses will double. Other significant applications will include multimedia databases and reference materials, desktop video publishing, image-based implementations, voice annotation and desktop video conferencing. Corporations willingly share their successful multimedia experiences. For example:

GPU Nuclear Corporation has a four-hour interactive training course

including simulations (Stafford, 1994). Fred Myer, Inc. expects to have more than 300 multimedia training modules in its 128 stores by the end of 1993 (Greene, 1994).

Chevron U.S.A. has used lectures, slide shows, videos, and hands-on training, along with safety manuals, to train employees on the Federal Department of Transportation safety standards for transportation of hazardous materials. After some initial resistance, which often accompanies change, groups are now requesting new multimedia training tools (Newson, 1992).

Holiday Inn Worldwide, Pacific Bell Company and accounting firms Ernst & Young and Deloitte & Touche use multimedia training (Francis, 1993). DuPont is purchasing 600 multimedia work stations (Splavec, 1992). Companies as diverse as Alyeska, which manages the 800-mile trans-Alaska pipeline, The New England, a chartered mutual life insurance company, and IDS Financial Services now integrate multimedia into their training programs (Tynan, 1993).

Estimates are that by 1996 U.S. corporations will spend $302 million training employees, an increase of approximately 800% since 1990 (Tynan, 1993). Much of this increase in training dollars is for multimedia software, hardware and program development.

MULTIMEDIA BENEFITS

Corporations agree that training can "...raise productivity, build loyalty, and boost profits" (Henkoff, 1993, p. 62). Traditional corporate instructional methods include on-the-job training, national instruction centers, self-paced in-house video training, workshops, conferences, and manuals. As large organizations further define their instructional strategies they will continue to use a combination of these methods, but they are also introducing multimedia to take advantage of its benefits, both for the individual and for the organization (Oz & White, 1993).

New Employees Don't Have to Wait for Training

In many organizations a few people are responsible for presenting training to a large number of employees in a variety of situations. These situations include orientation and basic skills for new employees, continuing technical skills training for specialized employees, and non-technical and/or remedial skills or regulatory training. Multimedia methods allow timely training for all employees. For Federal Express, "The greatest benefit [to multimedia training] is time compression..." (Tynan, 1993, p. 43).

Take the Training to the Employee

With the use of networks, notebook computers, and multimedia CD-ROM players, training can be integrated directly into the employee's work, home, or commuting environment (Caton, 1992; Sony, 1993). "Multimedia allows us to do remedial training at point-of-need for people in all locations" (Bjorling, 1992, p. 6).

Each Employee Gets Personalized Training

Using multimedia authoring software a manager can design training around specific employee requirements. Thus, employees can automatically study material that meets their specific needs. For example, over 10,000 Allstate insurance agents and 15,000 support staff need to understand the legal language of insurance policies and explain it to customers. As needed, agents can study auto, homeowners, or business insurance (ICON Associates, 1992).

Each Organization Gets Personalized Training

The organization can maintain and monitor its instructional standards program. From both a legal and safety perspective, corporate managers are concerned about employees receiving the same training and about the corporation's documentation of train-

ing programs. Computer-managed instruction provides for these needs. "Xerox can guarantee a consistent level of education to its far-flung service personnel..." (Tynan, 1993, p. 42).

Learning is Self-Paced

Since computer-based training (CBT) is self-paced and flexible, students can skip material they have already mastered and concentrate on material they have not yet learned. Additionally, students can play back materials for review. Students "...develop skills faster and have higher retention rates when they control the training vehicle as they can with CBT" (Janson, 1992, p. 92).

Increased Retention

Research, comparing traditional classroom methods with multimedia training, shows the latter to be more effective in helping employees retain information because of the increased relevance of the training. Bethlehem Steel has several multimedia training courses available and has found that employee retention improved 20 to 40% (Interactive video, 1991) when multimedia training is used.

A Department of Defense study on multimedia training found that on average retention improved 38% (Ultimedia, 1992).

Materials Can Be Easily Revised

Revision of multimedia programs is easy to accomplish. Once resource materials are obtained, they can quickly be added, deleted, modified, or re-arranged to fit corporate, government, or individual needs. This was an important reason for Hughes Aerospace and Defense to adopt multimedia technology (Tynan, 1993).

Record Keeping is Facilitated

Since computer-managed instruction can develop and score tests and monitor each student's performance, the computer takes on some of the more routine record keeping duties.

Therefore the instructor has more time to develop course material and provide individualized instruction. BellSouth meets OSHA safety requirements by tracking "...the participation and performance of each employee" (IMC, 1993, p. 7).

Decreased Training Costs

Multimedia training startup costs are high. The initial costs include the acquisition of hardware, authoring software; digital resources such as photos, video, and sound; training of current staff and/or hiring of newly skilled people; adaptation of current training goals and methods; and development of new programs. Maintaining manuals, videos, and other traditional training materials can also be costly. However, the use of multimedia may reduce some of these costs.

Once initial training expenditures have been made and values identified, it is the consensus among industry users of multimedia training that interactive multimedia is cost effective. Dow Jones is beginning to realize benefits from their investment, after investing in multimedia training nearly five years ago (Smith, 1993). Steelcase, Inc. "...has reduced cost from $200 per employee per year to only $20 for training its 4,000 employees..." (Oz & White, 1993, p. 36).

Atmos Energy Corporation, a gas utility with headquarters in Dallas, chose computer-based instruction to train employees in time-management and computer applications. The firm eliminated the need to send trainers to its more than 80 locations in Texas, Oklahoma, and Kentucky.

Industry is recognizing the cost-effective benefits and accepting multimedia and computer-based instruction. Educational research investigating the use of traditional teaching and multimedia methods in the learning process also supports the use of new technology (Kotlas, 1992; McNeil & Nelson, 1991; Oblinger, 1992). Perhaps the MIS course can also benefit.

THE MIS COURSE

There is much discussion about appropriate content for a college of business junior level management information systems (MIS) course, and many variables account for differences at various colleges and universities. Whether one follows the AACSB recommendations, traditional MIS textbooks or another agenda, multimedia can be part of the instructional method. For purposes of this paper, a combination of the AACSB (1993) suggestions and popular MIS textbooks (Hicks, 1993; Laudon, 1994) will provide the example.

Part One:
Organizational Foundations of Information Management

- The Organization and Information Management
- Challenges of Information Management
- Examples of Information Systems
- Strategic Information Systems
- Systems Fundamentals

Part Two:
Information Management Issues

- Change
- Ethics
- Security
- Productivity
- Globalization
- Trends
- Social Impact

Part Three:
Technical Foundations of Information Management

- Decision Making and Information Needs
- Decision Support and Executive Information Systems
- Expert Systems and Artificial Intelligence
- Office Automation
- Database
- Telecommunications
- Functional Area Information Systems

Part Four:

Toward Implementation

- Information Strategy Planning
- Systems Development
- Application Development by End-Users
- Controlling Information Systems
- Managing International Information Systems

MIS AND MULTIMEDIA

To illustrate how one might use interactive multimedia instruction in the junior level MIS course, a few examples from Part One, above, will be developed.

Part One:

Organizational Foundations of Information Management

The Organization and Information Management. Typical topics include those factors that make an organization what it is: its mission, goals, objectives, critical success factors; its people, departments and processes; and the structures, both traditional and innovative, that tie them together. Emphasis is given to the role of data and information. Often chapter mini-cases and major case studies are provided as illustration for class discussion or projects. How can interactive multimedia be used to enhance teaching these traditional topics?

The publisher could provide interactive case studies on CD-ROMs as part of the textbook package, just as they now provide video tapes and floppy diskettes. Through simulations, students could become members of an organization and help write the company's mission, goals and objectives. They could thus compare the results of their decisions with actual corporate decisions. Students could hire and fire employees, rearrange corporate structure and change organizational processes.

Challenges of Information Management. One can emphasize the importance of matching organizational and information systems goals, the effect technology has on organizations (and their competition), the influence of globalization, and cost/benefit issues.

Students can use a variety of interactive learning methods to think about information systems goals. They can role-play as an information systems manager, functional department head, or end-user, as they examine examples of new technology and then consider their place in the organization. Since there are few right or wrong decisions to make, alternative solutions can be given to students, along with their respective pros and cons.

Current lecture notes can slowly be adapted to a multimedia instructional format. Globalization issues and their impact on the organization can be illustrated more richly using multimedia tools; a variety of technical alternatives can be supplied that might be applied to issues.

Examples of Information Systems. Descriptions of the organization can include audio and video clips: interviews of executives, line-workers, and MIS staff; corporate facilities, production lines, and computer centers. Students can "click on" the structure chart to get additional information about different functional areas. The human resource department provides detailed biographies that students can use later in the course as part of a problem-solving exercise. Students can see company reports, working conditions, and culture and later begin to manage the organization by changing the mission and goals; begin to centralize or decentralize; deal with ethical and security issues; consider system design issues and alternative solutions; anticipate the effects of globalization; consider cost/benefits. Processes and problems can be viewed from the perspectives of the user and the technical staff. Video cases currently available could be used as a beginning point for the development of multimedia cases.

Strategic Information Systems. Include classic examples of successful strategic information systems, such as American Hospital Supply and American Airlines, emphasizing the factors that made them leaders in their industry. Perhaps what is more important, students can run corporate simulations, manipulating such strategic variables as unique product features, switching costs, internal efficiency, alliance, growth, and innovation, and compare their results with other students', the instructor's ideal, or reality. If desired, introduce personalities and the problems of change to confound the experience.

Systems Fundamentals. Students have seen examples of organizations and computer systems. Now they can review the fundamental features of a system, its components, boundary, environment, feedback and so forth. Overlay these theoretical features and integrate them with practical features from the above examples. Students (or the computer program) can manipulate the system to gain further understanding about the impact of input, processes, and alternative output on a real or hypothetical organization or system.

DELIVERING MULTIMEDIA COURSEWORK

Consider three different systems when planning to use multimedia as an educational tool: development, classroom delivery, and student use.

Development

If one purchases canned multimedia programs, or software that comes with a text, development is not an issue. This is by far the least expensive method but it also has the least flexibility for the instructor and student.

If one is going to produce one's own multimedia programs the development computer system needs to be more powerful than the delivery or student system and will cost $2,800 to

$5,000. Currently, as a minimum, a DOS/WINDOWS development system should realistically include:

- 486DX 66MHz
- 16 Meg RAM
- 400-500 Meg hard drive
- Dual speed CD-ROM drive
- 16 bit sound card and speakers
- 15" SVGA non-interlaced monitor
- 24 bit true color video board with 2 Meg RAM

Items that provide additional flexibility include:

- Video capture board
- 1200 x 1200 dpi flatbed color scanner
- SVHS video camera (High8)
- A CD-ROM mastering system

Authoring Software. Multimedia development software is of two types, computer-based training (CBT) authoring software (and now presentation software), and authoring software with computer managed instruction capabilities. There are significant differences between these types in terms of capability and price.

Multimedia authoring/presentation software is quite sophisticated with text, image, sound, animation, and video capabilities. The learning curve and program development time are reasonably short for the average computer user because of the use of objects (images), flow charts, or descriptive text as the "programming" language. This software allows the instructor and student to do all the traditional multimedia functions except computer-managed instruction. Software costs range from $39.95 to $495. Authoring software examples include:

- Authority (Interactive Image Technologies Ltd.)
- Bravo (Alpha Software Corporation)
- Compel (Asymetrix Corporation)
- HSC Interactive (HSC Software)
- Super Show & Tell (AskMe Multimedia Center)
- SuperShow IV (PC West Software)

Multimedia authoring software that includes computer-managed instruction capability may cost $5,000 or more and will include: more flexible and complete data collection techniques; a variety of testing, reporting, and analysis functions; and individual student tracking. Examples of authoring software with computer-management capabilities are:

- Authorware (Macromedia)
- QUEST (Allen Communication)
- TenCORE (Computer Teaching Corporation)
- TIE (Global Information Systems Technology)
- ToolBook (Asymetrix)

Classroom Delivery

Two main concerns are the computer system and the display system.

The computer system may be permanent or portable. One may equip a classroom with a fixed computer system but the authors have found this to be the less desirable method. The computer may be configured wrong, and even when it is correct another instructor will change it. The hard drive will be full and/or the software will not run off the network. Appropriate cables will be too short, there will be no monitor, the keyboard will fall from the podium or one will be forced to stand where the screen can not be seen. If a program is developed at one speed, say 66 MHz, and presented at another speed (33 MHz), unpleasant surprises may occur.

With a notebook/subnotebook computer, development work can be done at the office or home and lectures delivered with the same system. Pre-check cabling connections and the other problems will not be a factor. A dual-scan color notebook with additional sound and CD-ROM capabilities can be purchased for under $3,000, or a complete notebook multimedia system is about $5,000 to $6,000.

Unfortunately, good display systems are still expensive, ranging from $5,000 to $9,000. Less expensive dis-

play panels do not handle motion well. The systems can be permanent or portable. For example, projectors hanging from the classroom ceiling, display panels placed on an overhead projector, or self-contained portable units. Classrooms already equipped with one or more TV sets may use a PC (VGA) to TV (NTSC) signal convertor. Prices range from under $100 to $600+. Something in the middle price range should be adequate.

Student Use

The student system, like the classroom system, does not have to be as expensive as the development system as long as it is reasonably powerful and has sound, video card, and dual speed CD-ROM drive. For $400 to $500 one can upgrade a current computer. They may be placed in the computer lab, the library, MIS lab, kiosks or other appropriate places. A college or university could use the network, a distance learning center (Reveaux, 1993), an equipment checkout or rental system. Some colleges require students to purchase their own computer as part of the registration fee.

CHALLENGES

The purposes of this paper were to examine unique characteristics multimedia brings to the educational experience; to explore ways industry is using multimedia for training purposes; to review benefits industry has discovered through experience; and finally, to consider multimedia technology as a method for presenting the junior level MIS course.

Multimedia, as an instructional tool, is finding its way into higher education. Solomon (1994, p. 81) "... explores the factors that have inhibited widespread use of multimedia...[in]...higher education as well as the factors that are necessary to allow multimedia to thrive." Sammons (1994) specifically studied the deterrents university faculty have in adopting multimedia teaching methods and

recommends strategies for overcoming these problems.

The next step, for information systems educators, is to consider new educational models (Charp, 1994; Holden, 1994); expand their research on the potential benefits of using multimedia in the MIS curriculum; and speculate on the future of the electronic text (Hood, 1994). Trauth, Farwell, and Lee (1993, p. 293) found "...there is an 'expectation gap' between industry needs and academic preparation." This paper illustrates yet another example of the problem as management information systems programs continue to fall behind industry in the use of a new educational method, multimedia.

Then, there is virtual reality.

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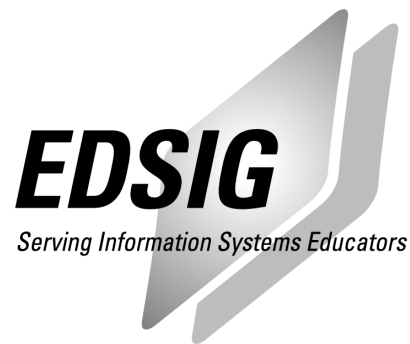
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