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An Experimental Research on Accessing and Using Information from Written versus Multimedia Systems

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Abstract

Multimedia technologies are being increasingly used in classrooms. It is expected that 50% of personnel training will be with the use of this medium in the coming millennium. This paper contributes by proposing an experimental research that intends to bring the debate of multimedia in education and training to the forefront. This study will be tested in a laboratory setting during Spring 1999 quarter and the results will be presented at the Americas Conference on Information Systems (AMCIS).

Introduction

There has been, and there continue to be an increased use of multimedia training. Some corporate experts predict that 50% of personnel training will be delivered by computer-based instructional systems by the year 2000, up from the current 20% (Allerton, 1996). Newren and Lasher (1993) document that education students, of whom business education majors are a subset, get a variety of audio-visual and multimedia equipment training, but computer skills are only a small percentage of their pre-service training. Although the use of multimedia in education continues to grow, and its related technologies and software improve, research to support the effectiveness of multimedia as a positive influence in the learning process is still very wanting (Wetzel, Radtke, & Stem, 1994).

On the other hand, the proliferation of information-based technologies has created a workforce in need of training in order to keep up with the fast pace of innovation. For example, Akeyo and Pollard (1992) surveyed corporations, asking personnel directors what telecommunication skills were needed for clerical help, and found that an increasing number of telecommunications competencies are required for support staff.

This paper will examine student problem solving, satisfaction, and thought processes as affected by the use of multimedia versus text-only material.

The research questions are:

- Does multimedia instruction provide a better platform for students' achievement over the long existing traditional text-based instruction?

- Is user satisfaction enhanced by the use of multimedia instruction?

Definition of MultiMedia

Multimedia involves transmission that combines several media of communication such as text, graphics, video and sound. Some authors have used the term interactive media to include multimedia which encompasses all of the six digital media types namely text, graphics, animation, audio, images, and video (Fetterman, 1997).

Simply defined, multimedia is the delivery of information in a computer-based presentation that integrates two or more media, including text, graphics, motion video, still video, voice recognition, animation, and sound (Beckman, 1991). It is, however, not necessary to include all of these for the system to be a multimedia system.

Research Model

The research model shown in the figure 1 illustrates the effects of accessing and using information from instruction displayed with multimedia and text-only material. This model has been adopted from Ramarapu et al., 1997 model on the emergence of hypertext and problem solving. Figure 1 shows the research model. This study will test three hypotheses:

- Faster and more accurate student problem solving results from instruction displayed with multimedia material as compared to text-only material;
- Greater student satisfaction results from instruction displayed with multimedia material as compared to text-only material;
- Student thinking is challenged more from instruction displayed with multimedia material as compared to text-only material.

Instructional Material

We have created a case study entitled, "AUCNET USA" that has been already published in a referred journal (Sankar and Mohan, 1996). AUCNET USA sold used cars to dealers throughout the United States using a real-time on-line satellite system. Its main competitors were national auto auction houses and independent auctions.

AUCNET's proprietary technology allowed it to provide its customers services comparable to those offered by traditional auto auction houses but with greater convenience. The convenience arose as customers previewed cars and bid on cars from their own dealerships instead of traveling to auction sites. The sellers benefited as they did not need to transport their vehicles to an auction site. The on-line auction also offered more choice to the dealers as they could view autos offered for sale throughout the country or a region.

Currently, we are in the process of creating extensions to the case study that include:

- videos that show the operations of the company,
- web site that shows the information technology options available - selling through the web and selling through low earth orbiting satellites,
- creation of competency material that explains the concepts of business plan, telecommunications industry, telecommunications fundamentals, and the technologies that are used to sell used-cars through the web and the satellites.

Research Methodology

The research methodology is to divide a telecommunications management class into two groups: one that will be exposed to the written case study that will be conducted in class; the other will be provided the multimedia based case study that will be conducted in the computer lab in order to minimize the interaction of the two groups. Students will be randomly assigned to both groups. Their ability to produce the expected results, problem solving performance and user satisfaction will be measured with validated instruments.

This study will use multivariate analysis of variance (MANOVA) to analyze the data. This will be based on a two-factor design. Within MANOVA, three planned contrasts will be used to test the hypotheses about particular combinations of the means. The first contrast will compare the difference between all instruction displayed with multimedia material and instruction displayed with text-only material to test H1. The second contrast will compare the difference between student satisfaction that results from instruction displayed with multimedia material and instruction displayed with text-only material to test H2. The third contrast will compare how student thinking is challenged from instruction

displayed with multimedia as compared to instruction displayed with text-only material to test H3.

Implications of Research

This study will provide empirical data that will show whether the introduction of multimedia in educating students about telecommunications management provides improved user satisfaction or problem solving performance. It will also answer questions about the importance (Moore, 1994) or unimportance (Clark, 1983) of multimedia instruction.

This result will be helpful to Chief Information Officers as they decide on the amount of resources to be expended on multimedia in the future. As is well known, transmission of multimedia is bandwidth-intensive and can be a resource hog. The results will identify the multimedia elements that provide the most value. If the CIO have to choose among multimedia elements in order to conserve on bandwidth, these results would be beneficial. For example, if photographs prove to be equally effective as videos for a given problem, the reduction in bandwidth by using photographs is tremendous. It is important that research into the effectiveness of using multimedia be conducted so that the CIOs can properly allocate their human and financial resources.

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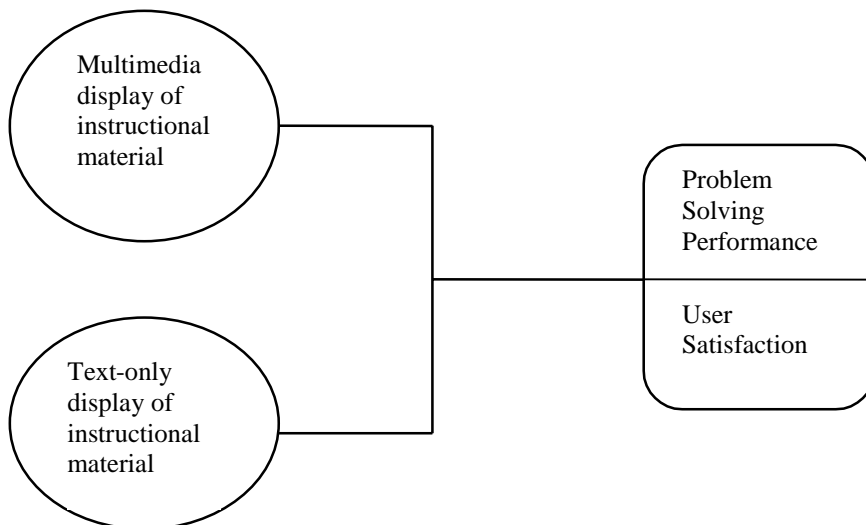
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Figure 1: Research model



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