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Multimedia & Learning: Where's the Connection?

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ABSTRACT'

Multimedia has been touted as a panacea. a tool that will revolutionize both the way educators teach and the way students learn. What is often ignored in the rush towards multimedia is a concern for the outcomes from multimedia uses --- the learning. The present article explores why multimedia and learning arc often not correlated.

INTRODUCTION

Multimedia or computer-based education and training (CBET), broadly defined, is "... the coordinated combination of video, sound, text, animation, and graphics" (Bruder, 1991). It presents instructional and entertainment content through the use of more than one delivery medium. What is often an afterthought in intent of such instructional design is the outcome of the delivery mediums -- is the target audience learning more from the new medium than traditional methods of instruction? Thc learning that the audience experiences is the single most effective way of assessing the worth of multimedia. Such worth can further manifest itself through increased retention rates (due to reduction in boredom or the feeling of worth of the curriculum) and serve as a recruitment tool for university systems. Unfortunately, today multimedia is often assessed from the standpoint of technical outcomes -- can the system display video fast enough is the sound audible, is the software intriguing enough.

The promise of multimedia, which less than 5 years ago was heralded as the vehicle which would transform education, is most often chided now for its lack of effectiveness. "Computers in the schools have soaked up huge capital expenditures without providing any appreciable return on investment" (Reinhardt, p. 51). While 99 percent of schools of higher education now have computer labs, only one third of schools have more than one computer for every 10 students. Yet, American institutions of higher education have spent an estimated S70 billion on computer-related goods and services over the last 15 years, S20 billion of which has been earmarked for teaching and learning technology. Part of the lag is understandable, since institutions of higher education. Bootstrapped by sagging budgets. have been forced to play catch-up when dealing with computer-related technologies.

The History and Use of Use Multimedia

Twenty-five years ago. a decade before the microcomputer appeared, university-based computer experts and educational psychologists began envisioning the computer as a teacher. Software was created that presented facts asked questions. Checked answers diagnosed problems and suggested additional study. The vision was to make the computer as effective as a human teacher. Thus, efficient technology would replace labor-intensive practices and change the shape of education. Research on artificial intelligence sought to create a learning computer. one capable of assessing the needs as well as the learning of students.

The first attempts to use computers in schools date back to 1959, and early experiments with learning via satellite began in 1973 (Fisher. 1992). These early experiments involved few students and teachers and were limited by the technology available. It wasn't until the 1980's that a dramatic infusion of technology in schools began. Today, colleges and universities arc spending billions on computer-related technology. A report from IBM Academic Consulting shows institutional spending at more than S6 billion for 1994 (Reinhardt, 1995). However, if you were to walk into a college classroom, it is likely that you would find a person at the front of the room talking to the class about material in a textbook, writing on a chalkboard, or possibly using an overhead projector. According to Michael Kirst, an expert on education change. "if your great-grandmother came back to visit a classroom today, she would recognize almost everything. In the last hundred years. the only classroom innovation that has taken root is the movable desk" (Luchrmann. 1990). Then as now, the teacher typically spends 95 to 98 percent of class tune talking, while individual student's average about 0.5 responses per period. Present classroom technologies are still dominated by books, pencils, and chalk.

Multimedia and Learning

Townsend & Townsend (1992) cite six benefits of multimedia in the teaching/learning situation. These include: (1) multimedia reaches the senses, which enhances learning as it can he tailored to the learning style of individuals; (2) multimedia encourages and validates individual self-expression by allowing students to decide how they assimilate information, (3) multimedia gives a sense of ownership as individual students actually create what they learn; (4) multimedia creates an active, not passive, atmosphere for learning, which forces students into participation and interaction with presented material. (5) Multimedia acts as a catalyst for communication between students and between students and instructors; and (6) the use of multimedia is already within the day-to- day environment of most individuals from automatic bank tellers, to video games and television and most individuals can relate to the technology. Bruder (1991) also suggests that an important benefit of multimedia is that it is fun to participate in as either a receiver or presenter of information. Reinhardt (1995) also identifies ways in which multimedia can enhance teaching and learning. He specifies that: (1) multimedia can boost curiosity, creativity, and teamwork amongst participants. (2) Multimedia can change the role of teacher from the traditional role of omniscient ruler to that of a tour guide. *(3)* Using multimedia can reinstill the apprenticeship model of learning. (4) Multimedia can increase access to information. (5) Multimedia can provide a richer environment to penetrate "media overload", and (6) multimedia can break down the wall of the classroom.

However, little is currently actually known about the effect of multimedia on students' learning of subject content. Sonic research suggests that computerized multimedia presentations should enhance student learning and comprehension because numerous studies show that children who have been exposed to television all of their lives develop styles of cognitive processing of information that is attuned to the dynamic. Fast-paced and multi-imaged format that is typical of entertainment programming (McLuhan, 1964; Pearson. Folske, Paulson & Burgraf. 1994). However, education literature suggests the use of computerized multimedia presentations have diffcrcnt effects on different students. This is due to variations in individual methods of processing information and subsequent learning the Gestalt orientation to education specifies that the individual's perception of informational ambiguity is the catalyst for

learning. Learning occurs as an individual seeks to reduce the ambiguity inherent in any new situation. However, according to Gestalt doctrine, excessive ambiguity will impair learning (-Pittenger & Gooding. 1971). This requires the instructor to present intellectual challenges while maintaining optimal levels of ambiguity and minimal frustration. This frustration can be easily felt in multimedia presentations if the rate or style of delivery strays too wildly from student expectations.

Mizzel & Lever (1990) suggested that to achieve this level of ambiguity with minimal frustration levels requires the consideration of individual differences in "learning style". KoIb (1985) also stated that students learn quicker, more effectively and comfortably when learning experiences are matched to their learning needs. An individual's learning style is a preferred method of processing information (Mizzel & Lever, 1990). O'Keefe (1982) defined it as "cognitive, affective, and physiological traits" (p.44) that indicate how an individual will perceive, interact and respond to a learning environment. Differences in learning styles have been posited to be based upon variations in cognitive structure and a result of bow one thinks solves problems and perceives input stimuli (Sperry, 1972). Likewise, Cross (1975) posits that individual's see and make sense of the world in different ways. Problems are solved in different ways, attentions to environmental aspects van', patterns of interpersonal relations are different and information processing is unique. These differences transcend to differences in the preferred way of encountering and assimilating new information. Mizzcll & Lever further stated "In spite of our best efforts to force students to learn in ways that we design and provide, they seem to insist on learning in their own way"

Learning Styles

Researchers have developed various definitions and measures of learning style. Some concentrate on a single major dimension such as Witkin's use of the embedded figures test to classify learners as field dependent (global) of field independent (analytical). Others seek to extend the concept and develop a total profile of learning. this multidimensional approach is exhibited in the 21 dimensions identified by Rita and Kenneth Dunn in their Learning Style Inventory (Slater, 1989), Kolb's four dominant learning styles -- Convergers. Divergers, Assimilators, and accomodators (Kolb, 1985), and Lee and Pulvino (1981) in the descriptions of visual, auditory, and kinesthetic learners, measured by the "How Do You I Learn" inventory. Others adopt a more "fun-filled" approach to learning styles theory to aid teachers in an easy to understand and remember manner. One example of this approach is the use of "true Colors", developed from the Myers-Briggs approach by Don Lowry (1985). However, as the learning styles analysis is approached, the goals are the same: to identify ways in which different students learn.

Once learning styles have been identified, different instructional methods and tools can be developed to help different types of learners succeed. For example, as identified by Lee & Pulvino (1981) visual learners have a predisposition for learning through the visual modes of reading, watching, and observing. They learn best when they can see how things are done or how topics are related. Visual aids such as movies, pictures, graphs, diagram's. etc., help visual learners. Auditory learners prefer to learn by listening to lectures and discussions. They learn best when they participate in discussions or respond to questions. Seminar and discussion styles of content presentation fit auditory learners best. The third type of learner, the kinesthetic, have a preference for learning by doing. They prefer to use trial and error in learning. They typically have strong feelings as to whether something is right or wrong, good or bad, but often have difficult explaining exactly why they feel that way. Kinesthetic learners do well in situations where they' can use their bands to create and develop what they learn.

Research Propositions

Multimedia technology provides a tool to help match content presentation to individual learning sties. Research has shown that understanding different learning styles gives instructors a greater likelihood of maximizing learning and that students learn more quickly, effectively, and comfortably' when learning experiences are geared to their learning needs (KoIb, 1985). Computerized multimedia presentations of material tend to be fast moving and have high information learning experiences (Pearson, et al 1994). Different methods of presentation auditory, visual and interactive can be integrated into a single content session. But while theory bas presented different learning styles and ideal methods of' delivery, research has not confirmed that matching multimedia presentation to learning style actually enhances or increases the acquisition of knowledge.

One study which explored the extent to which student learning was facilitated by the use of computerized multimedia presentation found that learning style and multimedia presentation was not related and that students perception of learning was enhanced when exposed to multimedia presentation of material (Pearson. 1994). This study however, did not measure learning in the recall, comprehension and application of material but rather the student's perception of whether learning had occurred. Specifically students were asked "I learn better when multimedia is used that when it is not used" and "Generally' speaking. I remember the media segments better that I remember the lecture material."

Thus, while multimedia does provide a tool and medium to accommodate different learning styles, the question remains as to whether or not this accommodation influences the retention, recall and application of subject content. Additional research is needed to address this fundamental question. Also, stimulation of interest in a topic which leads to further exploration of the subject may be generated through multimedia presentations. Research which explores this aspect of learning in relation to multimedia presentation would also be beneficial.

Specifically, the following research propositions are suggested:

Proposition 1	Multimedia presentation of material allows greater flexibility in accommodating multiple learning styles
Proposition 2	Multimedia presentation of material increases the retention and recall of subject content
Proposition 3	Multimedia presentations of material increases the ability to apply the subject content.
Proposition 4	Multimedia presentation of material stimulates an increased interest in future exploration of subject content

'The incorporation of multimedia technology provides the components required to create effective instruction in a format that may be suited for today's learners. It has the inherent potential for generating exciting. Inquiry-based learning episodes. Future research is needed to expand on the specific way in which multimedia influences the learning experience.

References

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