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MULTIMEDIA AND STUDENT EXPECTATIONS

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ABSTRACT

Keywords: Multimedia, student learning

This paper focuses on student expectations regarding the use of multimedia in the classroom. It explores the role of previous exposure to multimedia as a form of educational technology in shaping student perceptions of an ideal learning environment and influencing expectations of multimedia usage in subsequent classes. Data was taken from surveys given to 714 college students at a small southeastern university. Findings indicated that those students that had used multimedia techniques themselves included multimedia in their ideals of the optimal classroom even though they thought that they would not be as likely to be exposed to it in the future.

INTRODUCTION

A mere ten years ago, articles on Multimedia were scarce. Scarce enough that every article on multimedia needed to provide a definition of what multimedia was before any theory was presented. Ten years later, the pervasiveness of multimedia in education is suggested by the burgeoning of multimedia-related product sales. Companies that once sold overhead projectors and light bulbs now distribute color display panels, single gun projectors and multimedia aids. The products that these vendors provide education and business clientele changes as rapidly as the technology itself. Multimedia *is,* in effect, mirroring developments in Personal Computers. What was state-of-the-art yesterday is obsolete today, and the 'yesterday to today' time-line is measured in months instead of years or decades.

What isn't apparent is whether the application of multimedia hardware and software is impacting pedagogical approaches in how information is presented. What was once standard practice - the use of chalkboard as a staple of lectures - should be undergoing a transformation as revolutionary as the technology behind the development of multimedia itself As Scott Kuehn (1994) noted, "computer-assisted instruction programs have become popular both at the elementary, secondary and college levels" (1994, pA7l). The exposure to computers and multimedia components therefore, should also be affecting the audience it is designed for. What was once novelty to some students - the experience of being exposed to multimedia - may someday soon be commonplace. As students become exposed to the use of multimedia in the classroom, their expectations and their idea of an optimal learning environment should also change. These student expectations are the focus of this paper. Namely, we seek to assess the degree to which college students have been exposed to multimedia, the extent to which they themselves have used multimedia in the past, their conceptions of an ideal learning environment and whether they expect to experience multimedia in future classroom experiences.

Purpose

This paper focuses on student expectations regarding the use of multimedia in the classroom. It explores the role of previous exposure to multimedia as a form of educational technology in shaping student perceptions of an ideal learning environment and influencing expectations of multimedia usage in subsequent classes. Gioia and Bass (1985-1986) have observed that college students have grown up in an intensive environment of television, movies and video games, and have developed learning styles where comprehension occurs largely through visual images. This fact may shape what students perceive

and affect both their interest levels and their retention of information. In this vein, a similarity can be drawn to the phenomenon that has occurred in news coverage, whereby 'snippets' or 'sound-bites' are the forms of information most sought due to time constraints and limited attention spans. Similarly, students raised in an environment where senses are flooded with visual inputs may have different expectations regarding what they consider to be an optimal information presentation method, and whether they consider multimedia as a presentation tool to be a nicety or a convention of necessity.

Multimedia and Existing Research Findings

The term 'Multimedia' can be defined as the "coordinated combination of video, sound, text, an imation, and graphics" (Bruder, 1991). The coordination of these audio-visual technologies occurs when instructional content is applied to the medium of multimedia. Multimedia, therefore, is more than simply technology. It is the application of technology to information presentation.

The field of educational technology has, for the last 10 years, conducted assessments of trends in usage and capital expenditure outlays in the field of multimedia. During the late 1980's a dramatic infusion of technology in schools began. Today, colleges and universities combined are spending billions on computer-related technology (Reinhardt, 1995). While many indications suggest that the educational application of this methodology is still in its developmental stage, student exposure to multimedia is increasing (Kuehn, 1994).

Current research on the uses of multimedia has focused on outcome assessments -- are students learning and does multimedia facilitate the learning process? Research on multimedia has also focused on instructor resistance, student outcomes (Bailey & Cotler, 1994), and student learning styles (Dunn, Beaufry and Kiavas, (1989). Journals such as the Journal of Computer Assisted Learning, the Journal of Computer-Based Instruction, and the Journal of Educational Computing Research, according to Scott

Kuehn, "have attempted to fill the needs of those doing research on student and instructor reactions to computer-assisted instruction, as well as those evaluating the effectiveness of computerized instruction" (1994, p. 171).

What is of interest to us is the 'audience' of multimedia. The effective presentation of material requires an analysis of the audience. Each audience has its own mix of personalities, backgrounds, desires, and culture of expectations which affect their perception of both the material presented and the style of presentation. Unfortunately, the expectations that students have concerning multimedia have not been addressed. Research has shied away from this forum for several reasons. First, outcome assessments of student learning are desired to justify expenditures and provide rationale for continued funding for multimedia. Second, outcome measures of multimedia are needed to provide evidence of rigor in teaching methodologies to accreditation agencies. Third, as instructors and professors, we have become accustomed to telling our students what they need to know, with little regard to their needs or expectations. This rationale drives much of the current research on multimedia.

It has long been accepted in quality literature that meeting the expectations of the customer is an important component of providing quality service (Earnst & Young, 1991; Vroman and Luchsinger, 1994; Zeithaml, Parasuraman, and Berry, 1990). In *fact,* in 1989 the American Quality Foundation and Ernst and Young performed an intensive study of quality practices on three continents (Ernst & Young, 1991). The study identified ten practices that distinguish the firm committed to quality leadership. Two of these ten core practices relate to the identification and meeting of customer expectations.

Educational institutions can be regarded as providing service to the student. One aspect of this service is in the form of instructional content in a classroom environment. In applying quality concepts, meeting the student's expectations of the classroom environment would increase perceptions of quality

of their educational experience. Meeting student expectations would also partly satisfy Zahorik's (1997) call to meet students halfway. Zahorik stated that we err on the side of students when we purely give them what they expect - both in terms of content and methodology in teaching. He also stated that we err on the side of scholars when we specify learning objectives and methodologies used without regard to student expectations. Perhaps combining both aspects would constitute an arena where the learning process is mutually satisfying.

Usage of Multimedia in the Classroom Environment

While educational institutions have dramatically increased spending on technology, the profusion of these applications in the classroom is still in its infancy. 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" (Luehrmann, 1990). This perception is substantiated by research which indicates slow adoption of technology in the classroom. DeLoughry (1994) reported that a study of 765 colleges revealed only 10 percent of faculty were using technology in the classroom. Luna and McKenzie (1997) cite 64% of students reporting little or no prior exposure to multimedia in the classroom, and DeLoughry (1994) found that in a study of 765 colleges, only 10% of faculty were using technology in the classroom. What is of more concern perhaps is the effect this lack of exposure is having on students. Beerman (1996) found that in a survey given to 220,757 college students, 33% were bored in class and 54% were often late to class because they viewed the class as boring. The resistence that faculty have in using multimedia as a pedogogical tool is "partially due to lack of information on strategies about how to facilitate the process" (Bailey and Cotter, p. 184). In other words, faculty at institutions of higher education may have found few of their colleagues that were using the technology and that they themselves were not willing to be the first to endure the steep learning curve

associated with adapting to new technology. Resistence may also be due in part to reward structures which do no offer recognition of the efforts required to put together a multimedia lecture. For many instructors using multimedia, the only reward they get is the satisfaction that they know how to use the technology and that students appear to be more interested. The 'research' agenda at many institutions of higher learning rarely includes flexibility in faculty evaluations to include whether they spent additional time preparing and administering multimedia presentations at the expense of research publications.

Student Perceptions of Multimedia in the Classroom Environment

Current research has indicated many benefits of including multimedia m classroom presentation. These benefits include aspects of learning, increased retention rates, and increased interest in the course. Research by Reinhardt *(1995)* specified 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 re-instill 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. Multimedia may then have more of an impact in terms of its after-effects than is currently understood. These after-effects can include altered perceptions of their sense of reality and the ability to think in conventions beyond the realm of their previous learning experiences. In addition, Dennis (1997) referred to an "enactivist" model of cognition and learning, whereby students create their own sense of reality. In this vein " learning is thus occasioned rather than caused" (1997, p.3). Wise and Groom specified that "while grades are easy to collect and the data is easily manipulated, grades alone don't reflect the indents of the classroom, particularly the longer term changes in behavior of the students and faculty and the associations that may be formed which create a mental structure for

learning and relating future knowledge to the student's current base knowledge" (199?, p. 62). In essence, as Marchese (1997) stated, "we're better at talking about learning as a goal than about the phenomenon itself" (p1).

The benefits of multimedia have been echoed by students exposed to the technology. From a students' perspective, the increased interest in the course would have the most immediate impact on their expectations. Bruder (1991) suggests that an important benefit of multimedia is that it is fun to participate in as either a receiver or presenter of information. This 'fun' aspect may contribute to increased interest and not be captured by traditional attempts to assess learning enhancement through the use of multimedia. Moore and Miller (1996) reported that students in introductory biology classes found multimedia attractive. Butler and Mautz (1996) found that students in a multimedia presentation consistently had more favorable impressions of the presentation than did students in a traditional lecture presentation. Beerman (1996) found evidence that college students exposed to multimedia in the classroom have an increased interest in the class. Likewise, Luna and McKenzie (1997) obtained attitudinal surveys of students exposed to multimedia teaching methods. Seventy-three percent of the students found multimedia to be a positive addition to the course, 64% preferred it to the traditional lecture method and 49% wanted to see more courses using multimedia. Similarly, *56%* of the students reported "enjoying it" and 52% believed the multimedia elements improved the lecture. Miller and Moore (1996) studied the effect of multimedia and found that multimedia raised attendance rates from 35% to over 90%, and that drop-out rates improved from 15.9% to 4.6%.

If previous research is representative of student opinion, then the inclusion of multimedia components should be perceived by students to be a positive addition to the classroom learning environment. Additionally, this perception would influence the students expectation of their learning environment. Zeithami, Parasuraman, and Berry (1990) found that the key factors by which customer expectations are generated include word of mouth communication,

personal needs, experience, and external communication that influence expectations directly. Thus, the previous exposure of the students to multimedia in a classroom should influence their expectation of including multimedia in their learning environment.

Hypotheses:

Based on the above review of literature and the suppositions that multimedia enhance the classroom experience, the following two hypotheses are suggested:

Hypothesis One: Previous exposure to multimedia educational technologies will lead to heightened expectations for these technologies to be used in subsequent classroom experiences.

Hypothesis Two: Previous exposure to multimedia educational technologies will increase students desire to include this technology in an ideal learning environment.

METHODOLOGY

A survey was given to 714 students at a small, private, southeastern university. The sample size was the largest known sample to date of a single-size pool of subjects, and was far larger than the recent sample taken by Rand, Galbreath, and Snodgrass in their assessments of multimedia in the classroom of accounting students (1997). The sample was composed of 39% male and 61% female students. Of the sample, 64% were freshmen, 8% sophomores, 11% juniors, 5% seniors and 5% graduates[1]. Seventy-two per cent of the sample

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[1] The total of these classes for the demographic categories was rounded, hence the discrepancy when summing the categories and finding that the total does not equal 100%.

were Caucasian, 14% African American, 2% Hispanic, 5% Asian, and 2% were classified as other. The age make-up of the sample included 5% 17 or younger, 2% between the ages of 18 and 20, 68% between the ages of 21 and 23, 4% between the ages of 24 and 29, and 10% age 30 or older.

The survey instrument consisted of 52 content and 6 demographic questions. The content questions addressed the following subject areas: anticipation of learning environment format; the extent to which students were exposed to computers in a learning environment during the last academic year; student perceptions of the ideal classroom; and the extent to which students used various types of software within the past year. Each question was answered with a 5 point likert scale; (5) Extensively (almost daily), (4) Periodically (once/week), (3) Occasionally (6-7 times per quarter), (2) Rarely (1-2 times per quarter) and (1) None at all.

RESULTS

The analysis was divided into three parts. The first part considered the components of the students' anticipated learning environment, the second part analyzed the students' perceptions of their ideal learning environment, and the third part identified relationships between the students previous exposure to (and usage of) computer technology with their anticipations for future exposure to multimedia environments. This third section also included an assessment of of the relationships between student's previous exposure to multimedia and preconceptions of an ideal classroom environment.

Part 1 - Anticipated Learning Environments

The anticipated learning environment of the students was measured by student responses to the such statements as: "I anticipate professors will use the following techniques to present course information". Each statement was followed by a list of pedagogical techniques which were scored on a likert scale; (5) Extensively (almost daily), (4) Periodically (once/week), (3) Occasionally (6-7 times per quarter), (2) Rarely (1-2 times per quarter) and (1) None at all.

Responses of 3, 4, or 5 were included in the analysis of the students anticipated environments as indicative of a positive response.

Fifty-one percent of the students anticipated that computers would be used in presenting class material.[2] Students were also surveyed regarding their expectations of the usage of other types of computer technology in a classroom setting. The use of computer projects in the classroom was expected by 47% of the students. Similarly, the use of computer-based activities in the classroom was expected by 45% of the students. The use of computer simulations was anticipated by 39% of the students. This lower percentage relative to the other expected uses of computers may be due to the fact that a large percentage of the sample came from freshman students who typically are not exposed to computer simulations. E-mail, Internet, and usage of the world wide web in the classroom environment was expected by 49%, 52% and 48% of the students respectively.

Part II- Ideal Learning Environments

The ideal learning environment of the students was measured by student responses to the such statements as: "In my ideal classroom, instructors would use the following:". A list of pedagogical techniques followed each statement which was scored on a likert scale; *(5)* Extensively (almost daily), (4) Periodically (once/week), (3) Occasionally (6-7 times per quarter), (2) Rarely (1-2 times per

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[2] We used components of computer usage as surrogates in the survey for components of multimedia. This was done to preclude confusion on the part of respondents as to the definition of multimedia.

quarter) and (1) None at all. Responses of 3, 4, or 5 were included in the analysis of the students ideal learning environment as indicative of a positive response. The presentation of material through the use of computers was included in the profile of 62% of students ideal classroom environments. Other aspects of computer technology in their ideal learning environment included computer activities, cited by 59% of the respondents; computer projects, cited by 50%; and computer simulations, cited by 50%. Use of e-mail, the Internet and the world wide web were a part of the ideal learning environment of 55%, 60% and 57% of the students respectively.

Previous Exposure to Computer Technology

Previous exposure to the use of computer technology in the classroom was measured by the students responses to questions regarding the extent that their instructors used computers during their last academic year. The usage of computers to present course material was reported by *53%* of the students. Other aspects of computer technology used in the classroom included simulations reported by 14% of the students and the use of e-mail which was reported by 11% of the student sample.

It could also be inferred that previous exposure to computer could come from the students personal usage of these tools. This was measured by asking students to indicate "To what extent did you use the following software during the past year". Responses were measured on a five point Likert scale; (5) Extensively (almost daily), (4) Periodically (once/week), (3) Occasionally (6 - 7 times per quarter), (2) Rarely (1 - 2 times per quarter) and (1) -None at all. Responses of 3, 4,or 5 were included in the analysis as a positive indicator of usage.

Twenty three percent of the students reported having used some form of presentation software such as PowerPoint or Toolbook and *25%* reported using graphics software. Other forms of computer technology surveyed included the use of wordprocessing software, 86%; spreadsheets, 86%; e-mail, 35%; internet, 43%; and the world wide web, 38%. It was also interesting to note that while only 62% of the students reported using computer-based games, 16% of the students use these daily and 23% use them on a weekly basis.

Part III - Relationship between Student Exposure, Student Expectations and Ideal Learning Environment

The third component of the analysis focused on the relationship between the students' exposure to computer technology in the classroom (both through the usage by previous instructors or through their own usage) and their expectations. This third part of the data analysis also correlated students' exposure and perceptions of their ideal learning environments. One-tailed correlational analysis indicated a weak but significant relationship between exposure from use by previous instructors and anticipation for material to be presented using computer technology ($r=.082$, $p=.05$). The student sample was divided into two groups based on their exposure to technology in the classroom through a previous instructors use of the computer to present course material. Fifty-six percent of students with a higher level of previous exposure (6 - 7 times per quarter or more) indicated that they anticipated professors to use this form of material presentation 6-7 times per quarter or more, while 47% of the students with less exposure indicated this expectation. The difference between the mean expectations of these two groups was significant (t-1.99, $p=.05$). Exposure in the classroom through pedagogy using computer technology for course presentation, in and outside of class assignments, simulations, and e-mail was regressed on the students level of anticipation of these tools. This *finding* indicated that the variance explained by previous instructor usage variables was very small ($r2 = .029$).

The second possible indicator of student exposure **to** multimedia aspects -- student usage of various computer tools -- was compared to their anticipation of usage in the classroom. A one-tailed correlational analysis indicated a negative, nonsignificant relationship between exposure from student use and anticipation for material to be presented using

computer technology (r -.04, p=ns). The student sample was divided into two groups based on their exposure to technology in the classroom through their own usage of computer tools. Forty-seven percent of students with a higher level of usage (6 -7 times per quarter or more) indicated that they anticipated professors to use this form of material presentation 6-7 times per quarter or more while 52% of the students with less exposure indicated this expectation. The difference between the mean expectations of these two groups was nonsignificant (t= .766, p = ns). A regression model which used the independent variable of exposure through the students' usage of computer technology regressed on the dependent variable of students' anticipation that course matenal would be presented with computer technology indicated that the variance explained by previous instructor usage variables was very small (r2 = .002).

Correlational analysis indicated a significant relationship between exposure from use by previous instructors and material presentation using computer technology as part of an ideal classroom environment (r.35, p=0l). Dividing the student sample into two groups based on their exposure to technology in the classroom through a previous instructors use of the computer to present course material indicated that 66 % of students with a higher level of previous exposure (6-7 times per quarter or more) included that aspect in their ideal learning environment. Only 47% of the students with less exposure indicated this in their ideal classroom. The difference between the mean expectations of these two groups was significant (t= -2.4 1, p=.02). Exposure through the usage of computer technology for course presentation, in and outside of class assignments, simulations, and e-mail regressed on the students ideal classroom descriptions indicated that the variance explained by previous instructor usage variables was very small (r2=.063).

Correlational analysis indicated a significant relationship between exposure from student use of computer technology and material presentation using computer technology as part of an ideal classroom environment (r.21, p=.000). Dividing the student

sample into two groups based on their exposure to technology n the classroom through the extent of their use of computer technology indicated that 73 % of students with a higher level of computer usage (6-7 times per quarter or more) included computer presentation of material in their ideal learning environment. Only 57% of the students with less exposure indicated this in their ideal classroom. The difference between the inclusion of computer presentation of these two groups was significant (t= -4.45, p=.000). Exposure through student usage of computer technology was regressed on the students inclusion of computers for material presentation in their ideal learning environment descriptions. Results indicated that the variance explained by student usage variables was very small (r2 = .049).

DISCUSSION

The hypotheses used the phrase 'multimedia educational technologies' to include the two components of students' previous exposure to multimedia in the classroom and their own use of multimedia. With regards to Hypothesis One, support was found to substantiate the claim that previous exposure to multimedia educational technologies would effect expectations for those technologies to be used in subsequent classroom experiences. However, the relationship was not what one would have thought. Those students that had used multimedia software themselves had a lower expectation that they would see the technology than those that did not use the technology themselves. This reason behind this finding may lie in the fact that those students that use multimedia are aware of the difficulties, time commitment and potential technical difficulties in using multimedia. Because of this, those students that had used multimedia themselves may not have thought that the effort would be repeated by instructors.

Another interesting finding was that those students that had used multimedia techniques themselves included multimedia in their ideals of the optimal classroom even though they thought that they would

not be as likely to be exposed to it in the future. This fact belies evidence from the study that even those suspicious of the potential pitfalls of using multimedia include the technology in their desires of the ideal classroom environment.

Overall, 62% of respondents included the use of computers in their profile of the ideal classroom environment, even though only *53%* reported using computers themselves to present information. However, only 51% thought that they would see the use of computers in the classroom. Although not included in the hypotheses, the data was also scrutinized to see if any model could be designed that would predict student expectations. As was reported in the results section, no significant model was achievable.

The term 'multimedia' was not used in the survey. Instead, we used various components of computer-related delivery in the classroom as a surrogate. Since the term 'multimedia' was not used in the study there will be those that may infer that was did not assess its use. We would assert that the contrary is true - that by breaking down multimedia into its various facets, we tested for a wider array of student experiences that is typically gleaned from studies that simply use the word 'multimedia'.

DIRECTIONS FOR FUTURE RESEARCH

Even though the sample size was robust, a larger cross-sectional study of representative students would provide additional veracity to the findings. In assessments into the effects of age on ideals and exposure to technologies in the classroom, no support was found to warrant possible claims that age would be a moderating or mediating variable into a possible link between multimedia exposure and expectations. However, the study did not capture non-classroom exposure of students to multimedia technologies, such as those experienced by students with past or current employment.

In addition, we recognize that emphasizing student expectations is but one piece of the puzzle in assessing the impact and worth of multimedia. The elusive construct of 'learning' needs additional emphasis. Furthermore, by studying student expectations and learning outcomes, several holes in findings remain. Teacher expectations and teaching styles may impact the experience that students take away from multimedia presentations. The fact that the technology is a mere 10 years old in its widespread use in the classroom is both an invitation to continued research and a struggle for those that seek to model the dynamics of the influence of multimedia in the classroom.

References

Available on request.