STUDENT PERSPECTIVES: EXPECTATIONS OF MULTIMEDIA TECHNOLOGY IN A COLLEGE LITERATURE CLASS

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This paper explores students' perceptions through survey about the definition, use and constructivist nature of multimedia use in literature classes at the collegial level. The culture of schools and students has changed. The possibility exists that students' brains are biologically different as a result of frequent and prolonged interaction with computers as a dominant source of stimulation and that optimal learning does not take place when only traditional lecture methods are employed in the classroom. Student expectations of classroom presentation styles that embrace a more holistic manner of learning than print alone have increased as the characteristics of the college age learner have changed. This would suggest that by combining text, visual imagery and multimedia text more elaborate contexts and meanings could be explored within the classroom setting. Today's college student has evolved as a learner and the types of classroom interaction that they have come to expect have also changed. Literature instruction should reflect these changes.

- Does gender affect student expectation of multimedia use in classrooms?
- Does collegiate year affect expectation of multimedia use in classrooms?
- Do Education majors have higher expectations than other majors of multimedia use in literature classrooms?
- Does the use of multimedia by a professor affect a student's course decisions?

Although many strides have been made of late in the usage of and interest in incorporating multimedia technology into college classrooms, there is a lack of teacher preparation in educational technologies that has hindered the implementation of these very technologies in actual classrooms at every level (Doering, Hughes, and Huffman, 2003). In addition, student expectations regarding increased use of interactive, multimedia experiences in the classroom have increased as the characteristics of college age learners have changed with internet exposure (Tapscott, 1998). The shift from broadcast media to internet media has created a communications revolution that is shaping our culture and the college learn-

er (Coufal, 2002). College students are often far more skilled at using digital media than the professors who are teaching them. Classroom practice often does not meet student expectation especially in the area of integration and use of multimedia. In addition, "if language defines a culture and is itself defined because members of a culture use language, is the language of the twenty-first century defining a new culture or is a new group causing a new language to evolve?" (Coufal, 2002). Constructivist multimedia instruction might well bridge the gap between old skills and a developing language. Knowing what kinds of expression aid what kinds of knowledge would allow information to be transmitted in a medium that would make it easiest for an audience to understand (Lanham, 1995), especially when we know that attention begins to lapse 10 to 18 minutes into any lecture (Johnstone and Percival, 1976). Advances in implementing constructivist multimedia methodology in literature classes should reflect student learning style and student expectation.

Multimedia instruction has been defined within limits by Peck (1999) as a computer controlled combination of two or more media types, to effectively create a sequence of events that will communicate an idea visually with both sound and visual support. A more integrative definition has been forwarded by Erwin and Rieppi (1999): a lecture classroom that is internet compatible and is equipped with dual multimedia computers, dual rear projection screens, a video disc player, a VCR, CD-Roms, an audio cassette player and an electronic student polling system with individual key pads. However, these definitions only take into consideration the basic instructional delivery system, not the constructionist methodology of use that is needed to create a superior or optimal teaching and learning experience (Harris, 2002).

A review of recent research on the implementation of multimedia implementation in the classroom indicates that experts have advocated it as a superior means to deliver information, promote students interaction and graphically organize material (DiCecco and Gleason, 2002; Kirylo and Millet, 2000). However the research also indicates that there is a high level of teacher apprehension about incorporating multimedia technology into individual classrooms due to a lack of preservice preparation in the use of educational technologies (Doering, Hughes, and Huffman, 2003). Government statistics from the Office of Technology Assessment (OTA) report that only three percent of teacher education graduates felt "very well prepared" to use technology in their classrooms (U.S. Congress, 1995). Even more recent reports indicate that only 11.3% of the nation's teachers feel they have advanced skills to integrate technology into their daily teaching (Survey, 1999). The value of integrating technology into classrooms at all levels has been acknowledged in many research studies in different disciplines (Agarwal and Day, 1998; Stone, 1999).

The present paradigm in colleges of education to require a technology education course within the education curriculum may not sufficiently address the high levels of anxiety, the needed exposure to the technologies or the follow up context/con-

tent scenarios necessary to train teachers to teach with technology. In fact, "few colleges of education adequately prepare their graduates to use information technologies in their teaching" (Summary, 2000). Even though twenty-two states mandate instruction in the use of technology, no actual experience in using computers to teach is required or modeled in most teacher preparation programs (Summary, 2000). In order to create classroom situations where teachers feel well prepared to use technology, instruction needs to be modeled by college professors who have integrated it into their own courses. This type of exposure, in addition to the actual hands on learning about the hardware will scaffold the college students' pedagogy within their own future classrooms toward interactive, authentic learning activities (Doering, Hughes, and Huffman, 2003). Even as we are faced with the task of implementing multimedia instruction in classrooms, a larger issue looms. The multimedia "hardware" must support instruction that is contextually relevant, interactive and meets the needs of the individual learner. Usage should help create the learning environment, but it is the type of instruction that is of paramount importance.

Creating an interactive, intellectually challenging multimedia environment must include an assessment of the college age leaner and the changes that technology has already evoked in the college age population. Tapscott (1998) coined the term N-Gen to describe those children who have grown up with the Internet and "form an intergenerational culture through their actions online." This group has a number of defining characteristics. A sampling of those N-Gen characteristics that is relevant to a discussion of multimedia classroom environments that were identified by Tapscott (1998) included:

- Fiercely independent: having a strong sense of independence, autonomy, and identity
- Inclusive: moving form a local or a national orientation to a global perspective through virtual communities and awareness
- Fully accessible and opinionated: expecting access to information and expression of fundamental rights
- Investigative: exploring ideas to understand their genesis, and simultaneously exploring technology to determine how to make something work
- Expecting immediacy: accessing and moving information at light speed, they expect to experience more events occurring in a minute than was possible off-line

It is these students who are present in college classrooms and their expectations and learning styles demand changes in the traditional chalk and talk paradigm that still exists in many lecture halls today. The possibilities in a literature classroom to have the "hardware" support instruction that is contextually relevant, interactive and student-catered are wide ranging.

"Students live multi-textual lives inside and outside the classroom, and this demands they become versatile learners able to construct meaning from images and text they meet head-on." (Piro, 2002) In addition, constructing meaning is an individual thing. Teachers should attempt to orchestrate meaning by creating an envi-

ronment conducive to the construction of new meanings by students. The visual, auditory, and non-linguistic infrastructures that multimedia instruction can provide allows students to think in visual images as well as written language. (Bloom, 2001). This type of instruction speaks to the strengths of the N-Gen population's learning style and classroom expectations. Literacy is more than the written or spoken word. Perhaps Eisner's (1994) definition of literacy serves to enhance our understanding of the importance of multimedia use in literature classes. His view of literacy as inclusive of visual imaging or picture reading sees it as "the ability to encode or decode meaning in any of the forms of representation used in culture to convey or express meaning". Literacy must be connected to the culture and contexts in which reading and writing are explored (Hobbs, 1996).

Studies indicate that student use and perception of a multimedia educational experience is highly dependent on the attitude of the instructor and his or her ability to provide useful contextual information in a format that meets the criteria of the relevancy and interactivity in a student centered approach (Slattery, 1998; Sloan, 1997). The quality of the learning experience depends considerably on the design and presentation of instrumental materials (Sanders, Morrison-Shetlar, 2001). Jiang and Ting (1998) explored various factors that influenced students' perceptions of the learning in a multimedia, web-based format and concluded that students learn better in an interactive environment. Again, the instructor's use of a multimedia format for discussion and interactive student participation increased students' perceived learning experience.

Methodology

Participants:

One hundred fifty students (35 male, 112 female, 3 chose not to identify themselves) enrolled in **Children's Literature and Storytelling** filled out the survey. These students represented both most majors and all years at the college because the course was offered in the general education core as a literature credit.

The Course:

Children's Literature and Storytelling explores the development of children as that development is directly impacted by the literature with which they interact. The course explores way to match reader and book on several levels: content, age, knowledge, skill and comprehension. Through a thorough examination of trade books in each genre of children's literature, the student becomes familiar with many of the children's titles now in print and the methodology needed to engage children with the literature. The professor interactively uses many forms of multimedia during class presentations including powerpoint, overheads, video, DVD, audio and the internet. Students are also required to give a presentation employing at least four forms of multimedia technology.

Assessment Instrument:

The attitude scale used in this study consisted of twelve questions using a Likert type response scale asking participants to strongly agree, agree, render no opinion,

disagree, or strongly disagree with statements about their attitude toward the use of multimedia in literature classrooms. Identification of gender, year in college and major course of study were also solicited for analysis. The survey was administered during a regular semester class and students were given fifteen minutes to complete the twelve questions.

The survey asked the students to respond to a variety of statements concerning the use of multimedia technology in the classroom (Chart 1). The survey was designed in such a way that the higher one's total score, the more one was adverse to the use of technology in the classroom. The upper score limit on the survey was sixty points. Conversely, the lower one's overall score, the more that respondent felt that technology was an aid to his or her own learning in the classroom. The lower score limit on the survey was twelve points. The survey also included an optional section for comments to allow respondents to explain more fully their feelings on classroom use of technology. In this way, those students who felt the survey did not ask the appropriate questions to gauge their feelings or wanted to qualify their answers could do so without skipping any survey questions. While certain identifiers about the respondents were requested, such as their year, gender, and major, none of those characteristics was required nor so detailed as to compromise the anonymity of the respondents.

Definition of terms:

Education majors versus non-education majors: Those students with majors designed for occupation in any field of education upon graduation were grouped with education majors. Those that fell outside this realm were grouped with those in the non-education major category. A full list-

Chart 1

Chart 1 – The survey

Please fill out the following survey on the use of technology in university classrooms by putting the number that corresponds to your opinion in each category.

1. Strongly Agree 2. Agree 3. No Opinion 4. Disagree 5. Strongly Disagree

__ I find a lecture give by a professor who utilizes technology easier to understand.
__ Certain types of technology are more effective in the classroom than others.
__ PowerPoint presentations are an effective presentation mode.
__ Video/DVD presentations are an effective presentation mode.
__ Overheads are an effective presentation mode.
__ Use of the Internet by a professor during a lecture is an effective presentation mode.
__ Combining various types of technology within a single lecture is an effective teaching tool.
__ I feel I have learned more in classrooms where the professor uses technology regularly.
__ I am a visual learner.
__ I choose classes partially based upon an instructor's use of technology.
__ Current college and university students expect a classroom environment that employs technology.
__Visual backup in a classroom allows me to make more connections with the information being presented.

ing of all majors included in the study, as well as how they were grouped is included in Appendix B.

Visual learners: Those students who identified themselves as learning best when seeing the object or theme or a representation therein of what is being discussed.

Technology in the classroom: Visual and electronic instruments used to further a student's understanding of a given topic. The technology group referred to in this study includes PowerPoint, overhead images, VHS/DVD presentations, and the Internet.

Year: Refers to a student's class standing, such as freshman, sophomore, junior, or senior.

Results and Analysis:

Generally, the students surveyed favored technology in the classroom. Most felt that it improved their learning experience with the use of Microsoft PowerPoint and VHS/DVD presentations as the most popular ways to convey messages. The data was broken down into more specific categories including gender, major, and year.

To address the first question of the study, that of whether there is a difference between male and female college students and their respective feelings about technology in the classroom, the sum of each student's responses were analyzed. The results included the following: (For full results, consult Appendix A.)

The results turned out to be statistically significant at neither the 1% nor the 5% level. In fact, the comparison of the data proves that there is little difference based on gender. The result is not terribly surprising considering it is difficult to imagine a reason as to why college-age men would respond to technology differently than college-age women in a classroom setting. One's comfort level with technology may play a part in the appeal of technology in the classroom. Yet, as this control shows, that comfort level is not dependent upon gender.

The next question this study hoped to answer concerned the effect of one's aca-

Chart 2

Chart 2 – Results of controlling the survey for gender*

Average male score: 23.91
Standard Deviation, male: 6.783
n-male: 35
Average female score: 24.535
Standard Deviation, female: 5.45
n-female: 112
t-stat for comparing the two data sets: 0.487955
p-stat for comparing the two data sets: 0.62779
degrees of freedom used: 48.23

*note: t-statistical-tests were used for each data set because after analyzing the means and standard deviations of each, it was determined that neither the distributions nor variances of each were too different from one another.

Chart 3

Chart 3 – Results of controlling the survey for major
Average education major score: 23.904
Standard Deviation, education major: 5.031
n-education major:73
Average non-education major score: 24.597
Standard Deviation, non-education major: 6.483
N-non-education major: 77
t-stat for comparing the two data sets: 0.7288
p-stat for comparing the two data sets: 0.46726
degrees of freedom used: 142.54

demic major on his or her opinion of classroom technology. Again, the sum of each student's responses was analyzed. The results included the following: (For full results and a full list of what was considered an education major as opposed to a non-education major, consult Appendix B.)

This analysis of data also revealed there to be no statistically significant difference at the 1% or 5% level between education majors and non-education majors. In light of the overwhelming positive response of the vast majority of the students, this result is not surprising. That is, since most respondents indicated that technology aided in their learning process, their major should not have a great degree of bearing on their preference. Two respondents with majors that traditionally are not known for their technological focus, History and English, still had a sum response of 19 and 31, respectively. Each of these sums falls below the halfway point of 36 in the survey's range, indicating at least a mildly positive attitude toward technology in the classroom.

Another analysis of the data called for investigating if a difference in opinion on technology in the classroom existed across year boundaries. The results of the survey were again broken up into two groups, consisting of seniors and juniors in one group (upperclassmen) and freshman and sophomores in another (underclassmen). Each of the two classes was combined with another to establish a more robust sample size, as well as to help even out the overwhelmingly large numbers of sophomores in the class. The results included the following: (For full results, consult Appendix C.)

As with gender and major, class year seems to have no bearing on one's preference for technology at the 1% and 5% levels. This is not to say that there is no difference between the students of each year and their preferences; rather, the differences are just not statistically significant. An inference one can draw from these results, though, is that the N-gen group of students to whom Tapscott (1998) refers in his study must now be completely in college. Otherwise, one would expect to see a distinct difference between those in their first year in college and those in their last.

Chart 4

Chart 4 – Results of controlling the survey for year
Average upperclassmen score: 24.31667
Standard Deviation, upperclassmen: 5.3024
n-upperclassmen:60
Average underclassmen score: 24.325
Standard Deviation, underclassmen: 6.116
n-underclassmen: 89
t-stat for comparing the two data sets: 0.009663
p-stat for comparing the two data sets: 0.992303
degrees of freedom used: 137.73

Yet, statistically, the difference is minor. If one were to look at graphs of responses comparing freshmen to seniors, one would find a slight skew of freshmen toward a more favorable opinion about technology in the classroom. This difference, though, is too complex to be studied here. Many confounders, such as the susceptibility of freshmen to be more impressed by technology they may not have seen in their high schools and thus more in favor of it, exist in this study. Conversely, seniors, having seen the technology for three years, may have become bored with technological additions to classroom exercises. The questions that would address these issues were not asked on the survey, though, and consequently those issues cannot be analyzed here.

The final item remaining to be analyzed, that of class choice and the degree of influence technology use in the classroom had on that choice, is the most interesting of the four. By comparing students' responses to the first statement asked about whether a lecture given by a professor who utilizes technology is easier to understand to the tenth statement pertaining to students' course selection and an instructor's use of technology, the following data sets were

Chart 4

Chart 4 – Results of comparing statement one to statement ten
Average score on question one: 1.7667
Standard Deviation, question one: .79512
n-question one: 150
Average score on question ten: 3.6466
Standard Deviation, question ten: .9739
n-question ten: 150
t-stat for comparing the two data sets: 18.2525
p-stat for comparing the two data sets: 6.4911×10^{-50}
degrees of freedom used: 286.5

created:

These results prove to be statistically significant at both the 5% and 1% levels. If one were to assume that students are rational beings, then one could also assume that students would enroll in classes that were best structured towards helping them learn. The statistical comparison, then, essentially states that a large majority of students find that technology aids their learning process when in the classroom. Paradoxically, though, a majority of students indicated on the study that they usually do not pick classes based on whether the professor utilizes technology in the classroom. In this way, students seem to be missing out on those classes that could best help them learn.

There are a number of ways to explain these statistical results, but the most compelling reasoning concerns course bulletins. In a casual investigation of course bulletins from several colleges, one will find the degree to which a professor employs technology in a course rarely published. Instead, the paragraph describing the course will list subject matter and often course requirements. Students then select courses based on this information, as well as their academic and time requirements. Little thought is paid to in-class use of technology. Yet, 134 out of 150 students strongly agreed or agreed with the statement that lectures in which professor use technology are more instructive. Thus, one could conclude that students do not make decisions about classes partially based on the professor's use of technology because that type of information is not available to them.

Another method of explaining the differences between statements one and ten also relies on course descriptions in a related but different way. Perhaps student word-of-mouth also fails to include sufficient information on a professor's use of technology. Student discussion of classes, be it in person or on websites created for reviewing professors' style of presentation, often does not mention a professor's use of technology. Again, a casual look at a few of these websites indicated that workload and a professor's ability to keep the class's attention (linked to technology, but not explicitly stated) were the most important aspects in evaluating a class. In this case, then, the information about technology's use in the classroom is not available to the students. Consequently, they cannot make an informed decision.

An immediate but effective way to remedy this type of situation would be to alter course descriptions in college bulletins to include information on the degree to which professors rely on technology in their classrooms. A statement indicating that many lectures are given with the aid of PowerPoint may appear ambiguous, but the statement's inclusion does more to aid a student's decision than the current general omission of technological information. The benefits of publishing this information even extend to those who dislike a professor's use of technology in the classroom. In light of published information, that student would be able to avoid classes that relied on the use of technology.

Another way to resolve this issue would be for professors to be more informative about their use of technology during the first few class periods or on the syllabus. Students would then be able to switch

classes during their shopping period and avoid those classes that used technology in a way they found unfavorable to their learning process. Small changes such as this and editing course bulletin announcements appear to be cheap but effective remedies to solving this problem.

Limitations

The recommendations of the study cannot guarantee better student placement or even a better overall learning experience. That is, because information about technology is not widely advertised, it is difficult to predict how students would react to the information once it is available to them. If it is assumed that they would behave rationally, one can assume the students who prefer technology would gravitate toward those types of classes. Yet, these assumptions do not take several issues into account. First and foremost, students have academic requirements and time restrictions that supercede any of their desires for a technology-based classroom. Some students are required to take a certain class for their major and many times and only one section of the class is offered. In such a case, advertising the degree to which technology is employed loses its value. Students that need the class to graduate will take that class. Any disclosure about technology would only help the portion of the class taking it as an elective.

Another potential problem with advertising the amount of technology employed in the classroom lies with the professor him or herself. Many times the instructor varies the degree to which he or she uses technology from semester to semester. Moreover, it is difficult to predict exactly when or how the technology will be employed. Lectures on PowerPoint may be structured, but videos may be cut from the class schedule if class time is lost due to inclement weather or multiple questions from the students. In this way, truth in advertising in course bulletins may only be able to go so far.

In summary, then, this study would recommend including information about the use of technology in classes in bulletins and syllabi because students do claim that they learn better when a professor utilizes technology. Yet, it is unclear as to the degree to which this solution will remedy the gap between students knowing that they learn more productively when technology is used and actually picking classes based on that use. Perhaps a study on the effects of publishing technological information in course bulletins is warranted. That study, though, cannot commence until schools incorporate the necessary technological information in their bulletins and other course descriptions.

Appendix A
Analysis of Data by Gender
All numbers in bold are percentages; regular text (n) equals the number of responses

Statement	Strongly Agree		Agree		No Opinion		Disagree		Strongly Disagree	
	Male (M)	Female (F)	M	F	M	F	M	F	M	F
I find a lecture given by a professor who utilizes technology easier to understand	**45.71** (n=16)	**36.60** (51)	**42.85** (15)	**52.37** (59)	**5.71** (2)	**7.14** (8)	**2.85** (1)	**2.67** (3)	**2.85** (1)	**.89** (1)
Certain types of technology are more effective in the classroom than others	**54.2** (19)	**40.17** (45)	**40** (14)	**54.46** (61)	**2.85** (1)	**3.57** (4)	**0** (0)	**.89** (1)	**2.85** (1)	**.89** (1)
PowerPoint presentations are an effective presentation mode	**28.57** (10)	**39.28** (44)	**57.14** (20)	**54.46** (61)	**8.57** (3)	**4.46** (5)	**2.85** (1)	**1.78** (2)	**2.85** (1)	**0** (0)
Video/DVD presentations are an effective presentation mode	**48.57** (17)	**46.42** (52)	**42.85** (15)	**50** (56)	**5.71** (2)	**.89** (1)	**0** (0)	**1.78** (2)	**2.85** (1)	**.89** (1)
Overheads are an effective presentation mode	**11.42** (4)	**15.17** (17)	**51.42** (18)	**50.89** (57)	**17.14** (6)	**19.64** (22)	**14.28** (5)	**14.28** (16)	**5.71** (2)	**0** (0)
Use of the internet by a professor during a lecture is an effective presentation mode	**37.14** (13)	**7.14** (8)	**45.71** (16)	**50** (56)	**8.57** (3)	**37.5** (42)	**5.71** (2)	**5.35** (6)	**2.85** (1)	**0** (0)
Combining various types of technology within a single lecture is an effective teaching tool	**62.85** (22)	**41.96** (47)	**31.42** (11)	**47.32** (53)	**0** (0)	**8.03** (9)	**2.85** (1)	**1.78** (2)	**2.85** (1)	**.89** (1)
I feel I have learned more in classrooms where the professor uses technology regularly	**25.71** (9)	**30.35** (34)	**45.71** (16)	**41.96** (47)	**22.85** (8)	**18.75** (21)	**0** (0)	**8.03** (9)	**5.71** (2)	**.89** (1)
I am a visual learner	**40.0** (14)	**49.10** (55)	**42.85** (15)	**38.39** (43)	**11.42** (4)	**8.03** (9)	**2.85** (1)	**4.46** (5)	**2.85** (1)	**0** (0)
I choose classes partially based upon an instructor's use of technology	**5.71** (2)	**2.67** (3)	**11.42** (4)	**5.35** (6)	**31.42** (11)	**25.0** (28)	**34.28** (12)	**47.32** (53)	**17.14** (6)	**18.75** (21)
Current college and university students expect a classroom environment that employs technology	**31.42** (11)	**15.17** (17)	**48.57** (17)	**58.03** (65)	**17.14** (6)	**17.85** (20)	**2.85** (1)	**8.92** (10)	**0** (0)	**0** (0)
Visual backup in a classroom allows me to make more connections with the information being presented	**40.0** (14)	**48.21** (54)	**51.42** (18)	**45.53** (51)	**8.57** (3)	**3.57** (4)	**0** (0)	**.89** (1)	**0** (0)	**1.78** (2)

* 35 men and 112 women were surveyed.

Three student responses have been left out of this chart because those students declined to provide their gender.

Appendix B
Analysis of Data by Major
All numbers in bold are percentages; regular text (n) equals the number of responses

Statement	Strongly Agree		Agree		No Opinion		Disagree		Strongly Disagree	
	Education Majors (ED) *	Non-Education Majors (NM)**	ED	NM	ED	NM	ED	NM	ED	NM
I find a lecture given by a professor who utilizes technology easier to understand	**39.72** (29)	**38.96** (30)	**52.05** (38)	**48.05** (37)	**5.47** (4)	**7.79** (6)	**1.36** (1)	**3.89** (3)	**1.36** (1)	**1.29** (1)
Certain types of technology are more effective in the classroom than others	**43.83** (32)	**42.85** (33)	**52.05** (38)	**49.35** (38)	**1.36** (1)	**5.19** (4)	**0** (0)	**1.29** (1)	**1.36** (1)	**1.29** (1)
PowerPoint presentations are an effective presentation mode	**41.09** (30)	**35.06** (27)	**54.79** (40)	**53.24** (41)	**2.73** (2)	**7.79** (6)	**1.36** (1)	**2.59** (2)	**0** (0)	**1.29** (1)
Video/DVD presentations are an effective presentation mode	**39.72** (29)	**55.84** (43)	**58.90** (43)	**36.36** (28)	**0** (0)	**3.89** (3)	**0** (0)	**2.59** (2)	**1.36** (1)	**1.29** (1)
Overheads are an effective presentation mode	**10.95** (8)	**16.88** (13)	**56.16** (41)	**46.75** (36)	**20.54** (15)	**16.88** (13)	**10.95** (8)	**18.18** (14)	**1.36** (1)	**1.29** (1)
Use of the internet by a professor during a lecture is an effective presentation mode	**9.58** (7)	**19.48** (15)	**50.68** (37)	**46.75** (36)	**34.24** (25)	**27.27** (21)	**5.47** (4)	**5.19** (4)	**0** (0)	**1.29** (1)
Combining various types of technology within a single lecture is an effective teaching tool	**47.94** (35)	**48.05** (37)	**43.83** (32)	**41.55** (32)	**5.47** (4)	**6.49** (5)	**1.36** (1)	**2.59** (2)	**1.36** (1)	**1.29** (1)
I feel I have learned more in classrooms where the professor uses technology regularly	**28.76** (21)	**31.16** (24)	**49.31** (36)	**36.36** (28)	**17.80** (13)	**20.77** (16)	**2.73** (2)	**9.09** (7)	**1.36** (1)	**2.59** (2)
I am a visual learner	**49.31** (36)	**46.75** (36)	**36.98** (27)	**40.25** (31)	**9.58** (7)	**7.79** (6)	**4.10** (3)	**3.89** (3)	**0** (0)	**1.29** (1)
I choose classes partially based upon an instructor's use of technology	**1.36** (1)	**5.19** (4)	**6.84** (5)	**9.09** (7)	**31.50** (23)	**23.37** (18)	**42.46** (31)	**44.15** (34)	**17.80** (13)	**18.18** (14)
Current college and university students expect a classroom environment that employs technology	**23.28** (17)	**16.88** (13)	**57.53** (42)	**53.24** (41)	**13.69** (10)	**20.77** (16)	**5.47** (4)	**9.09** (7)	**0** (0)	**0** (0)
Visual backup in a classroom allows me to make more connections with the information being presented	**52.05** (38)	**42.85** (33)	**43.83** (32)	**48.05** (37)	**2.73** (2)	**6.49** (5)	**0** (0)	**1.29** (1)	**1.36** (1)	**1.29** (1)

73 education majors and 77 non-education majors participated in this study.

*Education majors include Special Education, Physical Education, Open Options Education, Music Education, Math Teaching, Health and Physical Education, English / Secondary Education, Elementary Education / Spanish, Elementary Education / Sociology, Elementary Education / Psychology, Elementary Education / Music, Elementary Education / Music, Elementary Education / Math, Elementary Education / History, Elementary Education / English, Elementary Education / Art, Elementary Education/ Math, Science, and Technology, Early Childhood Education / Math, Science, and Technology, Early Childhood Education / Spanish, Early Childhood Education / Psychology, Early Childhood Education / Math, Early Childhood Education / English, Deaf Education / Psychology, Deaf Education / Elementary Education Psychology, Chemistry Teaching, Biology Teaching, Biology and Secondary Education, Art Education.

**Non-education majors include Psychology, Philosophy, Nursing, Music, Media Sociology, Mechanical Engineering, Math, Marketing, Law and Justice, Journalism, Information Systems Management, History, Health and Exercise Science, Graphic Design, General Business / Psychology, General Business, Finance, English, Criminology and Justice Studies, Computer Science, Communication Studies, Chemistry, Business Management, Business Information Systems, Business / Accounting, Business, Biology, Art History, Art / Graphic Design, Accounting.

Appendix C
Analysis of Data by Collegiate Year

All numbers in bold are percentages; regular text (n) equals the number of responses
Key: F= Freshman, So = Sophomore, J = Junior, and Se = Senior

Statement	Strongly Agree				Agree				No Opinion				Disagree				Strongly Disagree			
	F	So	J	Se	F	So	J	Se	F	So	J	Se	F	So	J	Se	F	So	J	Se
I find a lecture given by a professor who utilizes technology easier to understand	**50.0** (n=11)	**44.77** (30)	**29.03** (9)	**27.58** (8)	**31.81** (7)	**44.77** (30)	**61.29** (19)	**65.51** (19)	**13.63** (3)	**7.46** (5)	**3.22** (1)	**3.44** (1)	**4.54** (1)	**0** (0)	**6.45** (2)	**3.44** (1)	**0** (0)	**2.98** (2)	**0** (0)	**0** (0)
Certain types of technology are more effective in the classroom than others	**18.18** (4)	**52.23** (35)	**35.48** (11)	**51.72** (15)	**77.27** (17)	**41.53** (27)	**61.29** (19)	**44.82** (13)	**4.54** (1)	**4.47** (3)	**0** (0)	**3.44** (1)	**0** (0)	**0** (0)	**3.22** (1)	**0** (0)	**0** (0)	**2.98** (2)	**0** (0)	**0** (0)
PowerPoint presentations are an effective presentation mode	**50.0** (11)	**34.32** (23)	**45.16** (14)	**27.58** (8)	**50.0** (11)	**56.71** (38)	**48.38** (15)	**58.62** (17)	**0** (0)	**4.47** (3)	**3.22** (1)	**13.79** (4)	**0** (0)	**2.98** (2)	**3.22** (1)	**0** (0)	**0** (0)	**1.49** (1)	**0** (0)	**0** (0)
Video D/C presentations are an effective presentation mode	**45.45** (10)	**46.26** (31)	**51.61** (16)	**48.27** (14)	**54.54** (12)	**47.76** (32)	**21.31** (13)	**48.27** (14)	**0** (0)	**2.98** (2)	**3.22** (1)	**0** (0)	**0** (0)	**0** (0)	**3.22** (1)	**3.44** (1)	**0** (0)	**2.98** (2)	**0** (0)	**0** (0)
Overheads are an effective presentation mode	**18.18** (4)	**8.95** (6)	**19.35** (6)	**17.24** (5)	**45.45** (10)	**47.76** (32)	**51.61** (16)	**62.06** (18)	**22.72** (5)	**2.68** (18)	**12.90** (4)	**3.44** (1)	**13.63** (3)	**11.94** (8)	**16.12** (5)	**17.24** (5)	**0** (0)	**2.98** (2)	**0** (0)	**0** (0)
Use of the internet by a professor during a lecture is an effective presentation mode	**4.54** (1)	**14.92** (10)	**9.67** (3)	**24.13** (7)	**40.90** (9)	**46.26** (31)	**58.06** (18)	**51.72** (15)	**50.0** (11)	**29.85** (20)	**32.25** (10)	**17.24** (5)	**4.54** (1)	**7.46** (5)	**0** (0)	**6.89** (2)	**0** (0)	**1.49** (1)	**0** (0)	**0** (0)
Combining various types of technology within a single lecture is an effective teaching tool	**36.36** (8)	**52.23** (35)	**45.16** (14)	**48.37** (14)	**63.63** (14)	**37.31** (25)	**51.16** (16)	**31.03** (9)	**0** (0)	**59.70** (4)	**0** (0)	**17.24** (5)	**0** (0)	**1.49** (1)	**3.22** (1)	**3.44** (1)	**0** (0)	**2.98** (2)	**0** (0)	**0** (0)
I feel I have learned more in classrooms where the professor uses technology regularly	**22.72** (5)	**35.82** (24)	**25.80** (8)	**24.13** (7)	**63.63** (14)	**37.31** (25)	**45.16** (14)	**37.39** (11)	**9.09** (2)	**22.38** (15)	**16.12** (5)	**24.13** (7)	**4.54** (1)	**1.49** (1)	**12.90** (4)	**10.34** (3)	**0** (0)	**2.98** (2)	**0** (0)	**3.44** (1)
I am a visual learner	**54.54** (12)	**43.28** (29)	**58.06** (18)	**41.37** (12)	**27.27** (6)	**43.28** (29)	**29.03** (9)	**48.27** (14)	**9.09** (2)	**10.44** (7)	**6.45** (2)	**6.89** (2)	**9.09** (2)	**1.49** (1)	**6.45** (2)	**3.44** (1)	**0** (0)	**1.49** (1)	**0** (0)	**0** (0)
I choose classes partially based upon an instructor's use of technology	**4.54** (1)	**4.47** (3)	**3.22** (1)	**0** (0)	**0** (0)	**13.43** (9)	**0** (0)	**6.89** (2)	**27.27** (6)	**23.88** (16)	**38.70** (12)	**24.13** (7)	**45.45** (10)	**58.29** (39)	**45.16** (14)	**41.37** (12)	**22.72** (5)	**14.92** (10)	**12.90** (4)	**31.03** (9)
Current college and university students expect a classroom environment that employs technology	**4.54** (1)	**23.88** (16)	**16.12** (5)	**24.13** (7)	**77.27** (17)	**52.23** (35)	**51.16** (16)	**51.72** (15)	**13.63** (3)	**17.91** (12)	**19.35** (6)	**17.24** (5)	**4.54** (1)	**5.97** (4)	**12.90** (4)	**6.89** (2)	**0** (0)	**0** (0)	**0** (0)	**0** (0)
Visual backup in a classroom allows me to make more connections with the information being presented	**31.81** (7)	**49.25** (33)	**54.83** (17)	**44.82** (13)	**68.18** (15)	**40.29** (27)	**38.70** (12)	**51.72** (15)	**0** (0)	**8.95** (6)	**3.22** (1)	**0** (0)	**0** (0)	**0** (0)	**3.22** (1)	**0** (0)	**0** (0)	**1.49** (1)	**0** (0)	**3.44** (1)

22 Freshmen, 67 Sophomores, 31 Juniors, and 29 Seniors took the survey.
One student's responses have been left out of this table as he or she declined to provide his or her class standing.

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