

Faculty Use and Integration of Technology in Higher Education

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Although technology has become pervasive on most college campuses today, it has not been heavily infused in the activities of teaching and learning (Grabe & Grabe, 2008). Additionally, growing investments in educational technology (Cuban, 2001; Oppenheimer, 2003) requires a close examination of the way faculty and students use and integrate technology in the classroom. This paper is based on a recent study that examined students' technology use, skills, and expectations, as well as students' evaluation of faculty use of technology to support classroom instruction. Ideally, this article is intended to help faculty identify effective strategies that could improve and strengthen academic programs to meet the learning needs of all students, especially the Net Generation students. The study also provides an insight into how higher education faculty might model technology integration in their courses to enhance student learning.

The enrollment of the Net Generation students in higher education has changed college classroom dynamics (Hartman & Roberts, 2005, Sharpe, 2005). Howe and Strauss (2000) define Net Generation learners as those born between 1981 and 1994. This generation of learners frequently uses the Internet for education, communication, entertainment, and self-expression. The Net Generation students are different in their characteristics and learning expectations; they tend toward independence and autonomy in their learning styles. They are more technologically literate compared to previous generations (Oblinger, 2004) and are more persistent in their quest for transferable skills from their education to their future jobs (Coaldrake & Stedman, 1999).

To meet the technological demands of college students, many institutions of higher learning continue to invest substantially in computer technology and computer-mediated communications on their campuses (Cuban, 2001; Oppenheimer, 2003). Additionally, college instructors are provided with technology training workshops and support to effectively integrate technology into their courses. However, despite all the technological improvements and faculty professional development strategies that have been put in place, Oblinger (2003) cautioned that the extent of technology awareness and proficiency that the emerging generation of learners has may “create an imbalance between students’ expectations of their learning environment and what they find in their colleges and universities” (p. 44).

Research findings by Jones (2002) and Taylor (2006) indicated an existing technology gap between college students and their instructors. Jones reported that students generally use technology in more diverse ways than their instructors. While faculty use email mostly to communicate to their students and colleagues, students use diverse communication tools such as instant messaging, blogs, wikis, MySpace, and Youtube. Cuban (2001) reported that instructors “communicate in their scholarly disciplines, and prepare for teaching through electronic means. Yet when it comes to teaching, few close observers would deny that most professors are either nonusers or occasional users of computer technology in the classroom (Cuban, p. 104).

In recent years, there has been considerable focus on faculty use of technology (Keengwe, 2007) and the impact of technology use in higher education on student learning (Waxman, Lin, & Michko, 2003). While educators have witnessed increased access to the Internet, greater bandwidth, and advanced computer tools including mobile technologies, many questions remain unanswered as to whether or not the large financial investments in technology is impacting student learning (Burnham, Miller, & Ray, 2000; Oppenheimer, 2003). A technology brief from the American Association

of Colleges for Teacher Education (AACTE) reports that it is not enough for professors to use technology in their office, or even to use presentation software in their classroom. However, to advance the goals of technology in education as well as to enhance meaningful learning, faculty must “design courses that require our students to use technology themselves—only then will they be prepared to incorporate technology into the lessons they will teach their own students (Wetzel, 2001, p. 5).

In a study to examine students’ perceptions of technology adoption by faculty at a Midwest public university, Keengwe (2007) reported that students lacked computer skills in various computer applications that are necessary to support and enhance their learning experiences. This implies that college students do not necessarily possess the much needed skills to conform to the process of technology integration, but could benefit from direct technology-specific instruction by their faculty. Oblinger and Oblinger (2005) noted, “Whether the Net Generation is purely a generational phenomenon or whether it is associated with technology use, there are a number of implications for colleges and universities (p. 2.10).

PURPOSE OF STUDY

Educational technology certainly challenges the entire approach to the classroom experience, the essence of teaching, and the purpose of a school, but as a tool, it presents tremendous opportunities to support student learning. Even so, more access to educational technology tools such as computers does not automatically translate to appropriate and effective computer integration practices that could enhance student learning. Cuban (2001) contended that computers, in most institutions, are most often employed to supplement traditional classroom pedagogy and are yet to be effectively integrated into daily classroom practices. As a result, college administrators and faculty need to focus more on identifying appropriate strategies on faculty integration instead of lobbying for more computer tools in the classrooms. Effective pedagogical strategies should come first, then appropriate technology tools second.

Faculty are challenged to prepare graduates to effectively use technology as a learning tool yet the faculty are new to various technology uses and have no personal experiences as students themselves learning in technology-infused classrooms (Jacobsen, Clifford, & Friesen, 2002). To successfully teach with technology, instructors need to have a strong comfort level with, and consistently implement, technology tools as part of their own repertoire

of tools in courses they are assigned to teach. In addition, modeling technology use in teaching methods courses is the best means for preparing pre-service teachers to integrate technology into their own classroom teaching (Zehr, 1997).

Although findings from research conducted in technology use in education has led to improvements in teaching and learning with technology, the information gathered has primarily been from the faculty and not the students' perspective. Additionally, given the staggering investments and increased access to education technology resources, and the emergence of a new generation of learners, the purpose of this study was to examine students' technology use, skills, expectations, and evaluation of faculty technology integration in instruction.

RESEARCH QUESTIONS

The following research questions were investigated in the study:

1. To what extent do students use technology?
2. How do students perceive their own technology skills in comparison with faculty's technology skills?
3. Does faculty's use of technology match students' expectations?
4. To what extent does faculty integration of technology into instruction impact students' learning experiences?

METHODS AND PROCEDURES

Research Design and Participants

This study used a mixed method design to examine students' technology use, skills, expectations, perceptions of faculty use of technology, and the impact of technology on their learning. For the purpose of this study, integration of technology in education is defined as the process of using computers and computer-mediated communication technologies to improve student teaching and learning.

The study was conducted at a large mid-western public university. The institution has six colleges and offers both undergraduate and graduate education. The institution provides both students and faculty with state-of-the-art technology resources and support services.

The researchers employed a survey methodology to collect and analyze the data. The survey contained yes/no items, Likert scale items, and open-ended items to generate additional comments on students' own experiences and competency skills with various technologies as well as student evaluation of faculty technology integration into classroom instruction.

Validity and Reliability

Content validity refers to the extent to which inferences from test scores adequately represent the content or conceptual domain that the test is claimed to measure (Gall, Gall, & Borg, 2003). Reliability refers to research concerns in the replication and consistency of the methods, conditions, and results in a study (Wiersma, 2000).

Content validity was obtained by having faculty members in the field of educational technology review the survey items. Based on faculty comments on areas that required further clarification, the survey format was restructured, and several items in the survey were revised for improved clarity. Cronbach alpha reliability coefficient was used to determine the reliability of the survey items. The data indicated an overall Cronbach's alpha coefficient of 0.87—implying that over half of the variability was internally consistent or reliable.

A web survey and informed consent forms were distributed to students through campus email. The consent forms explained the purpose of the study as well as encouraged students' voluntary participation. The length of time to complete the survey was noted in the consent forms. Student and faculty names were not identified anywhere on the survey for confidentiality purposes.

Data Analysis

The purpose of this study was to examine students' technology use, skills, expectations, and their evaluation of faculty technology integration in this instruction. The quantitative data was coded and prepared for analysis using the statistical package for research software program SPSS. This data was analyzed using descriptive statistics while the qualitative data was examined for themes.

RESULTS

A total of 539 students responded to the survey—73% women and 27% men. Eighty percent (80%) of the students were between 18 and 26 years old and 20% were 27 years and above. The majority of the students (79%) were undergraduates and 21% were graduate students. Further analysis indicated that 85% of the sample was white, 5% was Black, 5% was Asian, 3% was Hispanic, and 2% of the sample reported that they were multi-racial. Figure 1 depicts students’ reported ownership of technology tools.

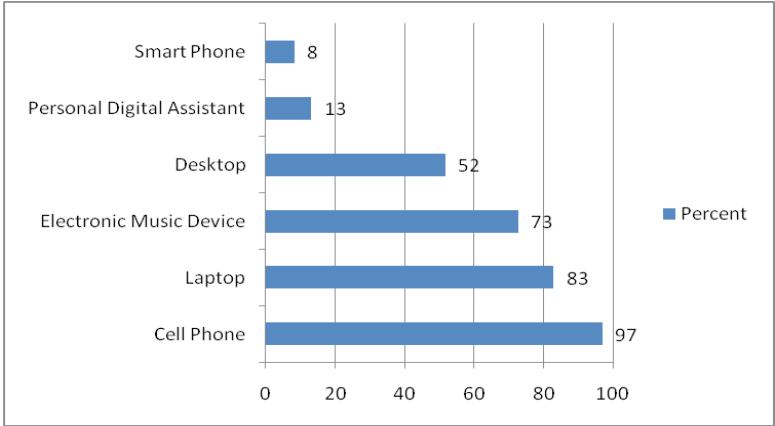


Figure 1. Students’ self-reported ownership of technology tools.

The data from Figure 1 suggest that almost all students own cell phones (97%), followed by laptops (83%) and electronic music devices such as ip-ods and zunes (73%).

Regarding students’ use of technology, most students (83%) indicated that in a typical week within the semester, they spent 3 hours or more using the computer for various course-related activities and assignments; 67% spent 3 hours or more communicating with their peers or instructors by email. In addition, 50% spent 3 hours or more on social networking activities on MySpace, SecondLife, or Facebook while 38%, 18%, and 7% reported that they spent at least an hour on social media activities on YouTube, InternetTV, or Podcasting, user-generated content activities such as wikis and blogs, and social bookmarking activities using delicious.com, respectively.

Students also reported on the types of technology they expected instructors to use in the classroom. Figure 2 presents students’ expectations in com-

parison to their perception of faculty's actual use of technology.

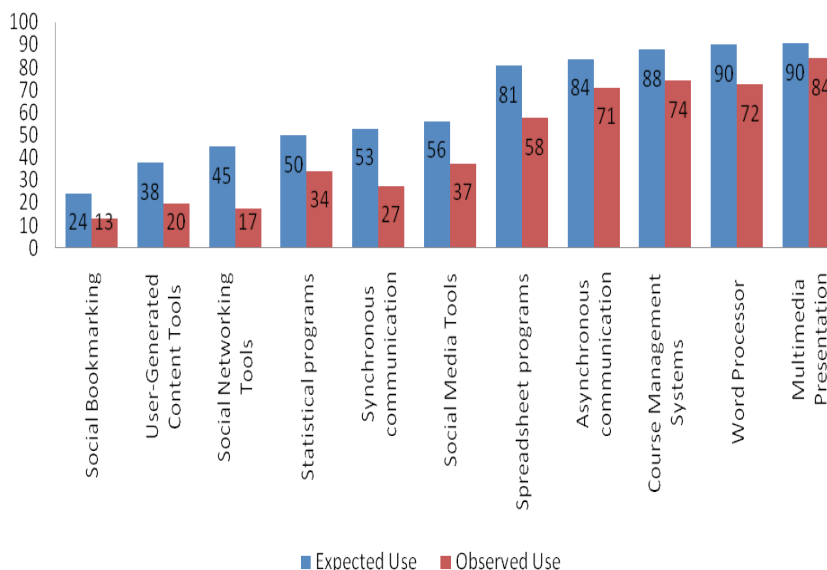


Figure 2. Students' expectation versus perception of faculty's actual use of technology.

The data from Figure 2 suggest that most students (90%) expected instructors to use multimedia presentation and word processors in their courses. In addition, 88% and 84% of students expected instructors to use course management systems (such as WebCT or Blackboard) and asynchronous communication systems (such as email) in their courses, respectively. Fifty-three percent (53%) and 56% of students expected their instructors to use synchronous communication systems (such as chat sessions) and social media tools (such as YouTube, InternetTV, or Podcasting) in their courses. Other technology tools listed by students as frequently used by instructors included cell phones, smart boards, geographic information systems, GoogleEarth, instructor websites, and overhead projectors.

Most of the students (84%) reported that their instructors used multimedia programs in their courses while only 27.3% of the students reported that their instructors used synchronous communication such as chat sessions in their courses. The data also suggest that students' technology expectations were higher than faculty's perceived actual use of technology. Students' self-reported technological skills are depicted in Figure 3.

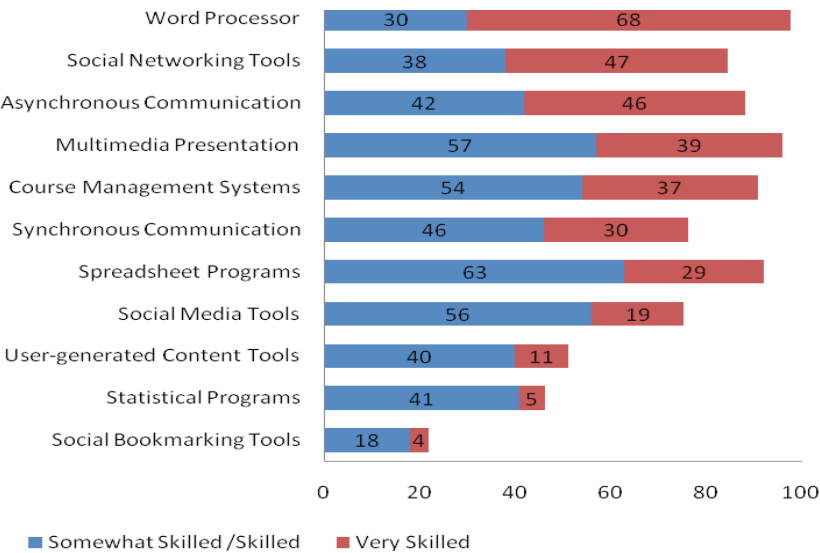


Figure 3. Students’ self-reported technological skills.

As depicted by the data in Figure 3, most students (97%) reported that they were somewhat skilled to very skilled with the use of the word processor. An equally high number of students (96%) reported being very skilled with the use of multimedia software such as PowerPoint and Hyperstudio. The data indicated that a lesser percentage of students were skilled in the use of statistical software such as SPSS and STATA (45%), and also with the use of social bookmarking tools such as delicious.com (22%).

Students’ perception of faculty technological skills is provided in Figure 4. This figure uses similar keys as provided in Figure 3 (Blue shades represent “Somewhat Skilled/Skilled while Red shades represent “Very Skilled”).

Data from Figure 4 suggest that 81% of the respondents perceived their instructors to be somewhat skilled to very skilled in the use of multimedia presentation, 74% perceived their instructors to be skilled in the use of word processors, while 70% reported that instructors were skilled in the use of course management systems such as WebCT and Blackboard.

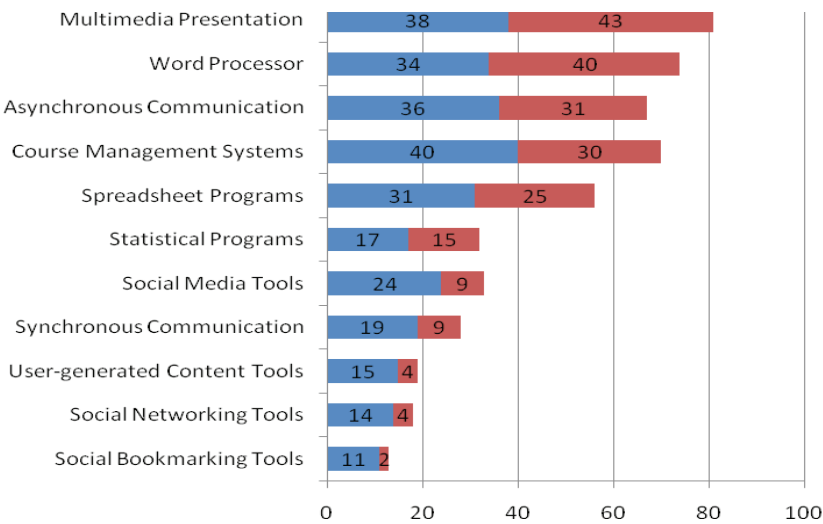


Figure 4. Students’ perception of faculty technological skills.

TABLE 1 PRESENTS DATA ON STUDENTS’ PERCEPTION OF THE EFFECT OF THEIR INSTRUCTORS’ USE OF TECHNOLOGY ON THEIR LEARNING.

Table 1			
Perception of the Effect of Instructors’ Use of Technology on Student Learning			
Item	Agree	Neither Agree nor Disagree	Disagree
Instructor’s Use of Technology:			
Helped increase my interest in the subject matter	51.1	33.7	15.2
Helped increase my level of engagement in class	62.6	21.3	16.1
Impeded my learning because I spent too much time learning to use the technology	14.6	23.2	62.3
Helped me spend less time on course activities	38.2	32.4	29.4
Helped me develop a more thorough understanding of the ideas and concepts taught in the course	56.5	27.9	15.6

Helped me better communicate with the instructor	66.6	20.7	12.7
Helped me better communicate with other students	54.8	27.1	18.2
Enabled me to receive prompt feedback from my instructor	64.0	23.8	12.3
Helped me better understand complex concepts introduced in class	45.8	32.6	21.6
Enabled me to actively participate in class activities	49.8	31.1	19.1
Helped me set challenging goals for my own learning	28.0	43.4	28.6
Helped me achieve the goals I set for my own learning	33.3	42.6	24.1
Impeded my learning because I possess inadequate technology skills	11.2	24.6	64.2
Took time away from learning the ideas and concepts taught in class	15.3	25.4	59.3

Most students agreed that their instructors' use of technology helped them communicate better with their instructor, enabled prompt feedback, and increased their level of engagement in class. Again, most disagreed that the technology impeded their learning because of time spent learning how to use it or that they lack the necessary skills.

Two broad themes emerged from the qualitative data. These were (a) the computer as a positive tool and, (b) the computer as a tool that has a negative impact on student learning.

The Computer as a Positive Tool That Makes Learning Easier

One student said:

“Although I do not really like technology, I find myself using it more and more, especially since I came to this university. Overall, it has a positive effect on my learning.

It especially helps my learning when the professors use PowerPoint presentations to aid them in lecturing, and they post their presentation on their

website.” Another student stated that:

“I think that when instructors use technology it’s extremely helpful; I am in two classes right now where they don’t use technology at all, and they are the hardest classes because of it. I think there is a reason for it, so they should use it.”

The Computer as a Positive Tool That Helps Students “Save Learning Time”

One student provided this response:

“Although the history department isn’t a technology utopia, digital texts are very helpful. I don’t know whether something written in 1900 and then uploaded last year counts as a wiki or a blog, but it saves me six hours of library hunting a week.”

The Computer as a Negative Tool That Impedes Teacher/Student and Student/Student Interaction

One student offered that:

“The lack of technology use in my classes was helpful because it allowed more face to face interaction with classmates and the instructors. Technology is slowly removing the human element under the guise of convenience and accessibility, claiming to bring us closer to a global community, while phasing out all human contact. The day I can’t say hello to the checker at the grocery store because he/she has been replaced by self check-out is the day I grow my own food.”

The Computer as a Negative Tool That Creates More Work for Faculty and Students Alike

One student wrote:

“I think the technology creates more work for the teacher and the student. The teachers are expected to create all of these electronic presentations instead of so much lecturing.

Also, since teachers want to use technology, students are expected to do the work electronically. MORE WORK FOR ALL.”

The Computer as a Negative Tool That Creates Frustration Among Students When Its Cost Outweighs Its Benefits

Some students voiced concern with respect to specific technologies used by instructors. Most students indicated their frustration with the use of clickers because they were not used as often as expected. One student stated: “We rarely use the clicker. I am outraged at the ratio of how expensive it was to how often it is used.” Another added: “Because it is not used much, I don’t benefit!”

The Computer as a Negative Tool That Adds Complexity to Learning

One student submitted that:

“I find that the Internet, especially regarding WebCT, Blackboard, etc. is too abstract to be anything but a hindrance on learning. I would ALWAYS prefer to have a piece of paper in my hand or something written on the chalkboard to copy down than have to go find WebCT, find out if anything’s been posted, check to see if what’s up there when I get there is anything that I don’t have already, copy/download it, and then figure out what to do with it so I can look at it at the same time as whatever I have to look at on my computer screen to complete whatever it is I have to do.”

It’s Not the Computer, It’s the Instructor!

Another finding is the common theme voiced by students not regarding the effect of technology itself but rather the effect of an instructor’s lack of technology proficiency on their learning. Here is one such comment supplied by a student:

“The instructors struggle with the technology longer than it takes to fully explain the concepts. When a professor tries to use technology, but does not know how to and ends up wasting class time, then the technology is too much of a distraction from learning.”

Another student stated that:

“I expect my teacher to be knowledgeable of the various technology tools. My teacher should take a course on how to run basic computer programs because about 15 minutes of every class time is spent trying to work the technology.” One student commented about the institution’s administration: “There are many instructors that are not proficient in the classroom

technology available throughout campus. This needs to be taken care of during the summer or before the instructor begins teaching. They **MUST** be proficient in the technology they are using.

I believe that most instructors need more training and a better attitude towards technology use in the classroom.”One student observed: “Instructors need to know how to use technology and learning the technology should not take too much of students’ time. Instructors should be able to strike a balance with the extent to which technology should be used in order to maximize the benefits of using technology in instruction. Otherwise, technology is detrimental to students’ learning.”

DISCUSSION

There is need to change the existing traditional pedagogical approaches to benefit the current learners on our campuses (Keengwe, 2007). However, making meaningful modifications, improvements, or changes to classroom instructional approaches cannot take place without a thorough understanding of students’ true technology skills. In addition, monitoring and examining students’ expectations and evaluation of faculty use of technology in instruction is necessary to provide valuable feedback to educators and administrators regarding effective technology integration in teaching and learning.

The ubiquitous presence of technologies in college libraries, laboratories, dormitories, and classrooms implies the need for competent faculty who can teach well with the available tools. Additionally, campuses need to design and implement a strong academic vision grounded on technology integration as well as offer relevant professional development programs that support teachers experimenting with new educational technologies. Jacobsen et al. (2002) argued that the challenge is to “develop fluency with teaching and learning with technology, not just with technology, itself” (p. 44). Grabe & Grabe (2008) noted that, “it seems reasonable that teachers will be more likely to help their students learn with technology if the teachers can draw on their own experiences in learning with technology” (p.4).

Evidence from this study suggests that students’ technology use and skill are different from those of their instructors. Additionally, faculty use technology at a lesser rate than expected by their students. Further, technology use in instruction may have either a positive or negative effect on students’ learning. There is need for faculty to gain primary technology skills in their instructional practices but they will be most successful using technology as a learning tool for their students if they can model their own instructional practices to enhance student learning.

References

- Burnham, L., Miller, A., & Ray, L. (March, 2000). *Putting the pieces together*. Paper presented at the International Conference on Learning with Technology, "Does Technology Make a Difference?" Philadelphia, PA: Temple University.
- Coaldrake, P., & Stedman, L. (1999). *Academic work in the twenty-first century: Changing roles and policies*. Higher Education Division, Department of Education, Training and Youth Affairs, Canberra, Australia. Retrieved January 18, 2008, from www.dest.gov.au/archive/highered/occpaper/99H/academic.pdf
- Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, MA: Harvard University Press.
- Gall, M. D., Gall, J. P., & Borg, W. R. (2003). *Educational research: An introduction*. Boston, MA: Allyn and Bacon.
- Grabe, M., & Grabe, C. (2008). *Integrating technology for meaningful learning* (5th ed.). Boston, MA: Houghton Mifflin.
- Hartman, J. L., & Roberts, G. (2005). *What does the net generation expect from us? Seminars on academic computing*. Retrieved July 24, 2007, from <http://www.educause.edu>
- Howe, N., & Strauss, W. (2000). *Millennials rising: The next great generation*. New York, NY: Vintage Books.
- Jacobsen, M., Clifford, P., & Friesen, S. (2002). Preparing teachers for technology integration: Creating a culture of inquiry in the context of use. *Contemporary Issues in Technology and Teacher Education*, 2(3). Retrieved August 10, 2007, from <http://www.citejournal.org/vol2/iss3/currentpractice/article2.cfm>
- Jones, S. (2002). *The internet goes to college: How students are living in the future with today's technology*. Pew Internet and American Life Project. Retrieved February 24, 2008, from http://www.pewinternet.org/pdfs/PIP_College_Report.pdf
- Keengwe, J. (2007). Faculty integration of technology into instruction and students' perceptions of computer technology to improve student learning. *Journal of Information Technology Education*, 6, 169-180.
- Oblinger, D. (2003). Boomers, gen-xers, and millennials: Understanding the "new students." *EDUCAUSE Review*, 38(4), 37-47.
- Oblinger, D. (2004). The next generation of educational engagement. *Journal of Interactive Media in Education*, 2004 (8). Retrieved February 24, 2008, from <http://www.jime.open.ac.uk/2004/8/oblinger-2004-8-disc-paper.html>
- Oblinger, D.G., & Oblinger, J.L. (Eds.). (2005). *Educating the net generation*. EDUCAUSE E-Book. Retrieved July 25, 2007, from <http://www.educause.edu/educatingthenetgen>
- Oppenheimer, T. (2003). *The flickering mind: The false promise of technology in the classroom and how learning can be saved*. New York, NY: Random House.

- Sharpe, B. (2005). Changes in student learning behaviors. *Council of Ontario Universities Colleagues Working Paper Series*, 5 (1), 1-23.
- Taylor, M. K. (2006). Generation NeXt comes to college: 2006 updates and emerging issues. In *Focusing on the Needs and Expectations of Constituents* (Vol. 2). Urbana-Champaign, IL: North Central Association of Colleges and Schools.
- Waxman, H., Lin, M., & Michko, G. M. (2003). A meta-analysis of the effectiveness of recent research on the effects of teaching and learning with technology on student outcomes.
Retrieved July 24, 2007, from <http://www.ncrel.org/tech/effects2/>
- Wetzel, K. (2001). Toward the summit: Students use of technology. *AACTE Briefs*, 22(6), 5.
- Wiersma, W. (2000). *Research methods in education: An introduction*. Needham Heights, MA: Allyn & Bacon.
- Zehr, M. (1997). Teaching the teachers. *Technology Counts*, 17(11), 23-29.