Key Findings

The ECAR Study of Undergraduate Students and Information Technology, 2007

Judith Borreson Caruso and Gail Salaway

Technological advances are significantly changing and shaping our world. Undergraduate students, who are the focus of this study, perceive technology's persistence in their lives. These students, many of whom have never known a world without personal access to information technologies, often take them for granted and integrate them seamlessly into their daily lives. These technologies also represent an opportunity for making changes in higher education academic instruction. How can higher education fully embrace the possibilities they present? To begin this exploration, an understanding of undergraduates' ownership of, use of, and experiences with information technologies can provide needed insights.

This study, *The ECAR Study of Undergraduate Students and Information Technology, 2007*, is the fourth ECAR study of students and information technology (IT).[1] The purpose of the study is to build upon the studies in 2004, 2005, and 2006 and to provide information on undergraduate students' use of and preferences and expectations for IT.

The study is further enhanced with an insightful introduction by Chris Dede, who challenges the academy to explore technologies and their application in the academic environment. He recommends research and experimentation with technologies such as sociosemantic networking, massively multiplayer online games, and augmented reality interfaces. Also, through dialogues with students about application of these technologies, additional insights can be obtained, leading to transformational learning environments.

Methodology

The 2007 study builds on and extends previous studies and consists of the following data-collection and analytical initiatives:

- **Literature review:** This consisted of extending the 2006 literature review and reviewing other relevant surveys. Previous ECAR studies also provided guidance.

- **Web-based survey:** During March and April 2007, undergraduate students were invited to respond to an online survey. The resulting quantitative data form the basis for the results of the study. The 2007 survey was based on the 2006 survey, with some improvements. Participating four-year institutions sampled their freshman and senior classes, and associate's institutions sampled their whole student population. There were 27,846 respondents from 103 institutions. Carnegie breakdown of responses is 49.2 percent doctoral, 37.8 percent master's, 5.5 percent bachelor's, 6.6 percent associate's, and 0.9 percent other. Respondents were 62.1 percent female, 89.5 percent attend school full time, and 57.2 percent live off campus. While the results are statistically significant for the participating institutions, it is likely that the findings are instructive or indicative rather than conclusive of student experiences at other institutions.
- **Student focus groups:** ECAR collected qualitative data by means of student focus groups at Middle Tennessee State University, University of Wisconsin–Madison, University of Wisconsin–Milwaukee, and Vanderbilt University. A total of 50 students participated in the focus groups, and each focus group meeting lasted one hour.
- **Qualitative analysis of student comments:** Fully 4,752 students (17 percent of survey respondents) answered an open-ended survey question. They expressed opinions about their use of and skill with IT, the state of their institutions' IT support services, and their perceptions of technology use in their courses.
- **Longitudinal analysis:** The results of the 2005, 2006, and 2007 data were compared where possible to identify any significant changes over the past three years. Where questions are consistent over the past three years, ECAR uses comparative data from the 40 institutions that participated in each of the 2005, 2006 and 2007 studies. Where survey questions are consistent over only the past two years, ECAR compares data from the 65 institutions that participated in both of the 2006 and 2007 studies.

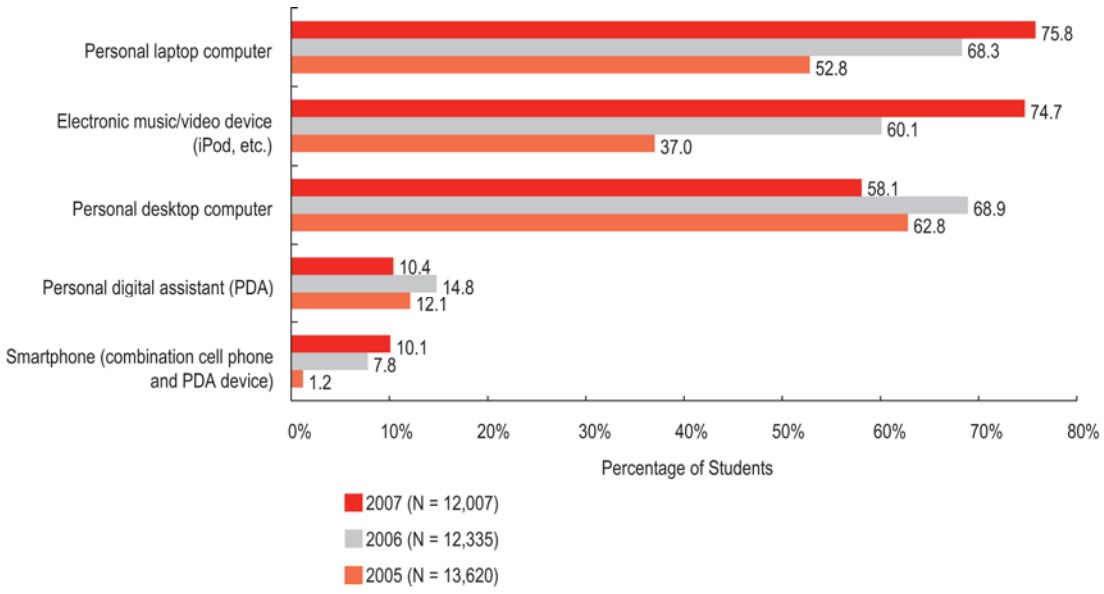
Student Ownership of Technology

Virtually all of the study respondents own some type of cell phone. The great majority of students own simple cell phones (86.1 percent), and 12.0 percent own a smartphone capable of general Web access (see Table 1). Smartphone ownership is on the rise. Figure 1 shows changes in technology ownership using longitudinal data from 40 institutions that participated in each of the past three studies. In 2005, when smartphones were new to the market, only 1.2 percent of respondents had one. Now, two years later, that percentage among our longitudinal institutions has risen to 10.1 percent.

Table 1. What Electronic Devices Students Own

	Males (N = 10,458)	Females (N = 17,117)	All
Type of Electronic Devices Owned			
Simple cell phone (without Web access)	85.3%	86.6%	86.1%
Personal computer—desktop	66.3%	57.0%	60.6%
Personal computer—laptop	73.1%	74.0%	73.7%
Electronic music/video device	77.0%	76.1%	76.4%
Electronic game device	73.5%	45.6%	56.3%
Personal digital assistant (PDA)	15.9%	9.4%	11.9%
Smartphone (combo cell phone/PDA)	14.9%	10.4%	12.0%
Number of Different Types of Electronic Devices Owned			
None	0.2%	0.2%	0.2%
One device	1.4%	2.0%	1.8%
Two devices	8.8%	14.3%	12.2%
Three devices	22.4%	36.3%	31.0%
Four devices	37.8%	30.3%	33.0%
Five devices or more	29.3%	17.0%	21.7%

Figure 1. Change in Technology Ownership from 2005 to 2007*



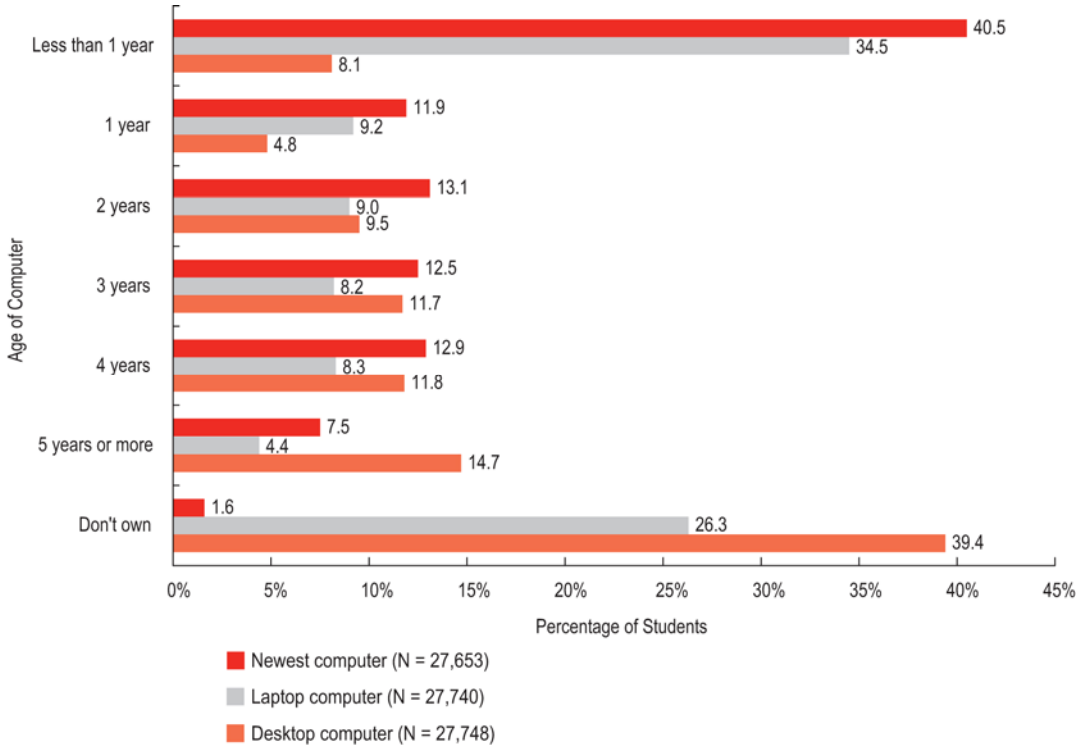
**Data for three-year comparisons are based on student responses from the 40 institutions that participated in each of the 2005, 2006, and 2007 studies. While institutions remain the same, the actual students responding are different for each year.*

The majority of respondents report owning devices associated with leisure, such as music, video, and game devices. Most younger respondents own music and video devices (83.1 percent of respondents who are 18–19 years old), and males and females now own them equally. This is a shift from just two years ago when a gender gap was still in evidence—for institutions that participated in each of the past three years' studies, significantly more males (46.1 percent) reported ownership of music and video devices than females (32.3 percent) in the 2005 data.

Almost every respondent (98.0 percent) owns at least two devices—most often some type of a cell phone and a computer. Respondents owning five or more of the devices listed in Table 1 are more often male (29.3 percent) than female (17.0 percent).

Laptops are still gaining ground as the platform of choice (see Figure 2). Overall, 98.4 percent of respondents own a computer. Almost three-fourths of respondents (73.7 percent) own a laptop, 60.6 percent own a desktop, and 35.7 own both a laptop and desktop. For the 40 institutions participating in the past three studies, laptop ownership has increased from 52.8 percent in 2005 to 75.8 percent in 2007. Overall, new computers are largely laptop computers—about one-third (34.5 percent) of laptops are less than one year old, while only 8.1 percent of desktops are less than one year old.

Figure 2. Age of Computers



Only 1.6 percent (457 respondents) don't own a computer at all. Respondents without their own computers report less overall time spent doing computer work, going online, and engaging in many Internet activities. But, they report the same patterns of use as other respondents for the basic activities of e-mail, writing documents for class, and accessing college or university library Web sites.

Student Use of Technology

Respondents spend many hours each week doing online activities for school, work, and recreation. The most frequent answer is in the range of 6–10 hours per week (26.5 percent), followed by 11–15 hours per week (18.1 percent). The overall mean is 18.0 hours per week, and the median is 14 hours per week. There are also those who spend an inordinate amount of time online—6.0 percent of respondents spend more than 40 hours a week doing online activites.

Time spent online varies by major, with engineering students showing the highest use, and life sciences and education majors showing the lowest use (see Table 2). The actual gap between the lowest and highest use majors does not seem large—just six hours per week, or less than an hour a day.

Table 2. Hours per Week Doing Online Activities, by Major

Major	N	Mean Hours per Week	Median Hours per Week
Engineering	2,650	21.9	16
Business	5,279	18.7	15
Humanities	2,868	18.7	15
Social sciences	5,332	17.8	15
Physical sciences	2,042	17.5	14
Fine arts	2,325	17.4	14
Life sciences	4,547	16.3	14
Education	3,638	15.9	12

Respondents are quite diverse in how they spend their time using technology. Table 3 gives a profile of some of these activities and highlights patterns of use, noting which demographic factors are most strongly associated with each activity.[2] E-mail and writing documents for courses have become ubiquitous; a majority of respondents use e-mail daily and write documents for their courses at least several times a week. The use of the university or college library Web site is not far behind. Technology basics for coursework—spreadsheets and presentation software—are used by about 9 out of every 10 respondents. Wikis have now taken off, with 41.7 percent of respondents accessing them, most at least weekly.[3]

Table 3. Student Computer and Internet Activities

	Students Engaged (N = 27,846)	Median Frequency of Use*	Associated Demographic Factor 1	Associated Demographic Factor 2
Almost All Students Engaged				
Create, read, send e-mail	99.9%	Daily	–	–
Write documents for coursework	98.6%	Several times/week	–	–
Use library on university/college Web site	94.7%	Monthly	Social sciences	Humanities
Create presentations (PowerPoint)	91.7%	Monthly	Senior	Business
Most Students Engaged				
Create spreadsheets or charts (Excel)	87.9%	Monthly	Senior	Engineering/ business
Online shopping	86.4%	Monthly	Senior	Male
Create, read, send instant messages	84.1%	Daily	Age (younger)	Reside on campus
Use course management system	83.0%	Several times/week	4-year institutions	–
Online social network (Facebook, etc.)	81.6%	Daily	Age (younger)	Reside on campus
Play computer games (online or offline)	78.3%	Weekly	Male	Age (younger)
Download Web-based music or videos	77.8%	Weekly	Age (younger)	Male
Create graphics (Photoshop, etc.)	72.3%	Monthly	Fine arts	Engineering
Some Students Engaged				
Access or use wikis	41.7%	Weekly	Male	–
Create audio/video (Director, iMovie, etc.)	32.6%	Once per quarter/semester	Male	Fine arts
Create Web pages (Dreamweaver, HTML, etc.)	29.1%	Once per quarter/semester	Male	–
Blogging	27.8%	Monthly	Fine arts	–

** The median frequency of use is calculated only for those students engaged in an activity. It is the midpoint in a series of numbers; half the data values are above the median, and half are below. Data values are 1 = never, 2 = once a year, 3 = once per quarter/semester, 4 = monthly, 5 = weekly, 6 = several times/week, 7 = daily.*

Gender continues to be a factor for some computing activities. Males dominate gaming and report more use of wikis and software to create audio/video or Web pages. And even though the data show that males and females own audio/video devices equally, males report that they actually download music and video more frequently. Further, the 65 institutions participating in the past two years' studies show an increase in respondents who download music and video—from 70.4 percent in 2006 to 76.2 percent in 2007. With the increase in ownership of electronic music devices and music-capable cell phones and the increased availability of music services, it is not surprising that the downloading of music and video is growing.

As expected, major is key to technology use. Engineering majors make more use of spreadsheets and graphics software; social sciences and humanities majors make more use of their institution's library; business majors make more use of spreadsheets and presentation software; and fine arts majors make more use of graphics and audio/video software as well as blogging.

Age is clearly a factor in the use of instant messaging (IM) and social networking, with 58.9 percent of 18–19 year olds reporting daily use of IM and 69.3 percent using online social networking sites (Facebook, etc.) daily. These numbers drop dramatically with age—only 17.6 percent of those 30 years or older use IM daily, and just 4.4 percent use online social networking sites (Facebook, etc.) daily. Overall participation in online social networking has risen dramatically just in the past year, and for the 40 institutions participating in the past three years' studies, respondents reporting use of online social networking has increased from 72.3 percent in 2006 to 80.3 percent in 2007.

Communicating with the Institution

More than 82 percent of respondents say they prefer using a university e-mail account over a commercial account for communicating with their institution. This preference is stronger for younger students (88.0 percent of respondents 18–19 years old) than for older students (69.1 percent of respondents 40 years old and over). In addition to age, on-campus residence is associated with a stronger preference for communication using a university account. Respondents also note a strong preference for e-mail as the favorite method for institution-related communications (85.1 percent) over other methods such as text messaging, IM, paper mail, or Web site.

Internet Access Method

Most respondents report having access to high-speed internet (91.5 percent); 69.7 percent primarily use wired broadband, and 21.8 percent primarily use wireless. Fully 8.4 percent of respondents are still using dial-up as their most frequent method of Internet access. Respondents from associate's institutions report using dial-up access most often (14.3 percent), in contrast to respondents from four-year institutions (8.1 percent). Dial-up access has decreased from 12.1 percent in 2005 to 7.8 percent in 2007 for the 40 institutions that participated all three years.

Student Technology Skills

Respondents rate their skills with course management system (CMS) and presentation software (such as PowerPoint) with mean ratings close to "very good" (scale = poor, fair, good, very good, excellent). Skill levels for spreadsheets, online library resources, and computer maintenance are rated somewhat lower, between "good" and "very good." While 23.7 percent of respondents rate their computer maintenance skill as "excellent," nearly one-third (29.7 percent) report their maintenance skills as "poor" or "fair."

Males report much stronger skill in computer maintenance and moderately stronger skill using video and audio software than females. Males and females show similar skill ratings, however, for the core technologies used in courses—CMS, spreadsheets, presentation software, and use of online library

resources. Also, student major matters when it comes to skill. Fine arts majors report more skill with graphics and audio/video software; engineering majors report more skill with spreadsheets and computer maintenance; and social science and humanities majors report more skill using library Web sites. Students who rate their technology skills stronger also tend to own more computers and other electronic devices, engage more often in many of the Internet activities, and spend more hours per week online.

Seniors rate themselves as more highly skilled than freshmen in online library skills, with 54.3 percent of seniors reporting “very good” or “excellent” skills compared to 40.3 percent of freshmen and 43.6 percent of community college respondents. Respondents report a similar pattern for spreadsheet skills. For other skills ECAR surveyed, no meaningful skill differences were reported between seniors and freshmen.

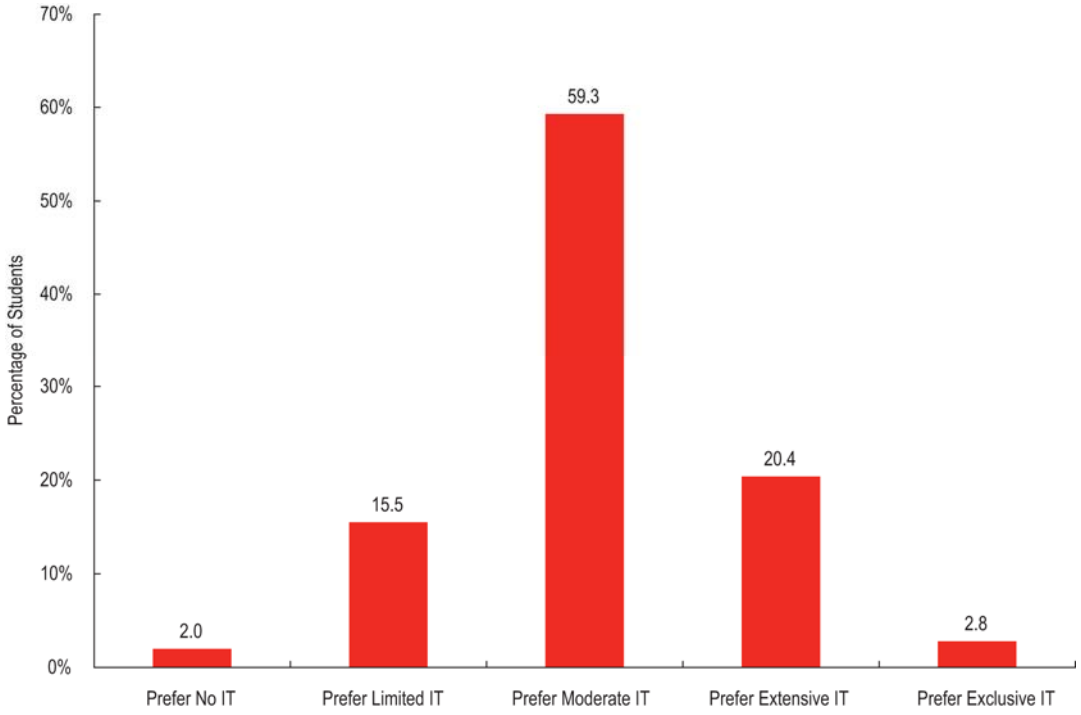
Student Technology Adoption Profile

Students were asked to describe themselves as technology adopters, using the standard scale created by Everett Rogers.[4] Fully 36 percent of respondents identify themselves as innovators or early adopters, 50.6 percent as mainstream adopters, and 13.5 percent as late adopters or laggards. Male respondents (55.4 percent) are more likely to identify themselves as innovators or early adopters compared to females (24.1 percent). Moreover, engineering students (60.4 percent) are more likely to identify themselves as innovators or early adopters than other majors (33.4 percent).

Information Technology in Courses

How much technology do students prefer in their courses? Student preferences for technology in courses has changed little since 2004 when ECAR first asked this question.[5] Students continue to report their desire for what they perceive as “moderate” technology in their courses (see Figure 3). Very few students prefer the extremes—only 2.0 percent prefer no technology at all in their courses, and only 2.8 percent prefer courses that use technology exclusively.

Figure 3. Preference for Technology in Courses (N = 27,675)



Almost 31 percent of male respondents prefer extensive or exclusive technology in courses, compared to 18.5 percent of females. Engineering and business students also prefer somewhat more technology in courses, as do older students. These findings are generally consistent with the past three years' ECAR study results.

Respondents were also asked about what technologies are being used in their courses. Most respondents report use of a core set of technologies in their courses at the time of the ECAR survey (March/April 2007), including e-mail, CMS, course Web sites, and software to create spreadsheets and presentations. Seniors report using more presentation software and spreadsheets in courses this quarter/semester than freshmen. Community colleges students show generally less use for all of these core technologies.

When students were asked whether they like to learn using various technologies, nearly three-fourths (72.0 percent) of the respondents say that they like to learn by running Internet searches; 53.3 percent through programs they can control, such as video games, simulations, etc.; 35.1 percent through text-based conversations over e-mail, IM, and text messaging; and 32.6 percent through contributing to Web sites, blogs, wikis, etc. These findings are interesting because the use of wikis and digital games is increasing in instruction.

CMS Use and Experience

Fully 82 percent of respondents have used a CMS (vendor products such as ANGEL, WebCT, Blackboard, Desire2Learn, OnCourse, or FirstClass; open source software such as Sakai or Moodle;

or homegrown systems tailored to a specific institution) at some point. Most freshmen (78.3 percent) and even more senior respondents (86.8 percent) have used a CMS.

Both the 2005 and 2006 ECAR studies reported that about 72 percent of respondents had taken a class using a CMS. The 2007 data show a significant jump to 82.0 percent. Even while more respondents have used CMS, they still view their CMS experience positively. Respondents say that their overall CMS experience is positive (76.5 percent), and about one in six of these respondents go so far as to say "very positive."

Over 90 percent of respondents have accessed class syllabi (97.7 percent) and online readings and other course materials (96.5 percent) in a CMS. Least used, although still used by about 70 percent of respondents, are getting assignments back from instructors and sharing of materials among students. One-half of respondents reported that they have used all nine of the CMS features in the ECAR list.

Students rate all CMS features as "useful" or better (see Table 4). Those rated highest, with a mean rating above "very useful," are directly related to monitoring and improving performance—keeping track of grades and getting access to sample exams and quizzes. Student comments about turning assignments in online and accessing syllabi and readings were also largely positive.

Table 4. Usefulness of CMS Features

Feature	N	Mean*	Std. Deviation
Keeping track of grades on assignments and tests online	21,341	4.38	0.925
Online access to sample exams and quizzes for learning purposes	19,924	4.17	0.965
Online syllabus	22,254	3.98	1.034
Turning in assignments online	19,622	3.82	1.174
Online readings and links to other text-based course materials	21,949	3.81	1.056
Taking exams and quizzes online for grading purposes	17,848	3.66	1.250
Getting assignments back online from instructors with comments and grades	16,314	3.74	1.252
Online sharing of materials among students	15,643	3.50	1.221
Online discussion board (posting comments, questions, and answers)	19,075	3.13	1.291

**Scale: 1 = not useful, 2 = somewhat useful, 3 = useful, 4 = very useful, 5 = extremely useful*

Note: Students who do not use a CMS feature are excluded.

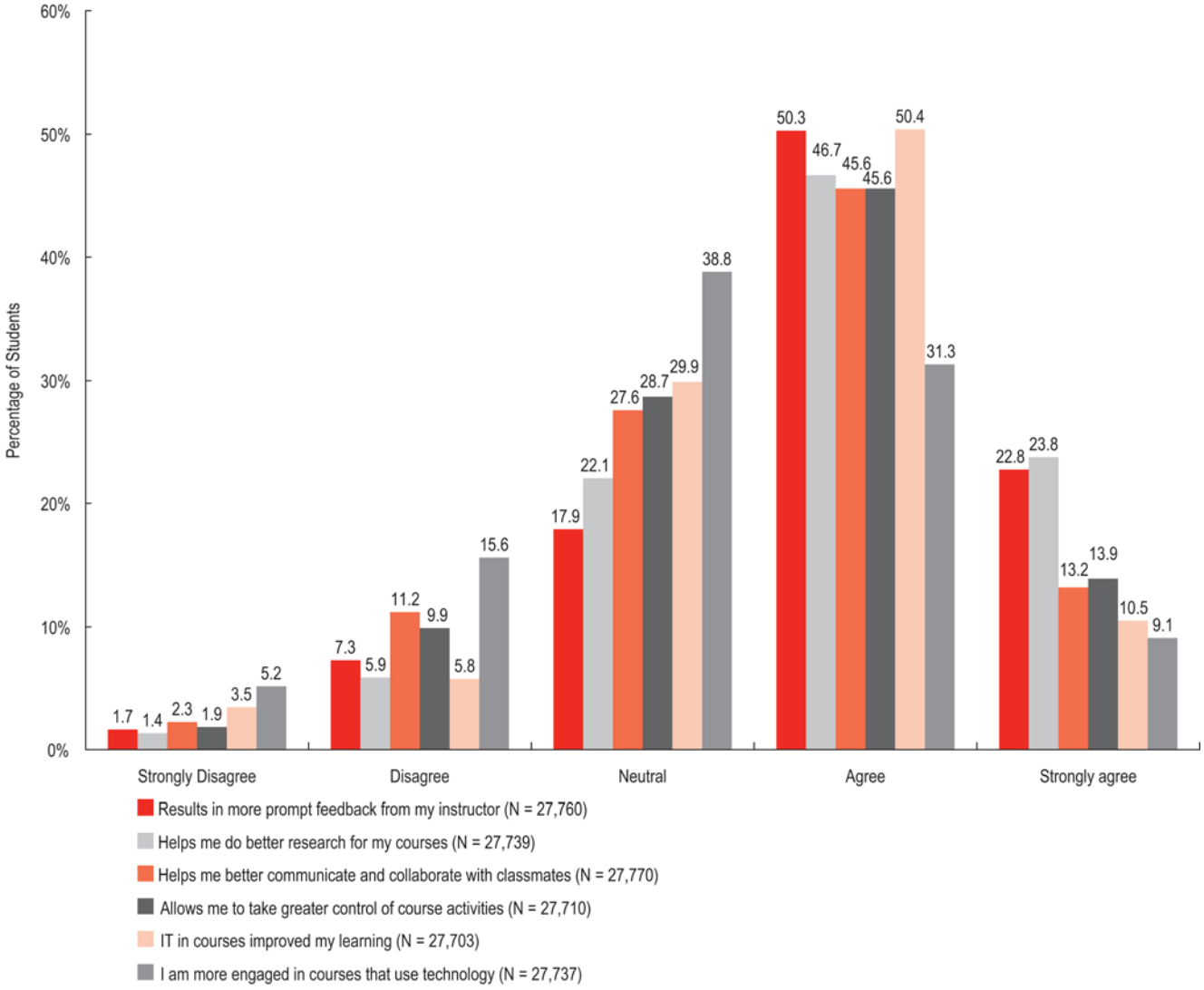
Faculty Use of IT in Courses

Respondents have much to say about their instructors' use of IT in their courses. When asked directly about the statement "Overall, instructors use IT well in my courses," half of the respondents agree (51.5 percent), and 6.7 percent strongly agree. Only 13.6 percent disagree. There are no meaningful differences in ratings based on demographic factors: Carnegie class, technologies used this quarter/semester, and several other factors. One difference is evident, however. Students who say their instructors use IT well they are more likely to report that technology has a positive impact on their academic experience.

Outcomes and IT

For each of the past three years, ECAR has asked respondents whether they agree or disagree with six outcome statements about technology's impact on student engagement, course activities, and learning. Figure 4 shows that respondents for 2007 are generally positive, as they were in 2005 and 2006.

Figure 4. Student Perceptions About IT in Courses



Respondents are most positive about technology's contribution to their course related research (70.5 percent agree or strongly agree) and how IT facilitates timely feedback from instructors (73.1 percent agree or strongly agree). They also point to e-mail communication with instructors as extremely helpful. When asked directly if "IT in courses has improved my learning," half (50.4 percent) of respondents agree and 10.5 percent strongly agree.

The distribution of responses about IT and student engagement shows a traditional bell-shaped curve, with only 40.4 percent agreeing that they are more engaged in courses that require use of IT. This finding indicates that the majority of respondents are unconvinced that IT in courses increases their course engagement (59.6 percent are neutral or disagree).

Respondent perceptions about the ECAR outcome statements are consistent across gender (with the exception of student engagement and IT), age, class standing, GPA, part-time versus full-time enrollment status, and Carnegie class. Responses are also consistent over the past three years' studies, with one exception. The 2006 data indicated that age mattered—older respondents were somewhat more positive than younger respondents about these outcome statements. However, the 2007 data do not show age as a differentiator.

Business and engineering majors, with their stronger technical profile, report somewhat more agreement that technology has a positive impact on their academic experience. This is especially true for student engagement in courses. More than half of engineering students (56.5 percent) and business students (51.3 percent) agree or strongly agree that they are more engaged in courses using IT, compared to other students (only 38.2 percent agree or strongly agree).

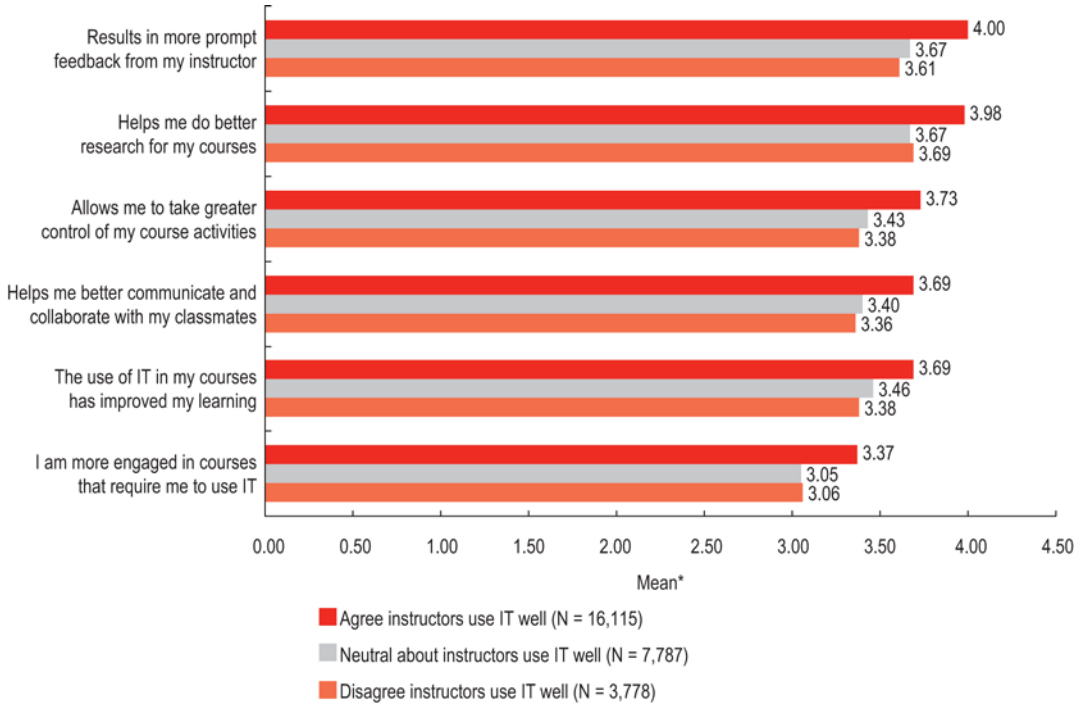
Outcomes and CMS, Preference for IT, and Faculty Use of IT

Respondents reporting a positive CMS experience generally agree with the six outcome statements about technology's impact on student engagement, course activities, and learning. In contrast, respondents reporting a negative CMS experience are more neutral about IT's impact in their courses. Of the six outcomes in Figure 4, positive CMS experience is most strongly associated with the outcome "IT in my courses allows me to take better control of my course activities."

Respondents who prefer more IT in courses agree more strongly that IT has a positive impact in their courses. Respondents who do not prefer much IT in their courses generally disagree or are at best neutral about all of the ECAR outcome statements. For example, of respondents who prefer limited or no IT in courses, 34.4 percent agree that IT improves their learning; in contrast, 79.5 percent of respondents who prefer extensive or exclusive IT in courses agree that IT improves their learning. Of the six outcomes, the strongest relationship by far occurs between the outcome "I am more engaged in courses that require me to use IT" and preference for extensive or exclusive IT in courses. Three-fourths (75.4 percent) of respondents who prefer extensive or exclusive IT in courses say they are more engaged in courses that use IT.

Respondents who were more positive about instructor use of IT in courses were also more positive about the benefits of IT in courses, and vice versa (see Figure 5). This is not surprising, given the relationship between instructor competence and learning. Research about student success concludes that when instructors use effective educational practices, students have a better academic experience.[6]

Figure 5. Student Perceptions About IT in Courses,* by Instructors Use IT Well in my Courses*



** Scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree*

In the answers to the open-ended survey question, hundreds of responses mention the link between technology and learning, either directly or indirectly. Responses fall into three major themes: IT as an enabler of learning, IT as a barrier to learning, and the balance between technology and face-to-face interactions with instructors.

Respondents identify five positive categories about IT as an enabler of learning:

- Technology facilitates organization and control in the learning environment.
- Technology facilitates communication with faculty and classmates.
- Technology can make content more accessible, including class materials and Internet resources.
- Technology in courses is valuable when directly linked to applications useful to future employment.
- Technology is an enabler of learning when professors use it effectively.

Respondents identified four categories about IT as a barrier to learning:

- There are problems with technologies themselves and their institutional implementations and support.

- The proliferation of technology has created a more complex learning environment.
- Poor use of technology by faculty (underuse, overuse, inappropriate use, or over dependence of technology) detracts from the learning experience.
- Instructors sometimes overestimate student comfort with or access to technology resources.

The third theme included the many student comments stating that technology is not a substitute for face-to-face interaction with faculty. This is consistent with our quantitative findings that by far most students prefer only "moderate" technology in their courses (59.3 percent). This theme was strong in student focus groups as well.

For better or worse, students put responsibility for the answer to the question "Does technology improve learning?" squarely on their instructors. Rarely do students attribute IT-related learning problems to their own technical limitations. If the student conclusions are correct, then optimizing technology effectiveness for learning is best focused on four areas:

- developing instructor technology skill sets;
- training instructors on how to effectively integrate technology and pedagogy;
- improving the speed, reliability, and support of the institutions' network and academic applications, especially course management systems; and
- increasing instructor and administrator awareness about how their students differ in technology savvy and access to technology resources.

The Most Valuable Benefit of IT

Over half of respondents (55.5 percent) select convenience as the most value benefit of IT in courses. Second is managing course activities (19.5 percent), followed by communicating with classmates and instructors (10.6 percent), and improved learning (10.3 percent). Even though 60.9 percent of respondents agreed that IT in courses improved their learning, just 1 in 10 respondents (10.3 percent) identified "improved my learning" as the most valuable benefit of IT in courses. Females more often value IT most for its help in communicating and collaborating with classmates (12.4 percent) than do males (7.5 percent).

Conclusion

The ECAR Study of Undergraduate Students, 2007 spotlights undergraduate students' use of, skill with, and experiences with IT in courses. It also identifies trends because student responses are compared for the years 2005, 2006 and 2007. While many findings remain the same for these years, differences also emerge—changes in technology ownership and usage patterns in general and in courses.

Some of the most important findings are reminders of the importance of the curriculum and classroom instruction. Differences between students do emerge when examining student major and their

perceptions and use of technology. Students immersed in a curriculum heavy with IT not only report greater use of and skill with technology but also were more favorable regarding the learning-outcome impact of IT in courses. The importance of the faculty in instruction is also reflected in student perception of faculty use of IT in courses and the impact of IT in courses on learning outcomes. Many students also note that technology is not a substitute for face-to-face interaction with faculty.

Endnotes

1. Previous studies included: Robert B. Kvavik, Judith B. Caruso, and Glenda Morgan, *ECAR Study of Students and Information Technology, 2004: Convenience, Connection, and Control* (Boulder, CO: EDUCAUSE Center for Applied Research, 2004); Robert B. Kvavik and Judith B. Caruso, *ECAR Study of Students and Information Technology, 2005: Convenience, Connection, Control, and Learning* (Boulder, CO: EDUCAUSE Center for Applied Research, 2005); and Gail Salaway, Richard N. Katz, and Judith B. Caruso, *The ECAR Study of Undergraduate Students and Information Technology, 2006* (Boulder, CO: EDUCAUSE Center for Applied Research, 2006).
2. Demographic factors analyzed include gender, age, family income, major, on-campus or off-campus residence, part-time versus full-time enrollment status, and class standing (senior, freshman, or community college student).
3. This number may be understated, as some respondents may not know the term "wiki." In addition, during Internet searches, respondents may be directed to wikis without realizing it.
4. Everett M. Rogers, *Diffusion of Innovations* (New York: Simon and Schuster, 2003).
5. The shape of the response curve in 2007 is a near-perfect bell, as it was in the 2004, 2005, and 2006 studies.
6. Arthur Chickering, *Applying the Seven Principles of Good Practice for Undergraduate Education*, ed. Zelda Gamson (San Francisco: Jossey-Bass, 1991); and George D. Kuh et al., *What Matters to Student Success: A Review of the Literature, Commissioned Report for the National Symposium of Postsecondary Student Success: Spearheading a Dialog on Student Success* (National Postsecondary Education Commission [NPEC], 2006), http://nces.ed.gov/npec/pdf/Kuh_Team_Report.pdf.

Judith Borreson Caruso (judy.caruso@cio.wisc.edu) is an ECAR Fellow and Director of Policy and Planning at the University of Wisconsin–Madison. Gail Salaway (gsalaway@educause.edu) is an ECAR Fellow.

A copy of the full study referenced above will be available via subscription or purchase through the EDUCAUSE Center for Applied Research (www.educause.edu/ecar/).

