

1 Executive Summary

I don't look at it as "getting on the Internet." The Internet is a part of life. It's a lifestyle.
—An undergraduate student

For today's traditional-age undergraduates, information technology (IT) plays an integral role in their everyday lives. They actively use many different technologies for school, work, and recreation. They adopt new technologies when they perceive the benefits and costs are aligned. They report a wide range of preferences, uses, skills, and opinions about IT in the academic context. And many of these views and practices change quickly over time. In this fifth annual study, the EDUCAUSE Center for Applied Research (ECAR) again employs analytics to better understand undergraduates' experiences with IT and how they are evolving. The purpose of the study is threefold:

- ◆ to provide information on the technology behaviors, preferences, and attitudes of higher education's undergraduates, especially as it relates to their academic experience;
- ◆ to provide information to college and university administrators that will help them implement campus technology environments for students; and
- ◆ to inform the practices of teaching faculty who are working to incorporate IT in rich and meaningful ways into their curricula and pedagogies.

The 2008 survey that informed this study has two components. First, as in previous

years, the core survey queries undergraduates about their use of, and skill with, technologies and their perceptions about the impact of IT on their academic experience. In addition, ECAR believes that there is value in providing more in-depth findings about specific topics that are both relevant and timely to higher education. For 2008, the survey therefore included a focus area topic about social networking sites (SNSs)—a technology that students are enthusiastically adopting and that is already changing the social fabric of universities. Nicole B. Ellison, assistant professor of telecommunication, information studies, and media at Michigan State University, provides the Introduction to this study (Chapter 2), describing her perspectives and research about the impact of SNSs on both students and the academic community.

Methodology

The 2008 study builds on previous ECAR studies of undergraduates and IT and uses a multipart research approach that includes

- ◆ a literature review (extending the 2007 literature review) and review of other relevant surveys;
- ◆ a quantitative web-based survey of college and university freshmen and seniors at 90 four-year institutions and students at 8 two-year institutions;

- ◆ student focus groups, which provided qualitative data from 75 students at four institutions;
- ◆ analysis of qualitative data from 5,877 written responses to the open-ended survey question; and
- ◆ a comparison of longitudinal data collected in the 2006, 2007, and 2008 surveys, where available.¹

The great majority of the 27,317 student respondents are among those commonly called *traditional* students—under 25 years of age (78.8%), attending a four-year institution (87.8%), and going to school full time (84.0%). Most attend public institutions (74.8%), and about a third (32.3%) attend institutions with enrollments greater than 15,000 students.

Key Findings

Undergraduates had much to say about their experiences with IT, and many themes and findings emerged from their responses. The following stand out as especially interesting or relevant to helping college and university administrators as they make investment and priority decisions about IT deployment at their institutions.

Mobility: Laptops and Internet-Capable Cell Phones

Laptops continue to gain as the computer platform of choice. This year, 80.5% of respondents own them, and longitudinal data for just those institutions that have participated in ECAR studies for the past three years show that laptop ownership has increased from 65.9% in 2006 to 82.2% in 2008. Most freshmen at four-year institutions have new laptops when they enter college—with 71.1% owning one that is less than a year old. Most respondents (68.9%) own a computer of some type that is two years old or less, well within recommended equipment replacement cycles. However, about one-sixth of respondents (16.8%) have a computer four

years old or older, more likely to encounter reliability and/or performance problems. And 1.5% of respondents still don't own a computer at all.

Colleges and universities are tracking the maturation and price points of converged mobile handheld devices as a platform for providing IT services to students. ECAR data show that Internet-capable cell phones are now owned by fully 66.1% of respondents. Yet, most do not take advantage of the Internet capability, citing high cost, slow response, and difficulty of use as primary reasons. Despite these barriers to use, ECAR finds that almost one-fourth of respondents do access the Internet from a cell phone or PDA at least monthly, and 17.5% do so weekly or more often. Among respondents who say they are early adopters of technology, 25.9% already access the Internet from handheld devices weekly or more often.

Computer and Internet Activities

ECAR respondents spend an average of 19.6 hours per week actively doing online activities for work, school, or recreation. Although more than two-thirds (69.0%) spend 20 hours or less, about 1 in 14 (7.4%) spends more than 40 hours per week—in the range typically considered a full-time job. Time spent online varies by major, with engineering majors using the Internet most often (mean of 24.8 hours per week) and life/biological sciences and education majors using the Internet least often (means of 17.9 and 17.6 hours per week, respectively). Community college students show significantly less overall time online (mean of 14.8 hours per week). Today, almost all respondents report using high-speed access to the Internet; only 1.9% of respondents report still using dial-up services.

For undergraduates, technology is first about communication. After discovering in previous surveys that e-mail use is ubiquitous,

the ECAR survey did not ask about it this year. A much newer mode of communication, social networking, has become nearly ubiquitous as well: 85.2% of respondents use SNSs (primarily Facebook), and most do so on a daily basis to keep in touch with others. Text messaging (used by 83.6%) and instant messaging (IM) (used by 73.8%) are immensely popular, especially among younger students. More than one-third of respondents are also interactive on the Internet by contributing content to blogs, wikis, and photo or video websites.

Students are also actively involved in creating visual and audio media. About one-third of respondents (males more than females) use audio-creation or video-creation software, and 73.9% use graphics software (Photoshop, Flash, or the like). Further, highly interactive games are popular, with almost one-third of respondents (more males than females) engaging in online multiuser computer games such as *World of Warcraft*, *EverQuest*, and poker. And the emerging online virtual worlds (such as Second Life) are already being used by about 1 in 11 respondents (8.8%).

IT Skills and Internet Literacy

ECAR survey respondents generally perceive that they are “fairly skilled” to “very skilled” in core applications used for course work—presentation software (such as PowerPoint), spreadsheets (such as Excel), course management systems (CMSs), and the college/university library website. Seniors report higher skills than freshmen in using spreadsheets and the college/university library website, reflecting experience gained from taking more courses. Gender differences are not great, with the exception that males report much stronger skills in computer maintenance.

This year ECAR asked three questions about information literacy, derived from the standards published by the Association of

College and Research Libraries (ACRL).² Not surprisingly, respondents consider themselves quite Internet savvy. A full 79.5% give themselves glowing reports about their ability to “use the Internet effectively and efficiently to search for information,” with half rating themselves as “very skilled” and another third rating themselves as “experts.” Further, about half of respondents say they are “very skilled” or “expert” when it comes to “evaluating the reliability and credibility of online sources of information” or “understanding the ethical and legal issues surrounding the access and use of digital information.”

Many educators believe that students’ perceptions about their IT skill levels and Internet savvy are questionable, characterizing their approach to information literacy as do-it-yourself and often relying too heavily on peers rather than on library staff or faculty.³ In addition, students may have confidence because they are unaware of the complexities involved or just because they have grown up with technology. This potential gap between actual and perceived skills and literacy is important to understand and factor into strategies for teaching and learning at the institution.

IT in Courses

Although respondents are generally enthusiastic about IT, most say they prefer only a “moderate” amount of IT in their courses (59.3%). This finding has been consistent over the past five years’ studies, even as new technologies have emerged and the overall digital environment has become increasingly dense. It suggests a widespread perception among students that IT resources are best situated in a variety of other learning environments. Especially, respondents emphasize that technology should not eclipse valued face-to-face interaction with instructors.

Males prefer somewhat more IT in courses than females. This year, for the first time, students from all age groups show the same pattern of preference for IT in courses.

Previous years' studies found that younger respondents preferred less technology in their courses than older respondents. In 2007 the difference was slight, and ECAR speculated that we might see a trend away from age as a differentiator (which the 2008 data now validate). This finding likely reflects that technology is becoming increasingly integrated into the lives of students of all ages.

Respondents identified which technologies they were actively using as a part of their courses during the quarter/semester of the survey (February 15 through April 7, 2008.) Several basic technologies were used by many respondents during that term—college and university library websites, spreadsheets, and presentation software. For these and other technologies used in courses, student major plays a key role. Engineering and physical sciences majors used more programming languages and discipline-specific IT; business and engineering majors used more spreadsheets; and fine arts majors used more graphics, audio-creation, and video-creation software. Community college students showed less use of technology in courses during this time. Of special note is that although few respondents (4.2%) used podcasts this quarter/semester, student comments from focus groups and from the survey were extremely positive about podcasts as a supplemental tool for courses. This mimics last year's finding.

ECAR also asked students if they liked to learn using specific types of technologies. The most frequently cited item was running Internet searches (80.2%). More than one-third of respondents (44.3%) say they like to learn through text-based conversations over e-mail, IM, and text messaging or by contributing to websites, blogs, or wikis (35.5%). Interestingly, a solid half (50.8%) like to learn through programs they can control, such as video games or simulations. This is important in the context of discussions about digital game-based learning in higher education and

whether the extent of learning justifies the resources required to implement a game.⁴

ECAR was interested in the extent to which students participate in online courses, especially considering earlier years' findings that most students prefer a balance between technology and in-class interactions. Only 11.9% of respondents were taking one or more online courses at the time of the survey, and only 2.8% were taking exclusively online courses. This makes sense, given that the ECAR survey respondent base is heavily weighted with so-called traditional students. In fact, part-time students and older students were more likely to be taking online courses.

Asking this question triggered many written comments about online courses. Positive comments pointed to convenience and the ability to take courses that would otherwise be unavailable to a student. The majority of comments, however, were negative. Four themes emerged—that the lack of face-to-face interaction detracts from learning, that online courses facilitate cheating, that technical problems still exist, and that online courses require students to “teach themselves,” making the courses more demanding.

Further, some institutions are considering the value to students of experiencing online courses. ECAR therefore asked students if during their college career “it would benefit students if my institution required students to take at least one entirely online course.” There is a resounding lack of support for this idea, with only 23.0% of respondents in agreement. The negative response is likely due both to the lackluster response to online courses as well as to students' taking issue with the idea of making the course a “requirement.”

Currently, 82.3% of respondents have used a CMS, most of them using it several times per week or more often. At four-year institutions, only slightly more seniors (85.3%) have used a CMS than freshmen (77.1%). Among respondents from the eight

participating community colleges, 60.1% have used a CMS. Consistent with previous years' findings, respondents generally like using a CMS; 57.8% of respondents say their CMS experience is positive, and an additional 11.7% go so far as to say their experience is very positive. However, about 1 in 20 students (5.3%) do report an overall negative experience with CMSs.

In response to previous years' comments from students about course problems related to reliability of CMSs, networks, and other IT services, ECAR asked directly about the availability of IT services for course work. Half of respondents (49.8%) agreed with the statement "My institution's IT services are always available when I need them for my course work." One-third (33.4%) were neutral, and 16.8% disagreed. Clearly, from a student perspective, there is room for improvement in the performance of most campus IT infrastructures and services.

Instructor Use of IT in Courses

As in previous years, hundreds of students commented about the link between technology, instructors, and learning. Qualitative analysis shows that the themes expressed in 2008 are consistent with those from last year (see the 2007 study report for an in-depth analysis).⁵ To supplement ECAR's understanding of issues that came up in previous surveys' qualitative remarks, the 2008 survey asked students three specific quantitative questions about instructor use of IT. ECAR finds that fewer than half of students think that most of their instructors use IT effectively in courses. The data show that

- ◆ two-fifths of respondents (44.0%) report that most of their instructors use IT effectively in courses,
- ◆ one-third of respondents (34.1%) report that most of their instructors provide students with adequate training for the IT the instructor uses in his or her course, and

- ◆ one-third of respondents (35.2%) report that most of their instructors understand the IT skill levels of their students.

Students who are positive about their CMS experience are much more likely to think that more of their instructors use IT effectively than those who report negative CMS experience. Similarly, respondents who agree that their institution's IT services are always available when needed for course work are also more positive about instructor use of IT in courses.

The Impact of IT in Courses

How does higher education's use of IT impact student success? This is a bottom-line concern for both educators and administrators and has been an ongoing challenge for decades. Adding a technology component to the mix means factoring in issues such as information literacy and emerging technologies. Still, the ECAR survey provides a valuable opportunity to learn more about how students perceive the impact of IT on their academic course work. To this end, ECAR designed questions about each of three important dimensions of student success.⁶

- ◆ *Learning*: "The use of IT in my courses improves my learning" (45.7% of respondents agree).
- ◆ *Student engagement*: "I get more actively involved in courses that use IT" (31.8% of respondents agree).
- ◆ *Convenience*: "IT makes doing my course activities more convenient" (65.6% of respondents agree).

Convenience is the clear front-runner. Each year, in both the quantitative data and the qualitative data, respondents tell us that convenience is the most valued benefit of IT in courses. Still, 9.4% of 2008 respondents disagree with the convenience statement. With respect to learning, almost half of respondents (45.7%) agree that IT in courses improves their learning; another 39.3% are

neutral, and 15.1% disagree. Perceptions about IT's impact on courses are consistent across most demographic factors, with a few exceptions. Engineering and business majors agree slightly more with all of these statements about IT in courses.

What are the common characteristics of respondents who are positive about the impact of IT? This cadre of students describe themselves as preferring more IT in their courses and as early adopters of technology. They are more positive about their experiences with CMSs and with the availability of campus IT services when needed for courses. Most important, they are more likely to say they have instructors who use IT effectively.

A Digital Divide

ECAR asked respondents to describe themselves in terms of technology on two dimensions—how much IT they preferred in their courses and how they adopt technology (from leading edge to trailing edge). Responses to each question form a traditional bell-shaped curve, indicating a wide range of views, from those who prefer extensive IT in courses and adopt technologies early to those who prefer limited or no IT in courses and adopt technologies only when necessary. Overall, student preferences for IT in courses and adoption practices do not vary significantly with age, class standing, or Carnegie classification. But they do differ when it comes to gender. For example, half of males (52.8%) consider themselves early adopters of technology, compared with only one-fourth of females (25.2%).

These different segments of undergraduates report very different experiences when it comes to technology. Those who are more technology oriented report that they experiment with new technologies and want to use them in courses. They spend more time online and accessing the Internet from cell phones and are more engaged in sophisticated software such as that used for creating graphics,

audio, and video. They largely view technology as having positive outcomes on their course work. In contrast, those who identify themselves as not very technology oriented prefer less IT in courses and are less likely to claim strong IT skills in the basics required for courses—CMSs, presentation software, and spreadsheets. They are less likely to view technology as having a positive impact on their course work.

This self-described “digital divide” highlights the reality that a one-size-fits-all technology strategy for teaching and learning may not be as effective as one that explicitly factors in the differences between these high-tech and low-tech groups.

Social Networking Sites

Ellison's Introduction to this study describes the fast-paced evolution and adoption of SNSs and how, after just a short few years, SNSs play an essential role in the lives of college and university students. Her essay is itself evidence that after several years during which journalism and pop cultural analysis dominated discussions of social networking, researchers are now taking SNSs seriously, studying a broad range of related issues. ECAR, as well, was prompted to ask undergraduates about SNSs.

SNS Users' Profiles

Overall, 85.2% of respondents are now using SNSs. In fact, ECAR longitudinal data about basic SNS usage from the 2006 survey to the 2008 survey—an elapsed time of only two years—show that for the 44 institutions that participated in all three years' surveys, the percentage of respondents who use SNSs has increased, from 74.8% to 88.8%. But the striking change is in how many respondents now use an SNS on a daily basis, up from 32.8% in 2006 to 58.8% in 2008. SNS usage has increased, and dramatically so.

Age is the single most important factor in looking at usage of and perceptions about SNSs. Younger students are clearly leading

the charge. Virtually all respondents 18 or 19 years old use SNSs (95.1%), in contrast with about half of respondents aged 25 or older (50.2%). Facebook is currently the SNS of choice at doctoral, master's, and bachelor's institutions, while MySpace is the SNS of choice at associate's institutions. Seniors, closer to entering the workforce, are more likely to use the growing career SNS LinkedIn than are freshmen.

Most respondents report using just one (52.9%) or two (38.4%) SNSs, and by far, most keep only as many profiles as the number of SNSs they use. These SNS profiles appear to be stable, with 80.7% of respondents saying they change a profile only monthly or less often. SNS friends are an entirely different matter, with more than one-fourth of respondents (28.4%) saying they have more than 300 SNS friends.

Most respondents (55.8%) spend 5 hours or less per week on SNSs, and another fourth (26.9%) spend between 6 and 10 hours per week. What are students doing with all of their time on SNSs? Hands down, the most common use is to stay in touch with friends (96.8%). Repeatedly, the open-ended survey comments spoke about the value of SNSs for getting and (creatively) staying in touch with family, local friends, long-distance friends, high school friends, and a host of other colleagues. Two-thirds of respondents value SNSs as a way to share photos, music, videos, and other works; about half report using SNSs to find out more about people, to plan or invite people to events, and to communicate with classmates about course-related topics. For these activities, younger students are more active.

Interestingly, SNSs do not seem to be so much about making friends of people students have never met in person (only 16.8% do so) or about finding someone to date (only 4.9% do so). As expected, males are more likely to use SNSs to find someone to date (8.2%) than females (3.0%).

Perhaps most interesting to colleges and universities is the finding that half of SNS users (49.7%, and females more than males) have integrated SNSs into their academic life as a mechanism for communicating with classmates about course-related topics. Only 5.5%, however, extend their use of SNSs to communication with instructors about course-related matters. Students in focus groups and in the survey comments expressed both pros and cons about the involvement of instructors in their SNS lives—many being adamant that social networking sites should be the exclusive realm of students, but others liking the idea of interacting with instructors and using the same SNS mechanism they already use to communicate with friends and classmates.

ECAR asked the 14.8% of respondents who do not use SNSs, why not? Two-thirds of these respondents say that one of their top three reasons is that they are just not interested, and two-fifths say they actually don't like SNSs. However, a significant number of respondents point to security concerns (19.0%) and privacy concerns (34.6%), and some of these might choose to use SNSs if they believed that privacy and security problems were remedied.

SNS Privacy and Security

Much attention, from both the popular press and researchers, has focused on SNS privacy and security issues. Are undergraduates at risk for identity theft, harassment, or other misuse of personal information? ECAR asked students their opinions about basic privacy concerns, and also about their practices to prevent exposure—what they reveal about themselves on SNSs and to what extent they place restrictions on access to their SNS profiles.

It is common for all age groups to reveal their first name and personal photos on SNS profiles (about 90%). Younger respondents are more likely to reveal all types of personal information ECAR asked about, especially last name, date of birth, e-mail address or IM

screen name, and cell phone number. Data patterns for revealing information are similar for males and females, with the following exception: Females report revealing less information that is especially helpful in identifying them directly—last name, cell phone number, and home phone or address.

Overall, SNS users do not appear to be overly concerned about privacy and security issues. Only about half of respondents (54.4%) are at least moderately concerned that their information will be misused. None of the concerns ECAR asked about—misuse of information, security problems (for example, exposure to files with viruses), cyberbullying or cyberstalking, and leaving a history that could cause problems (such as when applying for a job)—led even one-third of SNS users to characterize themselves as “very concerned” or “extremely concerned.” Females are more concerned than are males about security issues and about cyberbullying or cyberstalking. Older students are more concerned than are younger students about security problems and misuse of their information.

Why this lack of strong concern? One possibility is that students who say they are less concerned may just be unaware of the risks inherent in SNSs. Alternatively, since SNSs have capabilities for protecting personal information, it is likely that respondents who do actively place restrictions and/or take care in what they put on SNSs factor that into their answers and express less concern. In fact, most respondents using SNSs do put restrictions on who can access their profiles (87.4%), and nearly half (45.4%) say they put a lot of restrictions on them. Females are more likely to place restrictions and to place more restrictions than males. Younger respondents are somewhat more likely to do so than older respondents. However, older respondents are less likely to reveal personal information in the first place.

The strongest finding is that respondents who are more concerned about privacy and security are much more likely to place

restrictions on their SNS profiles. These SNS users are also somewhat more likely to reveal less personal information on SNSs. This suggests that understanding the risks and consequences of security and privacy exposure along with understanding methods of protecting personal information can help students choose what information they reveal and/or protect.

Conclusion

Most of the 2008 survey respondents belong to the Net Generation, and the ECAR data confirm the IT use characteristics often assigned to this generation. Findings indicate that they value IT’s role in providing convenience and expect IT services to be available when they need them; they actively use multiple modes of IT to communicate, socialize, and stay connected with others; they perceive themselves as net savvy; they choose mobile technologies and use of visual media; and they take advantage of Web 2.0 technologies to express themselves on the Internet in varied and creative ways. Older students show many of these characteristics as well.

At the same time, Net Generation students, along with older students, report that they are not looking for extensive use of IT when it comes to their academic courses. They do not take lots of entirely online courses, and most indicate that even when course lecture materials are posted online, they still do not skip classes. Instead, we found a widespread attitude that IT resources—no matter how students think about them—are best situated in learning environments where technology is balanced with other learning activities, especially face-to-face interactions with faculty and students in the classroom. As one engineering major summed up, “I feel that IT is a wonderful tool when it is fully understood by both the course instructor and the students. Anything less than that and the tool suddenly becomes something that merely looks pretty, or, in the worst case, is a clunky monster.”

Upcoming: The 2009 ECAR Study

In 2009, ECAR will again conduct the survey of undergraduates and IT. The survey will be updated to reflect changes in technology and to incorporate what has been learned from the 2008 study. Questions about the use of IT in and out of courses and about student perceptions regarding the impact of IT on their academic experience will continue to form the core of the survey.

The 2009 survey will again feature a special topic area. Because many colleges and universities are now making decisions about delivering IT services to Internet-capable cell phones, the 2009 survey will ask students about their use of Internet-capable handheld devices. It will likely include questions about what services and content students use, or plan to use, and their opinions about these devices as a platform for accessing institutional IT services.

ECAR invites colleges and universities to participate in and support the 2009 survey and, in return, receive the data from their institution's respondents.⁷ For more information, see the ECAR website, <http://www.educause.edu/ECAR/Reference/StudentStudy/5822>.

Endnotes

1. For comparison of 2006, 2007, and 2008 data, we used data from the 44 institutions that participated in the student study each of these years. Although the institutions are the same, they surveyed different students each year.
2. Association of College and Research Libraries, "Information Literacy Competency Standards for Higher Education," January 18, 2000, <http://www.ala.org/ala/mgrps/divs/acrl/acrlstandards/informationliteracycompetency.cfm>.
3. George Lorenzo, Diana Oblinger, and Charles Dziuban, "How Choice, Co-Creation, and Culture Are Changing What It Means to Be Net Savvy" (ELI Paper 4) (Boulder, CO: EDUCAUSE Learning Initiative, October 2006), <http://connect.educause.edu/Library/ELI/HowChoiceCoCreationandCul/39342>.
4. Richard Van Eck, "Digital Game-Based Learning: It's Not Just the Digital Natives Who Are Restless," *EDUCAUSE Review* 41, no. 2 (March/April 2006): 20, <http://connect.educause.edu/Library/EDUCAUSE+Review/DigitalGameBasedLearning/40614>.
5. Gail Salaway and Judith Borreson Caruso, with Mark R. Nelson, *The ECAR Study of Undergraduate Students and Information Technology, 2007* (Research Study, Vol. 6) (Boulder, CO: EDUCAUSE Center for Applied Research, 2007), 85–8, available from <http://www.educause.edu/ecar>.
6. Peter Ewell and Jane Wellman, "Enhancing Student Success in Education: Summary Report of the NPEC Initiative and National Symposium on Postsecondary Student Success" (National Postsecondary Education Cooperative, 2007), http://www.cpec.ca.gov/CompleteReports/ExternalDocuments/NPEC_Ewell_Report.pdf. ECAR used this and other articles generated from the initiative.
7. Students participating in the survey are assured that no confidential information about them will be made available to their institutions.