

Foreword

The EDUCAUSE Center for Applied Research (ECAR) was launched on January 1, 2002, to create a body of research and analysis on important issues at the intersection of higher education and information technology (IT). ECAR is fulfilling its mission through a program of symposia and through the publication of biweekly research bulletins, detailed research studies, occasional papers, executive roadmaps, and case studies. These publications are designed to highlight effective practices, lessons learned, and other insights from the practical experience of campus leaders. Since ECAR's inception, 13 symposia have been held, and more than 400 research publications have been issued.

Study of Students and Information Technology

The 2004 ECAR study of students and technology was a giant first step in fulfilling ECAR's earliest and most ambitious vision. Robert Albrecht, Mary Beth Baker, Diana Oblinger, and I had the audacity to imagine that ECAR, then a modest start-up, might someday institute an ongoing survey of the IT practices, preferences, preparedness, and performance of college students. It took ECAR Fellows Robert Kvaik and Judith Borreson Caruso, working with many others, to bring

this dream to fruition. The ECAR study is a simple one. In an era of spam e-mail, dwindling attention spans, and excessive market research, ECAR investigators knew that we would have, at best, a limited opportunity to engage—electronically or otherwise—with freshman- and senior-year students. We would have to navigate Institutional Review Board (IRB) scrutiny and approval processes not once, but repeatedly. We would have to depend on the generosity and shared vision of our colleagues throughout higher education to broker the necessary cooperation of CIOs, registrars, provosts, and many others. In 2004, 13 courageous universities took a plunge and important ground was broken.

Since 2004, steady progress has been made. Gail Salaway joined the team and has served the community with distinction since serving as principal investigator of the 2006 study. She and ECAR Fellow Judith Borreson Caruso have guided this effort for four years and introduced the idea of the “deep dive” to this effort. In 2008, ECAR dove deep on the topic of undergraduate students and social networking, and this year we look closely at the topic of undergraduates and mobile technologies.

This year ECAR welcomed Shannon Smith to the team. Shannon brings eight years of professorial experience (history) among the

Lakota Indians at Oglala Lakota College. She brings the passion and perspective of the experienced instructor. Gail Salaway and Judith Borreson Caruso continued to serve as investigators, bringing deep expertise to the table. Among other things, Judith facilitated student discussion sessions at Grand Rapids Community College; Hamilton College; University at Albany, SUNY; and the University of Wisconsin–Stevens Point to help us better understand the quantitative data from our survey. And this year, 30,616 students from 115 colleges and universities participated in the study.

Undergraduate Students, 2009

The higher education class of 2013, which passed through our gates this September, will be an interesting class to understand. Their birth year marked the birth of the Linux operating system and of PGP, the e-mail encryption utility. The year of their birth marked the first year that the World Wide Web was released publicly, and the year that Windows 3.0 was released. That release, along with the release of Intel's 80386 processor, made it possible for personal computers to support large graphical applications. Before the students in the class of 2013 were five years old, Netscape and Yahoo were founded, bringing the browser and search technologies to new levels of sophistication in the consumer marketplace. By the time today's freshmen were five years old, the Nintendo 64—a true 64-bit game platform—was commercially available, and before they were 10, the Sony Playstation2 was the “must have” Christmas gift for a great many.

By the time today's first-year undergraduates entered high school in 2005, the number of U.S. homes connected to the Internet by broadband equaled those connected via dial-up.¹ In all, more than 60 million Americans had broadband at home by 2005. Before entering high school

in 2005, 45% of American teens had cell phones, and 33% were already texting. Of those who texted, the mode of communication used *most often* when communicating with friends was IM over e-mail in a wide array of contexts.² By 2008, the proportion of Americans with broadband to the home had risen to 55%, and 82% of households with household incomes of \$75,000–\$100,000 per year had broadband.³

Many of today's first-year collegians really have grown up digital. The key technologies—the hardware, personal productivity software, communications infrastructure, and search, browser, and 3-D simulation technologies—that continue to define the computing and communications infrastructure today are old friends. Most were in place and reasonably robust before these students became teenagers.

The most technologically able of these new college students are incredible. Can Duruk and his friend illustrate the point. Duruk, a Carnegie Mellon University senior, was attacked and robbed by two armed men just before midnight in August 2009. By 4:00 a.m. he had led the police to the thieves and identified both of them in a police lineup. Duruk's police work was made possible by his knowledge of the technology on his stolen iPhone that he found through the Internet. When the robbers took Duruk's wallet, they also took the PIN for his bank card, and they took his iPhone. Using a friend's iPhone and MobileMe, an online application that synchronizes the iPhone and displays its exact location, Duruk and his friend were able to track the path of the robbers. They also followed the trail of the robbers' financial activity as well and were in constant contact with Pittsburgh police, who ultimately arrested the robbers at a suburban Eat'n Park restaurant.⁴

To a very great extent, anecdotes like Can Duruk's story and the data from ECAR, the Pew Internet & American Life Project, the *Student Monitor*, and other resources

paint a picture of a crop of capable and highly computer literate undergraduates. ECAR survey respondents continue to own a wide variety of technologies. In many cases they arrive on campus with new and mobile technologies, and they are easily acclimated to course management systems (CMSs) and other course and personal productivity tools. Increasingly, they not only read blogs and wikis or watch YouTube and other videos, but they also produce and contribute original text, photographs, and video. Indeed, a central story in the evolution of the ECAR student study is the shift of the web from a repository of others' content to a medium for creative contribution and a medium of social exchange. Undergraduates today extend the length of the shadows they cast via the Internet.

Mobility is becoming a dominant subplot in the story of undergraduates and IT. Today's students overwhelmingly prefer laptop computers to desktop computers, and growing numbers of students own smart handheld devices. Most of the 2009 ECAR survey respondents had a smartphone with a data plan, intended to have one, or would like to have one. The limits on these students' appetite for connectivity seem constrained more by money than by lack of interest.

Confirming, Comforting, and New Findings

It's no surprise that data from the ECAR student studies does not lurch from year to year. This is affirming to us, since it tends to validate past findings. As in the past, this year we found the following:

- ◆ Students own a variety of information and communication technologies and use them regularly to communicate, find and exchange information on the Internet, do class work, and recreate.
- ◆ Students want a "moderate" amount of technology in their courses.

- ◆ Freshmen and seniors report different skill levels and different preferences for technology in support of course activities.
- ◆ Male and female students continue to report differing hours of use of IT, differing skill levels, and differing IT application preferences, but these differences can be ascribed almost entirely either to the extra time males spend gaming or to the higher enrollment of males in business and engineering disciplines.
- ◆ The choice of a student's academic major is closely associated with the student's perceived skills in certain IT applications and in his or her reported preference for technology in courses.
- ◆ Students are overwhelmingly positive about CMSs, but they want greater consistency in their use and availability.

With regard to mobile technologies, we found the following:

- ◆ Although more than half of respondents (51.2%) owned an Internet-capable handheld device and another 11.8% planned to purchase one in the next 12 months, one-third (35.5%) neither owned such a device nor planned to purchase one in the next 12 months. Almost three-quarters (73.7%) of respondents who currently own such devices expected their use to increase or greatly increase in the next three years.
- ◆ Although nearly a third of those who owned such devices (29.0%) used the Internet from their device daily, another third (35.4%) said they never use the Internet from their device. More than three-quarters (76.0%) of the device owners who did not use the Internet capabilities of their device cited the cost of the data service as one of the three reasons that limited its use.
- ◆ The top Internet activities performed from a handheld device were checking

information such as news, weather, and sports (76.7%); using e-mail (75.1%) and social networking websites (62.5%); and using maps, getting directions, or planning routes (58.7%).

- ◆ Almost a third of respondents (32.2%) regularly used their cell phone or hand-held Internet device for non-course activities while in class.

Too Many People to Thank

The ECAR study of students and IT is an ambitious undertaking, and of course there are too many people to thank. All of us owe Shannon Smith, Gail Salaway, and Judith Borreson Caruso a lot for their outstanding work. This work is not only difficult in the usual analytical and logistical ways; it also poses a big administrative challenge. Quite rightly, the study of students demands and receives the full measure of protections under a variety of state and federal regulations. In particular, research on students often falls under the purview of college and university IRBs. IRB approval is never a foregone conclusion, and it is rarely easily obtained. For this study, approval was received from every institution that participated. At each institution, one individual handled the necessary and often complex coordination associated with obtaining the necessary approvals to move forward. These people are named—with our considerable thanks—in Appendix A.

In addition, a variety of campus operating leaders shepherded the process of developing randomized samplings of their freshman and senior populations and deploying the survey to resulting sample members. We also owe this large cadre of active supporters a lot. Sincere thanks also are extended to our colleagues at Grand Rapids Community College; Hamilton College; University at Albany, SUNY; and the University of Wisconsin–Stevens Point who

paved the way for us to meet with groups of students from their institutions.

On the content side, we thank Julie Little of EDUCAUSE, who guides EDUCAUSE efforts on the teaching and learning side. She has been a steadfast and thoughtful guide, counselor, and partner on this study. I am grateful for her time, skills, and collegial nature. I also cannot thank enough my colleague Ron Yanosky. Ron represents quite simply the best of what the academy offers—the academic mentor. Ron spent countless hours with Shannon reading and rereading her text and analyses, coaching her gently in the art of data interpretation à la ECAR. We are more cautious than many in interpreting data and careful in our use of adjectives or jargon. That care and caution can only be transmitted to ECAR investigators the old-fashioned way—through discussions between a senior mentor and his or her apprentice. Ron has a penetrating intellect and rabbinical patience. Studies conducted under his guidance simply get better for it.

Of course, after all of this work on content development is complete, the work of the production team begins. The care of our investigators and fellows in constructing and designing surveys and in analyzing responses and checking analyses is matched by a team of editors under the guidance of Gregory Dobbin and Nancy Hays. They are thorough people and work with a team of editors, proofreaders, digital compositors, and printers. In studies where a quarter-inch shift in a column can obliterate a careful analysis, one cannot understate the effort these people make or the successes they claim. And last, but of course not least, Toby Sitko resides at the interface of the research team and the production team and orchestrates the overall project with the skill of a symphony conductor. ECAR depends on her every day.

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Endnotes

1. John Horrigan, "Home Broadband Adoption, 2009," Pew Internet & American Life Project, June 2009, <http://www.pewinternet.org/Reports/2009/10-Home-Broadband-Adoption-2009.aspx>.
2. Amanda Lenhardt et al., "Teens and Technology," Pew Internet & American Life Project, July 27, 2005, http://www.pewinternet.org/~media/Files/Reports/2005/PIP_Teens_Tech_July2005web.pdf.pdf.
3. John Horrigan, "Home Broadband Adoption, 2008" (p. 3), Pew Internet & American Life Project, July 2008, http://www.authoring.pewinternet.org/~media/Files/Reports/2008/PIP_Broadband_2008.pdf.
4. ThePittsburghChannel.com, "Mugging Victim Tracks Suspects Via iPhone's GPS," August 20, 2009, <http://www.thepittsburghchannel.com/news/20631440/detail.html>.