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Methodology and Respondent Characteristics

P.S. I completed this survey from my iPod touch.

—An undergraduate student

The ECAR study of undergraduates and information technology (IT) was launched six years ago to help inform college and university leaders, technology staff, and faculty as they make critical decisions about their institutions' technology investments and implementations. To complete this study, ECAR collects, analyzes, and reports on both qualitative and quantitative data that profiles undergraduate use of technology in general and as it pertains to the academic experience. This information is particularly relevant to administrators responsible for deploying the overall campus technology environment and is useful to instructors and instructional technology staff as they decide how to incorporate IT into the curriculum.

Questions about undergraduates' use of IT in and out of their courses as well as perceptions about IT's impact on the academic experience form the core of the survey. Last year, ECAR began to incorporate a special focus area—a more in-depth set of questions about a topic that is currently important to higher education—that will change with each year's study. For 2009, noting the importance of mobile communications in student culture and sensing that a new generation of devices could make computing even more ubiquitous and personal, ECAR chose student ownership

and use of Internet-capable handheld devices for the survey focus area. Although this is our special focus area for 2009, we anticipate tracking the impact of handheld Internet devices in the academic environment in future studies as well.

Methodology

The 2009 study builds on and extends previous studies and consists of the following data collection and analytical initiatives.

Literature Review

ECAR conducted a literature review to identify relevant issues as well as to support survey analysis. This year's review expands upon the 2008 literature review and includes a review of other relevant surveys. The bibliography appears in Appendix E.

Web-Based Survey

A web-based survey of college and university undergraduates provided the quantitative data about student experiences with IT in higher education. This year's survey was based on the 2008 survey with a few minor changes to some core questions. In addition, a section was added to include questions about the focus area (student ownership and use of Internet-capable handheld devices). The online survey appears in Appendix B.

ECAR then invited institutions to participate in the survey, asking participating BA, MA, and doctoral institutions to sample their freshman and senior students. Each university used a different sampling model, and a number of them chose to include their entire freshman and senior classes. Associate's institutions were asked to sample their student body without regard to class standing. In the absence of weighting of institutional responses, this means that the results can be generalized to the sampled students but not to the 115 institutions.¹

Student Focus Groups

ECAR collected qualitative data by means of student focus groups at Grand Rapids Community College; Hamilton College; the University at Albany, SUNY; and the University of Wisconsin–Stevens Point. The interviews included as diverse a group of students as possible. A total of 62 students participated in the focus groups, and each focus group meeting lasted for an hour. The focus group interview questions appear in Appendix C.²

Student Comments

Approximately 7,000 students responded to the open-ended survey question to provide more information about their views of IT. They expressed opinions on their use of and skill with IT, the state of their institutions' IT support services, their perceptions of technology use in their courses, and their experiences with handheld devices. These comments were not statistically analyzed using a content analysis tool; however, many comments provided additional insight into the substance of the quantitative data, and a few were incorporated into the text of the study.

Longitudinal Analysis

Data from the 2006, 2007, 2008, and 2009 surveys were compared where possible to identify any significant changes over the past four studies. Where questions were

consistent over this time period, ECAR was able to use comparative data from the 39 institutions that participated in each of the 2006, 2007, 2008, and 2009 studies. Where survey questions were consistent over the past three surveys, ECAR used comparative data from the 53 institutions that participated in 2007, 2008, and 2009, and for the past two surveys, ECAR was able to use comparative data from the 71 institutions that participated in both of the 2008 and 2009 studies. However, it is important to note that this study does not attempt to follow the same students over time.

Analysis and Reporting Conventions

The following conventions are observed in analyzing and reporting data results:

- ◆ Some tables and figures presented in this study include fewer than the total 30,616 respondents from the 115 U.S. and Canadian institutions. In this case, they were adjusted for missing information or to reflect a subset of responses as indicated by the table or figure title.
- ◆ Percentages in some charts and tables may not add up to exactly 100.0% due to rounding.
- ◆ The Likert scales used in the online surveys are footnoted in the tables and figures showing results for these survey questions.
- ◆ We use the term “four-year institution” to refer generally to institutions that award baccalaureate degrees, regardless of whether those are the highest degrees they award. When we break out results by class standing, “freshmen” and “seniors” always refer to students from four-year institutions who report those class standings, whereas community college students are presented as a single class-standing category.

- ◆ Significant associations between survey questions (variables) that were both statistically significant and meaningful were reported in the text and/or supporting figures and tables. Note that a statistically significant relationship between two variables doesn't necessarily indicate a causal relationship.

Participating Institutions

Participation in the study was voluntary, and each institution obtained approvals from its institutional executives and its Institutional Review Board (IRB).³ Therefore, the institutions participating in the study do not constitute a statistical representation of U.S. and Canadian higher educational diversity as a whole (see Table 3-1). Specifically, they are overwhelmingly four-year institutions (103 out of 115 U.S. and Canadian

institutions participating). Responses are further biased toward doctoral institutions (55.6%), larger institutions (67.3% enroll more than 8,000 students), and public institutions (74.3%). Findings are therefore considered to be instructive or indicative rather than conclusive of student experiences at different types of institutions. Even considering these biases, the 114 U.S. institutions that participated in this study do reflect a mix of the different higher education institution types in the United States, in terms of Carnegie class, size of institution, private versus public status, sources of funding, and levels of technology emphasis. In 2009, 12 associate's (AA) institutions accounted for 8.2% of student respondents, whereas in 2008 fewer AA institutions (8) participated, but their respondents made up 12.2% of the respondent base.

Table 3-1. Profile of Participating Institutions

	Number of Institutions (N = 115)	Number of Respondents (N = 30,616)	Percentage of Respondents
Carnegie Class			
DR	53	17,016	55.6%
MA	36	8,219	26.8%
BA	11	1,843	6.0%
AA	12	2,522	8.2%
Other	2	376	1.2%
Canada	1	640	2.1%
Student FTE Enrollment			
1–2,000	10	1,404	4.6%
2,001–4,000	13	1,947	6.4%
4,001–8,000	26	6,679	21.8%
8,001–15,000	31	8,808	28.8%
15,001–25,000	21	7,503	24.5%
More than 25,000	14	4,275	14.0%
Control			
Private	38	7,852	25.7%
Public	77	22,722	74.3%

Respondent Characteristics

Invitations to participate in the survey were sent by e-mail to more than 290,000 students—seniors and freshmen at 103 U.S. and Canadian four-year institutions and to general students at 12 community colleges (see Appendix D).⁴ A profile of responding students appears in Table 3-2. Although four-year institutions invited only seniors and

freshmen, some students responded “other” when asked “What is your class standing?” These students’ understanding of their own standing differed from that of the official institutional record. In addition, 169 students did not respond to this question at all.

Of the respondents from four-year institutions, 34.2% were freshmen, 44.5% were seniors, and 13.0% replied “other” to class standing. Community college students make

Table 3-2. Profile of Student Respondents

	Four-Year Institutions			Two-Year Institutions	Total
	Seniors (N = 13,553)	Freshmen (N = 10,400)	Other (N = 3,972)	All Students (N = 2,522)	All Students (N = 30,447)*
Gender					
Male	39.3%	39.1%	38.0%	32.4%	38.5%
Female	60.7%	60.9%	62.0%	67.6%	61.5%
Age					
18-19	0.5%	92.2%	13.4%	19.4%	35.1%
20-24	76.7%	5.1%	63.2%	30.1%	46.6%
25-29	9.6%	1.2%	8.4%	14.1%	6.9%
30-39	6.8%	0.9%	8.0%	16.5%	5.7%
40-49	4.4%	0.4%	4.9%	12.1%	3.7%
50 and over	2.1%	0.2%	2.1%	7.8%	1.9%
Residence					
On campus	20.9%	75.9%	36.9%	4.2%	40.4%
Off campus	79.1%	24.1%	63.1%	95.8%	59.6%
Full/Part-Time Status					
Full-time	87.1%	97.2%	85.5%	51.3%	87.4%
Part-time	12.9%	2.8%	14.5%	48.7%	12.6%
GPA					
A	19.7%	17.2%	23.1%	24.5%	19.7%
A–	25.7%	22.4%	24.9%	18.4%	23.9%
B+	21.0%	18.8%	18.8%	18.9%	19.8%
B	16.2%	16.9%	15.8%	13.4%	16.1%
B–	8.8%	8.5%	6.8%	7.5%	8.3%
C+	4.9%	4.8%	3.8%	4.1%	4.6%
C	1.9%	2.5%	2.1%	2.4%	2.2%
C– or lower	0.2%	1.2%	0.6%	0.5%	0.6%
Don't know	1.5%	7.7%	4.2%	10.3%	4.7%

*Among the respondents, 169 students did not answer the question about their class standing.

up 8.3% of the respondents. As in past years, female students make up a larger share of the respondents (61.5%). Student respondents continue to be weighted toward so-called traditional students. Most respondents are under 25 years old (81.7%) and go to school full time (87.4%). Freshmen most often live on campus (75.9%), whereas seniors (79.1%) and community college students (95.8%) most often live off campus. Grade point averages for our respondents show 79.5% having a B or better average.

The overall student response rate in the 2009 study is 10.4%.⁵ Significant variation by institution was noted, and the response rate may be affected by a number of factors, including students' growing awareness of malware and computer viruses, making them more cautious about responding to the e-mail invitation, and the fact that students could have survey fatigue, since they receive numerous e-mails throughout the year asking them to take a survey and win a prize.

Respondents identified their majors (see Table 3-3). Note that the total number of responses is larger than the overall number of respondents (N = 30,616) because many respondents reported more than one major (16.0%). More students selected "Other" than any other major category. This is likely due to the proliferation of unique majors and combination majors that don't seem to fit the

listed major categories. As would be expected, more freshman respondents said they are undecided (15.5%), as well as about 1 in 10 community college respondents (9.4%).

Research Team

The principal investigators for this year's study are Shannon Smith, Gail Salaway, and Judith Borreson Caruso. Richard Katz, vice president of EDUCAUSE and founder of ECAR, contributed the Introduction.

Shannon D. Smith

Shannon D. Smith began her career in 1983 at Electronic Data Systems and spent 18 years specializing in business intelligence systems for corporate, government, and higher education clients. She began a doctoral program in history at the University of Nebraska–Lincoln in 1999 and has taught at Oglala Lakota College on the Pine Ridge Indian Reservation in South Dakota since 2002. As chair of the college's distance learning committee, she advocated for and oversaw the implementation of policies and technologies to bring a full curriculum of online courses to the geographically dispersed and economically disadvantaged student body. In addition to her research on learning technology and nontraditional students, she has published extensively on Western and American Indian history. Smith is an ECAR Fellow based in Boulder, Colorado.

Table 3-3. Student Respondents' Majors

Major	N	Percentage
Other	5,965	19.5%
Life/biological sciences, including agriculture and health sciences	5,547	18.1%
Social sciences	5,354	17.5%
Business	4,790	15.6%
Humanities	2,863	9.4%
Education, including physical education	2,857	9.3%
Engineering	2,733	8.9%
Fine arts	2,268	7.4%
Undecided	1,927	6.3%
Physical sciences, including math	1,786	5.8%

Gail Salaway

Gail Salaway earned her PhD in management of information systems from UCLA (1984). She is former Director of Administrative Computing and Communications at UCLA, where she was responsible for campus-wide administrative information systems and telecommunications services, and management of academic and general computing initiatives. As an ECAR Fellow, she has been principal investigator of research studies on IT leadership, IT alignment, IT networking, and undergraduates and IT.

Judith Borreson Caruso

Judith Borreson Caruso is Director of Policy and Planning at the University of Wisconsin–Madison and has been an ECAR Research Fellow since July 2002. She has been in higher education IT roles for 30 years in the areas of application development, data management, policy, and security. Caruso is active in several IT professional organizations, including EDUCAUSE. She has served on the EDUCAUSE Current Issues and *EDUCAUSE Quarterly* editorial committees. Currently, she serves on the executive committee of the University of Wisconsin System IT Management Council. While with ECAR, she participated in the enterprise resource planning (ERP), IT security, and student studies.

Richard N. Katz

Richard N. Katz has been Vice President of EDUCAUSE since 1996. From 1996 to 2001, Katz was responsible for professional development, conferences, IT, publications, and research. In 2001, he founded the EDUCAUSE Center for Applied Research (ECAR), now the largest research service devoted exclusively to IT issues in higher education contexts. Before joining EDUCAUSE, Katz held a variety of management and executive positions spanning 14 years at the University of California (UC). From 1999 to 2006, he led that university's development and implementation of

strategic management initiatives. For this work, he became the second recipient of that university's Award for Innovative Management and Leadership. Katz is the author, coauthor, or editor of seven books, four research studies, and more than 50 articles and monographs on a variety of management and technology topics. His book *Dancing with the Devil* was deemed one of the 10 most important education-related books of 1999 by *Lingua Franca*. He received his BA from the University of Pittsburgh and his MBA from UCLA.

Previous Years' Studies

In 2004, the first ECAR study was launched with a baseline of 13 institutions. This year, 114 U.S. institutions, 1 Canadian institution, and 3 international institutions participated.⁶ The data presented in this study reflect only the results from student respondents of U.S. and Canadian institutions.

The following previous ECAR studies on undergraduate use of IT are publicly available on the EDUCAUSE ECAR website:

- ◆ *The ECAR Study of Students and Information Technology, 2004: Convenience, Connection, and Control*, Robert B. Kvavik, Judith B. Caruso, and Glenda Morgan.
- ◆ *The ECAR Study of Students and Information Technology, 2005: Convenience, Connection, Control, and Learning*, Robert B. Kvavik and Judith B. Caruso.
- ◆ *The ECAR Study of Undergraduate Students and Information Technology, 2006*, Gail Salaway, Richard N. Katz, and Judith B. Caruso.
- ◆ *The ECAR Study of Undergraduate Students and Information Technology, 2007*, Gail Salaway and Judith Borreson Caruso.
- ◆ *The ECAR Study of Undergraduate Students and Information Technology, 2008*, Gail Salaway and Judith Borreson Caruso.

Endnotes

1. In addition to potential sampling errors, there are other potential sources of error that are not sample related, such as the wording of the survey questions (may not be clear) and most notably nonrepresentative responses (a large percentage of the students declined to take this survey). Since the response rates in this study were lower than hoped for at a number of schools, one cannot be certain of how representative the respondents are of their respective institutions or of this population in general. Therefore, caution should be exercised in assuming that the findings generalize beyond the sampled students.
2. Staff from participating institutions used a variety of methods to recruit students—posting advertisements in various campus locations, making announcements in large-enrollment classes, and e-mailing students. Food and beverages were provided as incentives to attend. Students who work in general-access undergraduate student computing laboratories or for student technology help desks were also included in the focus groups. Students were advised of Institutional Review Board (IRB) regulations that govern the research and their rights, and the responsibility of the investigators to protect their rights. Notes were taken. None of the comments made by students and cited in this study identifies any individual student. In some instances, we corrected their English but made no change in meaning.
3. Each institution required approvals from institutional executives and their IRB in order to participate in the study. The approval processes, although navigated by an institutional contact, varied considerably in difficulty from institution to institution. Often, the information required for approval was different from one institution to the next. The investigators made every attempt to provide all information required at the start of the study solicitation; additional details were added throughout the approval process to provide what each institution required. The information collected is confidential. No data from the quantitative survey are presented that would make it possible to identify a particular respondent. The data files used for analysis have been purged of any information that would have similar consequences. The IRB applications, application dates, and approval dates are available from ECAR.
4. To encourage a larger response from the students, ECAR offered 99 \$50 and \$100 gift certificates to be awarded to students, using a lottery.
5. Several participating institutions did not provide enrollment and sample information, so these data were not included in the calculation for overall response rate.
6. A single English-language version of the survey was prepared that is designed to work internationally.