

# **ECAR Study of Undergraduate Students and Information Technology**

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## 2006 ECAR Study Institutional Report

The University of North Dakota has participated in an EDUCAUSE Center for Applied Research (ECAR) study exploring the use of information technology in higher education in Spring 2006. The study consists of a Web-based quantitative survey of undergraduates (freshmen and seniors) from a mix of the different types of higher education institutions in the United States. Freshmen and seniors are the focus of the study, as they represent students early in and near the end of their college careers.

In general, the study focuses its investigations on the kinds of information technologies being used by students, and with what levels of skill; the perceived value and advantages by students using information technology; students' experiences with information technology in their courses; and the obstacles students face when using technology. In particular, the study will focus on student skills and the use of technology in teaching and learning.

ECAR hosted the survey on the Web site on <http://www.educause.edu>. The survey contains a student consent form that explains the purpose of the survey and assures students of the confidentiality of the data. The survey invitation was mailed out electronically to 640 freshmen and 700 seniors on March 27, 2006. The reminder was sent electronically on April 10, 2006. By the survey closing date on April 30, 2006, a total of 141 students participated in the survey.

The study is being conducted by ECAR. The principal investigators are Dr. Gail Salaway at ECAR ([gsalaway@educause.edu](mailto:gsalaway@educause.edu)) and Judith B. Caruso at the University of Wisconsin-Madison and ECAR ([judy.caruso@doit.wisc.edu](mailto:judy.caruso@doit.wisc.edu)). UND's main contact was Dorette Kerian, Interim CIO and ITSS Director.

After the end of survey data collection period on April 30, 2006, data was then analyzed by ECAR. In late December 2006, ECAR sent a copy of the analysis report (the actual dataset has not been made available to the institution) to the Office of Institutional Research at UND. Results obtained from this study explore student information technology skills and how students use IT at UND. The responses will most likely help us answer the following research questions:

- What kinds of information technologies are students using, and with what levels of skill?
- What do students perceive to be the value and advantages of the use of IT?
- What is the experience of students with IT in their courses?

### Demographic Information

Among 141 respondents at UND, 63 were males, 77 were females, and 1 unreported. Overall, 59 were freshmen (27 males and 32 females) and 82 were seniors (36 males, 45 females, and 1 senior did not provide gender information). Some of the descriptive data on the UND respondents are listed below:

- 93% freshmen were in the 18-19 age group and 77% seniors were in the 20-24 age group
- 97% freshmen and 84% seniors were full-time students at UND
- 76% freshmen and 31% seniors resided on campus

- 28% freshmen and 20% seniors have GPA below 3.0
- Academic disciplines (check all that apply and the accumulation may be exceeding 100%)
  - ◆ Social sciences: 17% freshmen and 18% seniors
  - ◆ Humanities: 9% freshmen and 4% seniors
  - ◆ Fine Arts: 10% freshmen and 2% seniors
  - ◆ Life sciences: 19% freshmen and 16% seniors
  - ◆ Physical sciences: 5% freshmen and 7% seniors
  - ◆ Education: 7% freshmen and 16% seniors
  - ◆ Engineering: 14% freshmen and 15% seniors
  - ◆ Business: 19% freshmen and 21% seniors
  - ◆ Other: 19% freshmen and 18% seniors
  - ◆ Undecided: 17% freshmen and 2% seniors

### Some of the Important Findings

#### 1. Technology Ownership

Nearly 57% of the students (63.7% of seniors and 47.4% of freshmen) who participated in the study own a personal desktop computer. Laptop computers are owned by 72% of the respondents (62.8% of seniors and 84.7% of freshmen). Personal digital assistance (PDAs) are owned by just about 11% of the respondents (12.5% of seniors and 8.8% of freshmen).

#### 2. Internet Access

Freshmen students, who often reside on campus, most often access the Internet through university resources (79.6%) while seniors most often use commercial access (54.9%). Nearly two out of three students have access to broadband service (65.9% of seniors and 62.7% of freshmen).

Frequently used method for access to the Internet

| During the academic year, what is your most frequently used method for access to the Internet (Q3.1) | UND          |              |                  | Other 4 year institutions |               |                  |
|--|--------------|--------------|------------------|---------------------------|---------------|------------------|
|  | SR<br>(n=82) | FR<br>(n=59) | Total<br>(n=141) | SR<br>(n=328)             | FR<br>(n=328) | Total<br>(n=656) |
| Commercial dial-up modem service   | 2.4%         | 1.7%         | 2.1%             | 5.0%                      | 3.2%          | 4.3%             |
| College-operated dial-up modem service   | 9.7%         | 10.2%        | 9.9%             | 3.4%                      | 6.6%          | 4.7%             |
| Commercial broadband service   | 41.5%        | 11.9%        | 29.1%            | 50.8%                     | 17.7%         | 37.7%            |
| College-operated wired broadband service   | 24.4%        | 50.8%        | 35.5%            | 24.2%                     | 53.8%         | 36.0%            |
| Commercial wireless network  | 11.0%        | 6.8%         | 9.2%             | 9.5%                      | 4.6%          | 7.6%             |
| College-operated wireless network  | 11.0%        | 18.6%        | 14.2%            | 7.1%                      | 14.0%         | 9.8%             |

#### 3. Patterns of Technology Use

Students were asked about the applications they use on their electronic devices. They reported that they use technology primarily for educational purposes, secondarily for communication, and lastly for presentation. They use computers for writing documents and sending e-mail, followed by surfing the Internet for pleasure and for classroom activities.

#### 4. Level of Skill

When asked about the level of skill they felt they had attained (5 scales: minimal, basic, conversant, accomplished, and fluent) with respect to each application, students rated themselves highly skilled in the use of communications, word processing, and the Internet. Seniors tended to rank themselves higher than freshmen with tools such as spreadsheets, PowerPoint, graphics software (such as Photoshop or Flash), online library resources, computer maintenance, computer security (such as firewalls or antivirus), and course management system while freshmen tended to rank themselves higher than seniors with tools such as video/audio software and web pages (such as Dreamweaver or FrontPage). However, without having the actual dataset to conduct further analysis, it is not clear at this time whether a student's major was a significant factor to students' self-ratings.

Your skill level using the computer technologies and applications

| What is your skill level using the following computer technologies and applications? (Combined percentage of Accomplished and Fluent) (Q2.36 to Q2.44) | UND          |              |               | Other 4 year institutions |              |               |
|--|--------------|--------------|---------------|---------------------------|--------------|---------------|
|  | SR (n=82)    | FR (n=59)    | Total (n=141) | SR (n=328)                | FR (n=328)   | Total (n=656) |
| Spreadsheets (Excel, etc.)   | <u>54.2%</u> | 25.0%        | 43.8%         | <u>50.8%</u>              | <b>36.7%</b> | 45.7%         |
| Presentation software (PowerPoint, etc.)   | <u>58.7%</u> | 39.5%        | 51.7%         | <u>52.2%</u>              | <b>43.8%</b> | 49.0%         |
| Graphics software (Photoshop, Flash, etc.)   | <u>22.0%</u> | 20.0%        | 21.2%         | <u>32.1%</u>              | <b>30.8%</b> | 31.6%         |
| Online library resources   | <u>44.0%</u> | 20.9%        | 35.6%         | <u>51.9%</u>              | <b>39.4%</b> | 47.0%         |
| Computer maintenance (download software updates, installing additional memory, organizing files, etc.)   | <u>35.0%</u> | 22.8%        | 29.9%         | <u>31.7%</u>              | <b>29.1%</b> | 30.6%         |
| Computer security (firewalls, antivirus software, etc.)  | <u>27.2%</u> | 17.9%        | 23.4%         | <u>27.1%</u>              | <b>26.5%</b> | 26.8%         |
| Course management system (Blackboard, WebCT, etc.)   | <u>44.3%</u> | <b>38.6%</b> | 42.1%         | <u>44.4%</u>              | 34.5%        | 40.7%         |
| Video/audio software (Director, iMovie, etc.)  | 31.0%        | <u>50.0%</u> | 38.3%         | <b>42.9%</b>              | <u>48.1%</u> | 45.0%         |
| Web pages (Dreamweaver, FrontPage, etc.)   | 37.5%        | <u>57.1%</u> | 41.9%         | <b>41.1%</b>              | <u>43.9%</u> | 41.9%         |

#### 5. Information Technology in the Classroom

Nearly 93% of seniors and 85% of freshmen reported that they have taken a course that used a course management system (CMS). Students who had taken a course using a CMS were asked to describe their overall experience, 85% of seniors and 87% of freshmen rated their overall experience as positive or very positive. Students reported the top five used information technology (e-mail, online gradebook, course management system, PowerPoint, and course website) in their courses during the current semester. A much higher percentage of UND students compared to their national peers reported using the online gradebook and course management system in their courses during the Spring semester in 2006.

Technologies used in your courses during the current semester or quarter.

| Are any of the following technologies used in your courses during the current semester or quarter (% answered "yes") (Q3.2 to Q3.18) | UND          |              |               | Other 4 year institutions |            |               |
|--|--------------|--------------|---------------|---------------------------|------------|---------------|
|  | SR (n=82)    | FR (n=59)    | Total (n=141) | SR (n=328)                | FR (n=328) | Total (n=656) |
| E-mail   | <u>92.7%</u> | 91.4%        | 92.1% (1)     | 95.8%                     | 94.6%      | 95.3% (1)     |
| Presentation software (PowerPoint, etc.)   | <u>73.2%</u> | 52.5%        | 64.5% (4)     | 72.1%                     | 57.1%      | 66.1% (3)     |
| Course management system (WebCT, Blackboard, etc.)   | <u>76.8%</u> | 71.2%        | 74.5% (3)     | 67.3%                     | 65.6%      | 66.6% (2)     |
| Course Web site  | <u>63.4%</u> | 59.3%        | 61.7% (5)     | 62.2%                     | 69.5%      | 65.1% (4)     |
| Spreadsheets (Excel, etc.)   | <u>58.5%</u> | 34.5%        | 48.6%         | 54.3%                     | 42.0%      | 49.4%         |
| Discipline-specific technologies (Matlab, Mathematica, AutoCad, Stella, etc.)  | <u>19.5%</u> | 17.2%        | 18.6%         | 19.1%                     | 16.3%      | 18.0%         |
| Webcast  | <u>7.4%</u>  | 3.4%         | 5.7%          | 4.1%                      | 3.3%       | 3.8%          |
| E-portfolios   | <u>2.4%</u>  | 1.7%         | 2.1%          | 8.7%                      | 5.7%       | 7.5%          |
| Online gradebook   | 84.1%        | <u>94.9%</u> | 88.7% (2)     | 58.7%                     | 67.4%      | 62.1% (5)     |
| Online quizzes or tests  | 39.0%        | <u>66.1%</u> | 50.4%         | 34.8%                     | 47.5%      | 39.9%         |
| Online discussions   | 32.9%        | <u>35.6%</u> | 34.0%         | 37.3%                     | 35.3%      | 36.5%         |
| Social networking software (thefacebook.com, etc.)   | 11.0%        | <u>30.5%</u> | 19.1%         | 15.6%                     | 30.9%      | 21.7%         |
| Clickers (student response systems)  | 13.4%        | <u>25.4%</u> | 18.4%         | 14.7%                     | 23.2%      | 18.0%         |
| Simulations  | 15.9%        | <u>16.9%</u> | 16.3%         | 16.4%                     | 16.1%      | 16.3%         |
| Instant messaging  | 3.7%         | <u>10.2%</u> | 6.4%          | 11.8%                     | 18.1%      | 14.3%         |
| Blogs  | 4.9%         | <u>8.5%</u>  | 6.4%          | 6.1%                      | 7.9%       | 6.8%          |
| Podcast  | 1.2%         | <u>5.2%</u>  | 2.9%          | 3.0%                      | 3.7%       | 3.3%          |

Your preference with regard to the use of information technology in your courses.

| Which of the following best describes your preference with regard to the use of information technology in your courses (Q3.1) | UND       |           |               | Other 4 year institutions |            |               |
|---|-----------|-----------|---------------|---------------------------|------------|---------------|
|   | SR (n=82) | FR (n=59) | Total (n=141) | SR (n=328)                | FR (n=328) | Total (n=656) |
| Prefer taking courses that use no information technology  | 1.2%      | 3.4%      | 2.1%          | 2.2%                      | 3.3%       | 2.6%          |
| Prefer taking courses that use limited technology   | 8.5%      | 22.0%     | 14.2%         | 14.7%                     | 20.6%      | 17.1%         |
| Prefer taking courses that use a moderate level of information technology   | 45.1%     | 55.9%     | 49.6%         | 55.9%                     | 58.4%      | 56.9%         |
| Prefer taking courses that use information technology extensively   | 39.0%     | 13.6%     | 28.4%         | 22.4%                     | 14.4%      | 19.2%         |
| Prefer taking courses that use information technology exclusively   | 6.1%      | 5.1%      | 5.7%          | 4.8%                      | 3.2%       | 4.2%          |

Students noted their preference for use of technology in the classroom, with the highest number of students (45.1% of seniors and 55.9% of freshmen) preferring to take classes that use a

moderate amount of technology. Approximately 14% (8.5% of seniors and 22.0% of freshmen) preferred classes that use limited technology, and 28% (39.0% of seniors and 13.6% of freshmen) preferred classes that use technology extensively. However, without having the actual dataset, it is not clear that whether a student’s major or student’s GPA was an important predictor of preferences for technology in the classroom.

## 6. Impact of Technology in the Classroom

Students reported the impact of technology on various classroom activities. The two activities receiving the highest impact were ‘improved my learning” and “more prompt feedback from my instructor”

The perceptions in using information technology in my courses

| The use of information technology in my courses (% answered “Agree” and “Strongly agree”) (Q3.19 to Q3.25, Q39) | UND       |           |               | Other 4 year institutions |            |               |
|---|-----------|-----------|---------------|---------------------------|------------|---------------|
|   | SR (n=82) | FR (n=59) | Total (n=141) | SR (n=328)                | FR (n=328) | Total (n=656) |
| Helps me better communicate and collaborate with my classmates than in courses that do not use technology       | 65.9%     | 48.3%     | 58.6%         | 59.3%                     | 51.3%      | 56.1%         |
| Results in more prompt feedback from my instructor than in courses that do not use technology                   | 75.6%     | 72.4%     | 74.3%         | 70.2%                     | 69.0%      | 69.8%         |
| Allows me to take greater control of my course activities than in courses that do not use technology            | 69.1%     | 60.3%     | 65.4%         | 57.1%                     | 55.0%      | 56.2%         |
| Helps me do better research for my courses than in courses that do not use technology                           | 67.9%     | 58.7%     | 64.1%         | 71.3%                     | 66.6%      | 69.4%         |
| I am more engaged in courses that require me to use technology than the courses that do not use technology      | 54.9%     | 50.9%     | 53.2%         | 43.4%                     | 35.6%      | 40.3%         |
| My school needs to give me more training on the information technology that I am required to use in my courses  | 30.4%     | 18.6%     | 25.6%         | 29.5%                     | 24.1%      | 27.3%         |
| The use of information technology in my courses has improved my learning  | 81.7%     | 71.2%     | 77.3%         | 67.9%                     | 59.5%      | 64.5%         |
| Overall, my instructors use information technology well in my courses   | 71.9%     | 64.4%     | 68.8%         | 58.4%                     | 54.7%      | 57.0%         |

## 7. Benefits of the Use of Technology in the Classroom

Students cited convenience as the greatest benefit, followed by “helping me manage my course activities” and “improving my learning”.

Benefits of the use of technology in your courses

| Which of the following benefits from using information technology in your courses was the most valuable to you? (Q3.37 to Q3.38) | UND       |           |               | Other 4 year institutions |            |               |
|--|-----------|-----------|---------------|---------------------------|------------|---------------|
|  | SR (n=82) | FR (n=59) | Total (n=141) | SR (n=328)                | FR (n=328) | Total (n=656) |
| Convenience  | 50.0%     | 49.2%     | 49.6%         | 52.8%                     | 51.3%      | 52.2%         |
| Helped me manage my course activities  | 26.8%     | 27.1%     | 27.0%         | 18.1%                     | 19.7%      | 18.8%         |
| Improved my learning   | 15.9%     | 16.9%     | 16.3%         | 13.9%                     | 13.9%      | 13.9%         |
| Helped me communicate with my classmates and instructors   | 6.1%      | 1.7%      | 4.3%          | 10.8%                     | 11.0%      | 10.9%         |
| No benefits  | 1.2%      | 1.7%      | 1.4%          | 3.0%                      | 3.3%       | 3.1%          |
| Other  | 0.0%      | 3.4%      | 1.4%          | 1.3%                      | 0.9%       | 1.2%          |

8. Students' Perceived Usefulness Using a Course Management System

The usefulness of the course management system

| How useful did you find the following course management system features (Q3.28 to Q3.31) | UND       |           |               | Other 4 year institutions |            |               |
|--|-----------|-----------|---------------|---------------------------|------------|---------------|
|  | SR (n=82) | FR (n=59) | Total (n=141) | SR (n=328)                | FR (n=328) | Total (n=656) |
| <b>Syllabus</b>  |           |           |               |                           |            |               |
| Not useful   | 0.0%      | 0.0%      | 0.0%          | 1.7%                      | 1.7%       | 1.7%          |
| Somewhat useful  | 9.2%      | 8.0%      | 8.7%          | 7.8%                      | 8.0%       | 7.9%          |
| Useful, Very useful, Extremely useful  | 90.8%     | 90.0%     | 90.6%         | 88.0%                     | 85.6%      | 87.1%         |
| Did not use  | 0.0%      | 2.0%      | 0.7%          | 2.5%                      | 4.7%       | 3.3%          |
| <b>Online readings and links to other text-based course material</b>                     |           |           |               |                           |            |               |
| Not useful   | 2.6%      | 4.0%      | 3.2%          | 2.8%                      | 2.7%       | 2.8%          |
| Somewhat useful  | 10.7%     | 8.0%      | 9.6%          | 9.7%                      | 10.4%      | 9.9%          |
| Useful, Very useful, Extremely useful  | 82.7%     | 84.0%     | 83.2%         | 82.7%                     | 77.9%      | 80.9%         |
| Did not use  | 4.0%      | 4.0%      | 4.0%          | 4.8%                      | 9.0%       | 6.3%          |
| <b>Online discussion board (posting comments, questions, and responses)</b>              |           |           |               |                           |            |               |
| Not useful   | 17.1%     | 6.1%      | 12.8%         | 10.4%                     | 8.2%       | 9.6%          |
| Somewhat useful  | 13.2%     | 22.4%     | 16.8%         | 16.3%                     | 13.8%      | 15.4%         |
| Useful, Very useful, Extremely useful  | 40.8%     | 51.1%     | 53.0%         | 59.5%                     | 52.6%      | 57.0%         |
| Did not use  | 28.9%     | 20.4%     | 25.6%         | 13.8%                     | 25.4%      | 18.0%         |
| <b>Access to sample exams &amp; quizzes for learning purposes</b>                        |           |           |               |                           |            |               |
| Not useful   | 0.0%      | 2.0%      | 0.8%          | 2.1%                      | 2.1%       | 2.1%          |
| Somewhat useful  | 3.9%      | 4.0%      | 4.0%          | 4.9%                      | 4.3%       | 4.7%          |
| Useful, Very useful, Extremely useful  | 82.9%     | 84.0%     | 83.3%         | 75.1%                     | 74.4%      | 74.8%         |
| Did not use  | 13.2%     | 10.0%     | 11.9%         | 18.0%                     | 19.2%      | 18.4%         |

| How useful did you find the following course management system features (Q3.32 to Q3.36) | Other 4 year institutions |           |               | Other 4 year institutions |            |               |
|--|---------------------------|-----------|---------------|---------------------------|------------|---------------|
|  | SR (n=82)                 | FR (n=59) | Total (n=141) | SR (n=328)                | FR (n=328) | Total (n=656) |
| Taking exams & quizzes online for grading purposes                                       |                           |           |               |                           |            |               |
| Not useful   | 2.6%                      | 0.0%      | 1.6%          | 6.1%                      | 4.8%       | 5.6%          |
| Somewhat useful  | 5.3%                      | 8.0%      | 6.3%          | 8.3%                      | 6.6%       | 7.7%          |
| Useful, Very useful, Extremely useful  | 77.6%                     | 72.0%     | 75.4%         | 62.0%                     | 57.0%      | 60.2%         |
| Did not use  | 14.5%                     | 20.0%     | 16.7%         | 23.6%                     | 31.7%      | 26.5%         |
| Turning in assignments online  |                           |           |               |                           |            |               |
| Not useful   | 2.6%                      | 6.0%      | 4.0%          | 4.5%                      | 4.3%       | 4.4%          |
| Somewhat useful  | 7.9%                      | 8.0%      | 7.9%          | 7.5%                      | 8.1%       | 7.7%          |
| Useful, Very useful, Extremely useful  | 69.8%                     | 56.0%     | 64.3%         | 72.8%                     | 64.4%      | 69.9%         |
| Did not use  | 19.7%                     | 30.0%     | 23.8%         | 15.2%                     | 23.2%      | 18.0%         |
| Getting assignments back from instructors with comments and grades                       |                           |           |               |                           |            |               |
| Not useful   | 3.9%                      | 0.0%      | 2.4%          | 7.2%                      | 4.6%       | 6.3%          |
| Somewhat useful  | 6.6%                      | 10.0%     | 7.9%          | 8.0%                      | 6.3%       | 7.4%          |
| Useful, Very useful, Extremely useful  | 56.6%                     | 48.0%     | 53.2%         | 57.1%                     | 54.0%      | 56.0%         |
| Did not use  | 32.9%                     | 42.0%     | 36.5%         | 27.7%                     | 35.1%      | 30.3%         |
| Sharing materials among students   |                           |           |               |                           |            |               |
| Not useful   | 3.9%                      | 4.0%      | 4.0%          | 6.9%                      | 5.4%       | 6.3%          |
| Somewhat useful  | 11.8%                     | 14.0%     | 12.7%         | 10.4%                     | 8.6%       | 9.8%          |
| Useful, Very useful, Extremely useful  | 53.9%                     | 44.0%     | 50.0%         | 56.3%                     | 48.7%      | 53.6%         |
| Did not use  | 30.4%                     | 38.0%     | 33.3%         | 26.4%                     | 37.3%      | 30.3%         |
| Keeping track of grades on assignments/tests   |                           |           |               |                           |            |               |
| Not useful   | 1.3%                      | 0.0%      | 0.8%          | 1.9%                      | 1.6%       | 1.8%          |
| Somewhat useful  | 1.3%                      | 2.0%      | 1.6%          | 4.1%                      | 3.9%       | 4.0%          |
| Useful, Very useful, Extremely useful  | 97.4%                     | 94.0%     | 96.0%         | 86.2%                     | 84.9%      | 85.7%         |
| Did not use  | 0.0%                      | 4.0%      | 1.6%          | 7.8%                      | 9.6%       | 8.5%          |

### Future Works

While this study of student information technology use and skills is just a snapshot in time, the findings can help guide UND in planning and improving information technology services. Also in order to explore the trends of students using IT on campus, the 2006 survey data may be compared with data from the same study to be conducted in 2008. The results can then be used to identify trends to assist with information technology decision-making and pedagogical planning. Additionally, the actual dataset will enable the Office of Institutional Research to carry out a more thorough study.