Teaching and Learning with Technology

Key Findings from Faculty and Student Surveys 2003–2004
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Instructional technology is defined as computers, software, multimedia, the Internet, web-based applications, and other tools used to enhance the teaching and learning process, both in and out of the classroom. During the 2003–2004 academic year, Cornell faculty and students were polled on their use and opinion of existing instructional technology at the university. The goal was to develop a baseline for current usage, to gauge levels of interest in the development of technology-based instructional resources at Cornell, and to find out what factors might impact implementation of existing or future instructional technologies. The following report presents key findings from the two surveys.

METHODOLOGY

Faculty Survey

On November 17, 2003, an e-mail was sent to 2,682 members of the academic community at Cornell, inviting them to complete an online version of the Teaching with Technology Survey 2003. Recipients included full, associate, and assistant professors; lecturers; adjunct and visiting professors; research associates; and extension associates (excluding county-based extension associates). The same group received a paper copy of the survey via campus mail shortly afterwards. On December 9, 2003, a reminder e-mail was sent to everyone in the group who had not yet responded. A total of 647 surveys was completed by the December 15, 2003 deadline, for a response rate of 24 percent. More than half the surveys were filled out on paper. The data were analyzed using SPSS 11 for the Macintosh, and a complete set of frequency tables and charts were produced for each question. An analysis of responses by college and appointment type indicated that the survey sample was representative of the Cornell academic staff.

Student Survey

On April 22, 2004, all graduate and undergraduate students at the Ithaca campus (19,564 total) were sent an e-mail inviting them to complete an online version of the Student Instructional Technology Survey 2004. Reminder e-mails were sent to non-responding students on April 29 and May 5, 2004. A total of 5,320 surveys was completed by the May 7, 2004 deadline—a 27 percent response rate. The data were analyzed using SPSS 11 for the Macintosh, and a complete set of frequency tables and charts were produced for each question. An analysis indicated that the survey sample was slightly misrepresentative of the Cornell student population; however, the differences were not deemed significant, and the unaltered data were used in the report.
**PERCEIVED VALUE OF INSTRUCTIONAL TECHNOLOGY**

87% of the student respondents agree that instructional technology can enhance student learning.

“For many of my basic biology and pharmacology courses there were simulations of drug pharmacokinetics and receptor/drug interactions modules on the computers. This was a wonderful teaching aide.”

—Student

“I believe the use of instructional technology in the classroom can enhance student learning.”

82% of the student respondents agree that Web-based materials can enhance student learning.

“My professor used Java applets to demonstrate artificial intelligence techniques. They were helpful because they presented a visualization of the abstract concepts that were being discussed.”

—Student

“I believe that Web-based materials can enhance student learning.”
Faculty more commonly use Windows computers than Macintosh, by more than a 2–to–1 margin.

What type of computer(s)/workstation(s) do you use (if any)?

- Windows 71.1%
- Macintosh 33.1%
- Unix workstation 7.6%
- Other 2.9%
- I don't use computers 1.1%

Two-thirds of faculty have a web site for at least one course.

Do you have a web site for at least one course?

- No 31.3%
- Yes 68.7%

E-mail lists and discussion boards are the most frequently used means by which instructors communicate with their classes.

Which of the following electronic communication/collaboration tools do you use in your teaching?

- E-mail list 65.1%
- Discussion board/bulletin board 19.5%
- Special mailbox 7.0%
- Conferencing tools 3.9%
- Chat 3.4%

Almost all faculty communicate via e-mail several times a day.

How often do you communicate via e-mail?

- Several times a day 98%
- Several times a week 2%
- Several times a month/Never <1%

“The best example I’ve seen of using instructional technology would be showing computer simulations of chemical reactions, which are not easily demonstrated on a blackboard.”

—Student

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How often do you communicate via e-mail?

- Several times a day 98%
- Several times a week 2%
- Several times a month/Never <1%
Faculty expect increased use of the Internet and other distance learning tools in the near future.

“The technology I use is very useful in the classroom and I support it.”
—Faculty

Presentation graphics and spreadsheet software are the most frequently used tools for facilitating instruction.

“One professor does virtual field trips during class. He has links in his PowerPoint presentations and will show us a web site related to the topic we’re talking about in class. We visited the Mars web site and looked at all of the Mars Rover info and discussed it relating to microbiology.”
—Student

Faculty use the Internet for a variety of instructional purposes.

“My professor uses a multi-media presentation for each of her lectures, and then puts the notes from the presentation online on our course web site. The presentation enhances the lectures and makes it easier to pick up key points, and the web site makes the course much easier to navigate and learn from.”
—Student

In the next two to three years, to what extent do you envision using the Internet or other distance learning tools to support instruction?

- I do not plan to use Internet or distance learning tools to support instruction 25.2%
- Supplement in-class instruction 68.6%
- Replace a portion of class time with online or distance learning activities 15.5%
- Replace all face-to-face instruction with online or distance learning activities 3.2%

Do you use the Internet for the following instructional activities? (Percent of respondents who answered “Yes.”)

- Post course materials 74.8%
- Access online course reserves 34.5%
- Require students to conduct online research assignments 30.8%
- Facilitate class discussion 28.5%
- End of semester course evaluations 15.4%
- Class assignment of multimedia presentations 15.0%
- Gather information via online surveys 14.2%
- Do interactive exercises 11.6%
- Give online quizzes 7.0%
- Write online 6.9%
- Pre-semester 6.9%
- Use GIS (geographical information system) or other spatial display of information 5.5%
- Exhibit compositions, dances, or other music/art activities 3.8%
Faculty cited time constraints, lack of skills, and their own skepticism as barriers to teaching with information technology.

“There are now so many forms of instructional technology that it’s hard to keep up with all of them. In addition, it is not clear to me which of these are effective and worth the effort and which are not.” —Faculty

GOING FORWARD

Faculty are interested in using the Internet for various instructional purposes in the future.

End of semester course evaluations Yes 15.4%
Do interactive exercises Yes 11.6%
Gather information via online surveys Yes 14.2%
Access online course reserves Yes 34.5%
Facilitate class discussion Yes 28.5%
Give online quizzes Yes 7.0%
Require students to conduct online research assignments Yes 30.8%
Write online Yes 6.9%
Class assignment of multimedia presentations Yes 15.0%
Use GIS [geographic information system] or other spatial display of information Yes 5.5%
Pre-semester assignments Yes 6.9%
Post course materials Yes 74.8%
Exhibit compositions, dances, or other music/art activities Yes 3.8%

Do you use the Internet for the following instructional activities? (Dark bar represents faculty who already use the Internet for the given purpose; light bar indicates those who do not, but would like to do so in the future.)

End of semester course evaluations No but would like to 43.6%
Do interactive exercises No but would like to 39.1%
Gather information via online surveys No but would like to 33.6%
Access online course reserves No but would like to 33.0%
Facilitate class discussion No but would like to 28.0%
Give online quizzes No but would like to 25.7%
Require students to conduct online research assignments No but would like to 22.8%
Write online No but would like to 22.7%
Class assignment of multimedia presentations No but would like to 22.6%
Use GIS [geographic information system] or other spatial display of information No but would like to 19.0%
Pre-semester assignments No but would like to 17.1%
Post course materials No but would like to 15.4%
Exhibit compositions, dances, or other music/art activities No but would like to 10.4%
Faculty respondents are interested in using electronic whiteboards, videoconferencing, and in-class polling in the future.

“My professor uses a student response polling system. It’s very effective in gauging how many people are following the class and it allows us to work out some good problems before the next exam. It has allowed me to do better in the class.”

—Student

Students selected multimedia presentations as the instructional tool they would most like to see used in the classroom in the future.

What type of instructional technologies/activities would you like to see incorporated into future courses at Cornell...in the classroom? (Percent who selected each choice as “most important”)

- Multimedia presentations: 51.0%
- Use of Internet by faculty: 17.8%
- Use of interactive technologies: 14.9%
- Student access to Internet: 11.4%
- Video conferencing: 5.0%

Students selected course web sites as the most important instructional tool outside the classroom in future courses.

What type of instructional technologies/activities would you like to see incorporated into future courses at Cornell...outside the classroom? (Percent who selected each choice as “most important”)

- Course web site: 59.2%
- Online access to practice exams and quizzes: 11.0%
- Online readings and links: 9.8%
- Ability to turn in assignments online: 6.2%
- Access to assignment grades online: 3.8%
- Online audio or video lectures: 3.5%
- Computer simulations or interactive exercises: 2.6%
- Online discussion board: 2.2%
Cornell Information Technologies, sponsor of the surveys, would like to express appreciation to all the faculty and students who took the time to answer our questions and share their insights. The information collected demonstrates that Cornell faculty are responsive in meeting and exceeding student expectations and supporting a standard of excellence in education. These findings will promote further discussion about the usage and value of instructional technologies at Cornell University.

If you are interested in receiving information on instructional technologies, best practices, and related campus events, subscribe to the Academic Technology Center mailing list (ATC-L) by filling out the form at http://atms.cit.cornell.edu.

The Teaching and Learning with Technology studies were authored by Eric E. Fredericksen, Clare van den Blink, Joan Falkenberg Getman, and Carrie Sanzone, Cornell Information Technologies, Academic Technology and Media Services.

### Response by College/School

#### Faculty

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<tr>
<th>College/School</th>
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<tr>
<td>Agriculture and Life Sciences</td>
<td>29.5%</td>
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<tr>
<td>Architecture, Art, and Planning</td>
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<td>Arts and Sciences</td>
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<td>Computing and Information Science</td>
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<td>Engineering</td>
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<td>Hotel</td>
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<td>Human Ecology</td>
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<td>Industrial and Labor Relations</td>
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<td>Johnson Graduate School of Management</td>
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<td>Law</td>
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<td>Veterinary Medicine</td>
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#### Student

**Undergraduate**

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<td>Agriculture and Life Sciences</td>
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<tr>
<td>Architecture, Art, and Planning</td>
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<td>Arts and Sciences</td>
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<td>Computing and Information Science</td>
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**Graduate**

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<td>Johnson Graduate School of Management</td>
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<tr>
<td>Law</td>
<td>10%</td>
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<tr>
<td>Veterinary Medicine</td>
<td>5.3%</td>
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