

# Mapping the Changing Technological Landscape: The University of Washington's 2005 Faculty and Student Surveys on Educational Technology

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## ABSTRACT

In this paper, we discuss key findings from the University of Washington's 2005 faculty and student surveys on educational technology. Positioning data from the current surveys against personal accounts gathered during focus groups and results from a previous study allows us to begin mapping the complex interactions that shape campus technology use. We offer an in-depth look at the availability of educational technologies and analyze when and how issues of access impact teaching and learning.

## Categories and Subject Descriptors

CU-A

## General Terms

Measurement, Performance, Human Factors

## Keywords

Institutional Assessment, Technology Use, Surveys, Access, Classrooms, Wireless, Faculty Perceptions, Student Perceptions

## 1. INTRODUCTION

This paper presents preliminary findings from the University of Washington's (UW) 2005 faculty and student surveys on educational technology. These surveys were created by a coalition of six campus units involved with educational technology. The purpose of this research is to understand current patterns of use and to identify emerging trends, so that we can make informed support and development decisions.

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SIGUCCS'05, November 6-9, 2005, Monterey, California, USA.  
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Emerging patterns in the data suggest that technology availability outside of the classroom (in campus labs or online) may be outpacing the level of access available in traditional campus classrooms. One development that may mitigate this problem is the university's plan to implement wireless access campus wide within the next three years. Our preliminary analysis suggests, however, that access to this type of infrastructure is only one of the factors that influence technology use in the classroom and the effectiveness of that use.

## 1.1 Background

Three years ago, representatives from six university groups came together to survey student use of educational technology. This survey was a companion to an instructor survey conducted the previous year by Educational Partnerships and Learning Technologies (EPLT). Joining EPLT in this effort were representatives from Computing & Communications (C&C), the Office of Undergraduate Education (from both the Office of Educational Assessment and Classroom Support Services), Educational Outreach, UW Libraries, and the Student Technology Fee Committee (STFC). The latter entity is in the unique position of being a student organization that manages a tremendous amount of money, all of the revenue from an annual student technology fee. The purpose this collaboration was threefold: to share knowledge and resources, to minimize redundancy, and to gain a more complete understanding of campus technology use.

One reason the collaboration was appealing to all groups is that each unit had been in the practice of conducting surveys for a number of years. Some units surveys were specifically about technology (EPLT, C&C, STFC), while others merely included a few questions about technology embedded in a broader survey. Due to this proliferation of studies, students and faculty would often receive as many as three separate surveys in one academic year, all including questions on technology. Given that a respondent's perspective on technology can change over the course of a year: causing him or her to answer the same question one way in the fall and another way in the spring, we were receiving conflicting results. Additionally, response rates were low for whichever unit conducted the last survey of the academic

year. By combining our efforts, we were able to ensure faculty and staff received no more than one technology survey per year and our data provides an accurate portrait of use. Currently, some units have completely stopped conducting their own survey (EPLT and STFC), while others continue to hold theirs on a rotating schedule. The collaborative survey now takes place every three years, and the libraries conduct a survey every two years. About once every six years the surveys will overlap, but not in the same quarter and not to the same extent that overlap occurred in the past.

The 2005 surveys are the second iteration of the study that took place in 2002. We reconvened the same partners to conduct this research, with all six units collaborating to design the survey instruments. The Office of Educational Assessment (in Undergraduate Education) has played the primary role in data collection to date and will remain a key contributor in the ongoing analysis of survey results. In both 2002 and 2005 EPLT has taken the leadership role in convening the group, meeting project deadlines, and coordinating the analysis and reporting of data.

## 2. METHODS

Our study brings together quantitative and qualitative measures to enhance our understanding of faculty and students' use of, perceptions about, and experiences with educational technology. We surveyed the majority of faculty and a representative sampling of students. We also conducted focus groups with a smaller collection of volunteers. Together, these data sources allow us to identify larger trends in technology use, as well as underlying reasons for these trends.

### 2.1 Surveys

We distributed surveys to university instructors and students via email in spring 2005. Subjects who did not respond to the online surveys were sent a paper version of the appropriate survey. Both the faculty and student survey contained sections on the following: demographics, use of technology, use of campus resources, and perspective on educational technologies.

In response to questions about technology use, subjects rated their overall expertise with technology, their ability to accomplish technical tasks, and their proficiency with different applications. In the student survey, questions were designed to capture subjects' current skill levels as well as their desired skill levels upon graduation. For faculty, similar questions tracked the skills subjects wished to gain over the next two years. The section on use of campus resources focused on computer labs, multimedia and computer classrooms, wireless access, and online resources.

The final section of the survey was designed to help shape university policy development and to increase our understanding of the technology outcomes that students and faculty find desirable. For instance, on both surveys we asked subjects to rate their level of agreement with the following statements: "The UW should require all incoming students to take a course designed to build basic technology skills" and "The UW should evaluate the use of technology by instructors."

The broad scope of the surveys allows us to look at multiple aspects of technology use on campus. While the campus units that created the surveys will use study results to answer questions relevant to their activities, the breadth of data gathered has a

larger impact—it provides a comprehensive map of the technological landscape at our university.

#### 2.1.1 Faculty Survey

Our sample consisted of all faculty members, graduate students, and temporary employees who had taught at least one course in the last academic year, excluding general studies, training, and independent study courses (the two former categories are often taught by undergraduates and staff). We also excluded individuals that had no contact information. We sent the survey to 4,390 instructors.

1,429 subjects responded to the survey: a 32.5% response rate. Of those 819 (57%) completed the survey online and 610 (43%) completed the survey on paper.

#### 2.1.2 Student Survey

Our sample consisted of a representative group of 3,500 students, chosen at random. Students were excluded from the sample pool if they had been solicited for studies by the Office of Educational Assessment within the six months prior to the survey's release. Graduate students holding teaching appointments were grouped with faculty.

988 students responded to the survey: a 28% response rate. Of those, 746 (76%) completed the survey online and 242 (24%) completed the survey on paper.

## 2.2 Focus Groups

In late spring 2005 we began conducting a series of focus groups with faculty and students in order to expand our understanding of the issues surrounding educational technology. We asked each group questions relating to the following issues: supports that facilitate the integration of technology, barriers to adoption, and the impacts of using technology. We also asked students to share their perceptions of how faculty were using technology and faculty to share their perceptions of student use. We ended the sessions with questions about the future of the university: we tracked reactions to the UW's decision to implement wireless and asked subjects to share their dreams for the future. We captured focus group data using two methods: typewritten notes and transcripts from audio recordings.

#### 2.2.1 Faculty Focus Groups

We conducted faculty focus groups in May and June 2005. Subjects volunteered to participate in a focus group when they completed the faculty survey. We spoke with 40 faculty members. Each focus group lasted 60-80 minutes and had up to six participants in attendance.

#### 2.2.2 Student Focus Groups

We began student focus groups in June 2005. Due to low response rates, we drew volunteers from two sources: students that volunteered to participate in focus groups when they completed our survey and students that saw an announcement on computers in campus labs. As of July 1, 2005, we had interviewed 25 students. Each focus group lasted 50-70 minutes and had up to five participants in attendance. Student focus groups are still in progress.

### 2.3 Current Status

At this time, we are in the initial stages of data analysis. The results that we are presenting in this paper are based on our preliminary analysis of data from the online surveys. We are still in the process of inputting data from the paper copies of the surveys. Currently, we have notes for all faculty and student focus groups and transcripts from four faculty sessions. Since we do not yet have a complete data set, we are only able to report on the trends we have noticed in our analysis to date.

Although the findings presented in this paper are preliminary, we will be able to present final results at the SIGUCCS conference in November. Since the majority of subjects completed the surveys online, we anticipate that the trends that we discuss in this paper will hold true in our final analysis.

### 3. PREVIOUS SURVEYS (2001 & 2002)

A Faculty Survey on Educational Technology was conducted in 2001 and a Student Survey in 2002, as well as Student and Faculty Focus Groups in 2002. The 2005 surveys maintain some of the original questions from these previous versions in order to allow for longitudinal analysis. The 2005 versions also institute several revisions to allow for a greater degree of comparison across populations, since the original surveys did not ask the same questions to faculty and students.

One of the most interesting points of comparison between the 2005 surveys and the 2001/2 surveys involves the manner in which subjects recorded their responses. In 2001, only 32% of faculty respondents completed the survey online; in 2005 the online response rate was 57%. Students demonstrated an even more substantial shift to the online format: 32% responded online in 2002 and 76% in 2005.

A similar increase can be found in students' reported access to high-speed internet in their primary residences. In 2002, 36.4% of respondents had high speed internet: 20.3% via cable modem and 16.1% via DSL (McGhee). Our preliminary numbers for 2005 show that 78.9% of students and 75.2% of instructors have broadband access at home. Numbers are not available for instructors in 2001.

The 2001 and 2002 surveys provide a benchmark from which to measure changes in patterns of use with various technologies. Since this paper focuses on the availability of technology in classrooms and the potential impact of wireless, we will focus on findings from the earlier assessments that relate to these issues.

In 2001, 42% of faculty survey respondents reported that they "had never used a computer in the classroom to do their work." In focus groups conducted in 2002 (following the student surveys) many faculty members expressed their frustration with the amount of technology available in classrooms. While they were satisfied with the rooms in the newer buildings, they still found the majority of classrooms to be without computers and other necessary infrastructure (Gustafson and Kors).

Question	Yes	No
Taught in a Multimedia Classroom	21.7%	78.3%
Taught in a Computer Classroom	26.7%	73.3%

**Figure 1: Classroom Use by instructors 2001**

The numbers in Figure 1 indicate the low numbers of faculty members who had utilized a multimedia classroom or collaboratory/computer classroom in 2001 (Lowell & McGhee).

In 2002, students were asked about laptop use. The numbers in Figure 2 indicate that a substantial segment of students had access to a laptop in 2002, but that laptop owners had not yet become the majority. Also, laptop users did not tend to bring their computers to class at that time (McGhee).

Question	Yes	No
Currently owns a laptop	48.8%	51.2%
Currently brings laptop to class <sup>1</sup>	9.4%	90.3%
Would bring if wireless were available	40.6%	60.4%

**Figure 2: Laptop use by students 2002**

### 4. SURVEY DEMOGRAPHICS (2005)

In this paper, we discuss emergent trends in our analysis of data from the online versions of the students and faculty surveys. Figure 3 shows the distribution by academic rank of the subjects that completed the online version of the faculty survey in 2005. Figure 4 shows the distribution by class standing of the subjects that completed the online version of the student survey.

Rank	Frequency	Valid %
Full Professor	148	18.5%
Associate Professor	99	12.4%
Assistant Professor	87	10.9%
Lecturer	97	12.1%
Instructor	40	5.0%
Teaching Assistant	271	33.9%
Other	57	7.1%
<b>Total<sup>2</sup></b>	<b>799</b>	<b>100%</b>

**Figure 3: Rank of faculty that completed online survey**

Class	Number	Valid %
Freshmen	85	11.5%
Sophomore	72	9.7%
Junior	179	24.1%
Senior	159	21.4%
Masters	121	16.3%
Doctoral	99	13.3%
Other	27	3.6%
<b>Total<sup>3</sup></b>	<b>742</b>	<b>100%</b>

**Figure 4: Class of students that completed online survey**

The fact that teaching assistants are the largest group of respondents to the instructor survey corresponds with campus

<sup>1</sup> In order to more easily identify emerging trends in the data, we have compressed the scale for some of the questions reported in this paper. "Never or almost never, seldom, sometimes, usually, always or almost always" translates as follows: the first two variables combine to form "no" answers and the latter three to form "yes." We will expand the scale when presenting our final results.

<sup>2</sup> 20 respondents left this question blank on the faculty survey.

<sup>3</sup> 4 respondents left this question blank on the student survey.

demographics. We estimate that approximately 40% of the instructors that engage in regular teaching at the university are teaching assistants. Faculty members that did not teach at least one course in the previous academic year did not receive the survey.

The responses concentrate at the junior and senior mark and above for students, reflecting two different dynamics at play. First, the university has a concentration of students in advanced ranks due to high numbers of transfer students from the state's community colleges. Second, that juniors and seniors traditionally respond at a higher rate to campus surveys. Potentially, students at this level have a higher degree of investment in and knowledge about the institution. This pattern, however, may cause the data to skew towards a higher level of technology expertise than would be standard for students at lower levels.

Of those completing the survey online, the average reported age of instructors was 41 and the average age of students was 25. These averages, as well as the rank distributions charted above, reflect the high numbers of graduate students teaching courses and taking classes at the university.

Since our preliminary analysis focuses on instructors and students who completed the surveys online, rather than on paper, we may find a higher level of experience and comfort with technology reflected in this population.

## 5. PRELIMINARY TRENDS (2005)

The issue of access to technology has emerged as a dominant theme in our data analysis to date. During focus groups the majority of faculty members expressed dissatisfaction with the level of technology available in university classrooms. The survey data related to classroom access, however, does not corroborate this perception in a decisive manner.

Additionally, the university has a plan for implementing wireless campus wide in the next three years. This development has the potential to significantly impact the types of activities that will be possible in classrooms, as well as other venues. Survey findings indicate that wireless access in classrooms may significantly change technology use patterns, but focus group data complicates this issue by indicating some additional supports that are needed in order for wireless to have a significant impact on classroom practices.

### 5.1 Technology in Classrooms

#### 5.1.1 Focus Groups

In faculty focus groups observations about the challenges surrounding the use of technology in classrooms tended to dominate the discussion. Participants noted problems ranging from a lack a consistent technological infrastructure across campus to the unreliability of existing technology in older classrooms. Many comments echoed those expressed by faculty in 2002 focus groups, suggesting that the UW has not made enough progress in this area in the last three years to keep up with the growing numbers of instructors that are integrating technology into their courses.

One significant obstacle to the integration of technology in campus courses is the lack of consistency in room assignments. Even when faculty members are assigned classrooms with

adequate and reliable technology, many are reluctant to invest the time to alter their class activities to make substantial use of that technology, unless they have some guarantee of being assigned a similar room in the future. According to one faculty member, if you get shifted to a lower-tech room the next time you teach the class, "You have more cost, [because] you will have to go back to teaching it in the same way you did before." Many faculty are willing to make the time investment for adapting a class if they know it will pay off in the future—altering the technology quotient of a class once, not multiple times. Focus groups indicated that the majority of faculty interviewed had a strong desire to use more technology in their courses, but only if they received adequate support from the university. The quotes that follow indicate some of the common threads that emerged in focus group discussions.

- "You have to know [technology] is going to be there in the same way, so you can depend on it. You [have to] know in advance, quarters in advance."
- "I'll get a room where the Ethernet won't work one day. What do you do? Do you cancel class that day when it doesn't work, or what?"
- "Most lectures are equipped with the appropriate technology, but most small classrooms are not."
- "My experience has been that there's no sort of standardization across university."
- "I had to spend 20 minutes getting the projector to work. That's embarrassing. It's just unprofessional, and that's where I quit [using technology]."

In student focus groups, participants raised many of the same concerns expressed by faculty, with one notable shift. Students were more likely to attribute problems with technology in a classroom to their instructors' inexperience and lack of training, rather than to faulty equipment. Some students complained the faculty members did not even know how to turn on the lights in high-tech rooms.

#### 5.1.2 Surveys

In 2001 only 21.7% of faculty reported teaching in multimedia classrooms (defined as a room with a "permanent computer at the podium with projection capabilities") and only 26.7% reported teaching in a collaboratory/computer classroom (defined as a room with "a computer at each student seat") (see Figure 1). 2005 data indicates a substantial increase in the percentage of faculty teaching in these spaces (see Figure 5).

Question	Yes	No	Total
Taught in a Multimedia Classroom	352 43.8%	452 56.2%	804 100%
Taught in a Collaboratory	529 66.4%	268 33.6%	797 100%
Made use of Multimedia Capabilities	383 73.0%	142 27.0%	525 100%
Request of Room was accommodated	395 86.1%	64 13.9%	459 100%

Figure 5: Classroom Use by Instructors

In reviewing these figures, it is important to note that not all faculty surveyed answered every question. The numbers in the column on the right indicate the overall number of respondents; percentages are based on the number of respondents for each question. Nearly all subjects answered the first question on teaching in a multimedia classroom, but the number of responses drops precipitously for the latter questions. Only 64% of survey respondents answered the question about whether or not they used the multimedia capabilities in a classroom and only 56% answered the question about room requests. Thus, the percentages shown in these responses cannot be taken as decisive measures of multimedia use and classroom access.

The numbers also show some startling inconsistencies. A higher number of subjects report making use of the multimedia capacities in a room (383) than reported that they had taught in a multimedia classroom (352). One explanation for this shift may be that faculty who checked out and set up equipment in other classrooms (a common practice on campus) may have answered this question, even though they had not taught in a classroom with permanent multimedia components. Another possibility is that respondents did not understand the question. We will need to investigate this pattern further as we complete our data analysis. The responses do suggest, regardless of these inconsistencies, that faculty believe that they are making use of technology when it is available.

We also asked students about their experiences with multimedia and computer classrooms. Figure 6 shows their responses. Note that the percentage of students attending class in a multimedia classroom or laboratory/computer lab is lower than the percentage of faculty who report teaching in these spaces (37.7% vs. 43.8% for multimedia classrooms and 53.1% vs. 66.4% for computer labs). We hypothesize two potential reasons for this discrepancy: faculty may have taught a small number of classes in these spaces and/or faculty may have taught a higher percentage of lower-level courses in these spaces than higher-level ones. Remember, the substantial majority of students filling out the survey have a class standing of junior or higher. Additionally, the numbers on the use of multimedia capabilities have the same problems, and to an even greater extent, as those on the faculty survey (472 reporting use of multimedia capabilities vs. 275 attending class in a multimedia classroom). Although the numbers need further investigation, we can say with some confidence that they demonstrate students' perceptions that instructors are making use of technology when it is available. This agrees with instructors' own perceptions of their use.

Question	Yes	No	Total
Attended class in a Multimedia Classroom	275 37.7%	455 62.3%	730 100%
Attended Class in a Computer Classroom	375 53.1%	331 46.9%	706 100%
Instructor used Multimedia Capabilities	472 86.9%	71 13.1%	543 100%

**Figure 6: Classroom Use according to Students**

Taken together, the survey and focus group data indicate both a strong movement towards the integration of technology into campus courses and the existence of several barriers to this integration. We will examine these trends in more detail as we complete our analysis.

## 5.2 Wireless Access

The university has recently begun an ambitious project—to construct a campus wide wireless network within the next three years. Several questions in the surveys and focus groups delved into the issues surrounding wireless implementation. The majority of faculty members perceived wireless as a positive step towards alleviating some common problems in classrooms. Students' comments tended to focus more on the benefits of wireless access in common areas; they were more enthusiastic at the prospect of working under a cherry tree in the "quad" than they were about having wireless in class. Survey findings, however, suggest that for both students and faculty, access to wireless in the classroom will have a substantial impact on their regular habits of technology use.

### 5.2.1 Surveys

We asked faculty and students a series of survey questions that focused on laptops and wireless. In 2002 we asked similar questions on the student survey. At that time 48.8% of respondents owned a laptop, but only 9.4% brought their laptops to class. A higher percentage of students (40.6%) indicated that they would bring their laptops to class if wireless were available (see Figure 2). Figure 7 charts students' responses to the same questions in 2005. Numbers show substantial gains across the board, particularly in terms of laptop ownership. While the majority of students do not currently bring a laptop to class, this trend looks to reverse dramatically when wireless becomes available in classrooms.

Question	Yes	No	Total
Currently owns a laptop	502 68.4%	232 31.6%	734 100%
Currently brings laptop to class	174 25.7%	504 74.3%	678 100%
Would bring if wireless were available	378 56.8%	288 43.2%	666 100%

**Figure 7: Laptop use by students**

Faculty numbers on laptop ownership and use are even stronger than the student numbers. The high percentage (45.8%) of faculty respondents that currently bring a computer to class most likely relates to the prevalence of Microsoft PowerPoint use on campus. Significantly, a strong majority of faculty respondents (66.6%) would bring a laptop to class if wireless were available.

Question	Yes	No	Total
Currently owns a laptop	646 79.6%	166 20.4%	812 100%
Currently brings laptop to class	358 45.8%	424 54.2%	782 100%
Would bring if wireless were available	496 66.6%	246 33.4%	745 100%

**Figure 8: Laptop use by instructors**

Taken together, the results from questions about laptops and wireless on both surveys indicate that wireless in classrooms will have a substantial impact on technology use. Even without wireless availability in the vast majority of classrooms, laptop use in class has risen dramatically in the last three years. The expansion of the wireless network will accelerate this trend in a dramatic manner.

### 5.2.2 Focus Groups

During focus groups, we asked both students and faculty the following question: “The University of Washington’s strategic plan calls for wireless access availability campus wide within three years. Considering that, how do you see the use of educational technologies changing in those three years?” Answers ranged from the visions of a campus without walls (where learning takes place everywhere) to suggestions that changes would be minimal, unless accompanying shifts in technical support and teaching practices were to take place.

Most participants fell into the latter camp, seeing wireless as allowing for a continuation and growth of current practices rather than a radical shift. They acknowledged that more students and faculty would bring laptops to class and that more instructors would use the Internet or Microsoft PowerPoint in classrooms. These subjects identified other supports that would need to be in place for wireless to have a larger impact. These included: data projectors and computer-friendly furniture in classrooms, financial resources for faculty to purchase laptops (many buy their own machines), laptop checkout programs for students, and models of pedagogical practices that would allow instructors to make the best use of this new resource. The quotes below indicate the range of discussion on this issue:

- “The things that will make it [wireless access] really powerful will be new applications that begin to use that conductivity to do things.”
- “There are management issues related to people doing email, people doing Instant Messenger on the side, and then asking questions. You wonder how they could have missed what they missed and it's because they weren't really there!”
- “It is partly because we don't have [wireless] that we don't have those models for what to do with it.”
- “Having wireless everywhere would make some technology available [an online toolkit] to students and instructors which was developed here at the University of Washington and is freely available.”
- “The furniture in the classroom really matters, because when it's those terrible little chairs with the armrest that comes out [...] it is not a good position to put your laptop. There's that worry that \$2000 are going to smash down onto the floor.”

A variety of similar issues emerged in student focus groups. Some of the main reasons students gave for not bringing laptops to class were the weight of the machines, the concern about not having a place to plug in and having the battery die during class, and the fact that laptops did not help with many class activities.

Some students had taken classes in rooms where wireless access is available. Of these students, one reported using the wireless access to generate collaborative notes (with a half dozen or so students contributing to the same notes using OneNote software). Others talked about the benefits of being able to look up related information on the internet while the instructor lectured.

Students echoed faculty concerns that laptops can become a distraction in class when they are used to check email, to send

instant messages, or to play games. One student offered a solution to this problem: instructors need to change their teaching style to take advantage of students’ laptops—“push the instruction” onto the laptops, so that students become active participants in class activities.

The patterns that emerged in the survey and focus groups indicate that wireless access is likely to have a significant impact on classroom dynamics. Additionally, this technology has the capacity to transform education by making new activities possible in the classroom, but only if adequate infrastructure, training, and support are in place.

## 6. NEXT STEPS

As noted earlier, the findings that we present in this paper are constrained by our incomplete data set and analysis. As we begin to analyze the data in its entirety we may find that these patterns change and new ones form. On the other hand, if these trends hold, there are a variety of steps that the university can take to address the issues raised in this paper.

- Work to make all classrooms tech-friendly, by replacing furniture, upgrading existing technology, and adding new technology as needed.
- Expand training opportunities for faculty to enhance their skills with classroom technology and with online tools and resources that can be used in wireless classrooms.
- Look to expand opportunities for students and faculty to check out laptops, so that all members of campus community can take advantage of wireless.
- Provide pedagogical models that demonstrate the best practices for employing technology (including wireless) in an effective manner.

## 7. ACKNOWLEDGMENTS

We would like to thank our UW partners for their assistance with the construction of the surveys: Computing & Communications, the Office of Undergraduate Education, Educational Outreach, UW Libraries, and the Student Technology Fee Committee. We would also like to recognize the following individuals for their assistance with focus groups: Brandon Koeller, Beth Koemans, Bayta Maring, and Karin Roberts. Assistance with data analysis has been provided by Deb McGhee, Vanessa Mark, Rochelle Martin, and Kim Lum.

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