

## Executive Summary

In Spring 2003, NC State University faculty were surveyed about their experiences with computer-based instructional and learning aids. 1,790 faculty were invited to participate in the survey. 983 did, for an overall response rate of 55%.

The survey asked about two categories of electronic instructional and student-learning aids: those likely to be used **in** the classroom and those likely to be used **outside of** the classroom. Overall, around 50% of the respondents reported using one or more of the in-class technologies in the list. Static electronic presentations by the instructor (e.g., Powerpoint) were reported most frequently (55%). Fewer than half the respondents reported using any of the other technologies listed. The most common were demonstrating web materials (45%) and presenting course concepts via animation, multimedia, simulation or other non-static means (40%).

Using email, chat rooms, bulletin boards, etc. to communicate electronically with students (reported by 94% of the respondents) and having students prepare (80%) and submit (64%) work electronically, and use digital content resources (71%) were the most frequently reported outside-the-classroom technologies. These are also technologies that respondents expected students to already know how to use. Learning management systems (LMSs) such as Wolfware and WebCT (42%) and having students use course-specific software (31%) were the outside-the-classroom technologies reported least often. Respondents teaching large courses were more likely than others to report using LMSs (58% vs. 38%).

If a respondent had *not* used a particular technology, a later section of the survey asked why. The most frequent reason for *not* using a technology was "I do not find it useful to the course." On average, 50% of respondents gave this as one of their reasons for not using in-class technologies, and 45% gave it for outside-the-classroom technologies. The second most frequent reason was "Not available or supported in my classroom" (30%).

Respondents were asked what would make it easier to use the technologies that they **did** use in their courses. "If they were available and supported in the classrooms in which I typically teach" and "If I had more time to develop assignments or classes with these technologies" were chosen most often, 37% and 36% of the time compared to 8-29% for the other things that were listed.

Email, web browsing and searching for information, word processing, and basic computer skills (e.g., managing files, copy/paste, etc.) were the skills that respondents most often expected students to have when they started these courses. Course-type and college differences in respondents' expectations seem consistent with course and discipline requirements. In general, preparation to use the in- and out-of-class technologies was high and consistent with faculty members' expectations. When students were not as prepared as expected, respondents were most likely to report that they worked with the students themselves during or outside of class (38% and 45%, respectively) or encouraged students to help each other (42%).

We should be careful not to interpret the survey in strictly technological terms. The results probably reflect a mix of technological, pedagogical, and resource issues. For example, faculty

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asked about their experience in small upper-level courses were more likely than those asked about other kinds of courses (large lower-level, small graduate-level, etc.) to report using any of these technologies. This may reflect the fact that smaller, upper-level classes generally focus on content in the major and are more likely to be held in classrooms with computer connections for all students. Another example is the fact that the most common reason for not using a technology in class was “I do not find it useful in the course.” More study is needed to find out why instructors don't find certain technologies useful in their courses. Some reasons for not using particular technologies were given more often by respondents from some colleges than from others and the colleges differed in the extent to which their respondents said their courses dealt with social and ethnical problems associated with technology. Possible reasons for these differences include how technology is viewed and used in the various disciplines, disciplinary differences in pedagogical style, and what building resources and technological support are available in each college. There may also be other factors. Finding out what's behind these differences will help make LITRE projects more effective.

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## About the survey

In Spring 2003, NC State University faculty were surveyed about their use of and satisfaction with computer-based educational-technology applications, resources, content and infrastructure. The web-based survey asked respondents whether or not they used computers and other electronic instructional and student-learning aids in courses that they taught the previous semester, Fall 2002. Respondents were asked about their experiences with the instructional and learning aids that they did use, why they didn't use the ones they didn't use, and what might help them use those they did use more effectively and make the ones they didn't use more inviting. They were asked to answer in terms of their experiences in courses of certain levels and sizes: some were asked about lower-division (100-200 level) courses with enrollments of 60 or more, others were asked about upper-division (300-400 level) courses with fewer than 30 students, and so on. Table 1 shows the course categories used for this survey and the number of faculty members asked about each type.

**Table 1:** Course categories, based on course level and enrollment

Category label	Course level	Course size*	Sample size*
Lower / small	100-200 level	less than 30	216
Lower / medium		30-60	228
Lower / large		more than 60	192
Upper / small	300-400 level	less than 30	370
Upper / medium		30-60	234
Upper / large		more than 60	87
Graduate / small	Graduate (500+ level)	less than 30	338
Graduate / medium		30-60	78
Graduate / large		more than 60	51

- \* *Course size*=enrollment. Single-student (thesis and independent study) courses were not counted for the purpose of this survey.
- \* *Sample size*=# of faculty members asked about this course category.

1,790 faculty were invited to participate in the survey. 983 did, for an overall response rate of 55% (margin of error:  $\pm 1.4$  percentage points<sup>1</sup>). Respondents' home colleges and participation in the course categories they were asked about (lower/large, upper/small, etc.) were similar to the distributions in the full sample. Response rates are fairly stable across colleges and course types, high enough to give acceptable margins of error in most cases. The categories with margins of error that demand real caution tend to be ones with small samples. Treat conclusions about these colleges and course types cautiously.<sup>2</sup>

## Technologies used *in* the classroom

The survey asked about two categories of electronic instructional and student-learning aids: those likely to be used **in** the classroom and those likely to be used **outside of** the classroom. The **in-classroom** technologies asked about were:

- Static electronic presentations **by students** (e.g., Powerpoint presentations)
- Static electronic presentations **by the instructor**
- Electronic presentation of course concepts via animation, multimedia, simulation, etc.
- Instructor demonstrations of Web materials (e.g., library resources)
- Computerized exams or quizzes given in class or in labs
- Student use of course-specific software in class or lab (e.g., Maple, SAS, ALIAS, Design Studio, GIS tools, JAVA, etc.)
- Electronic feedback to the instructor during class via handhelds, pushbuttons, laptops, etc.

Respondents also had the opportunity to add types of technology that were not included in the list.

Overall, around 50% of the respondents reported using one or more of the **in-class** technologies in the list.<sup>3</sup> For most of the technologies, the percentage is considerably lower. The technologies used most frequently tend to be the least technologically sophisticated.

Static electronic presentations by the instructor was reported most frequently (55%). Fewer than half the respondents reported using any of the other technologies listed. The most common were demonstrating web materials (45%) and presenting course concepts via animation, multimedia, simulation or other means (40%), which could include videos, slides, or audio presentations. In all the course types, static electronic presentations were reported noticeably more often than active presentations. This may be because active presentations are less available and harder to produce and/or because faculty are less familiar with them than they are with static presentation techniques.

Electronic feedback in class was reported least often, with 6% of respondents indicating they had used this. Respondents' open-ended comments, however, seem to indicate that quite a few more instructors would make use of electronic feedback if it were available in the classrooms.

In general, respondents from CHASS and PAMS and those asked about PE & Music courses were less likely than those from other colleges to report using any of these technologies in their classes. When results for different course-types are compared, faculty asked about their experience in small upper-level courses were the most likely to report using any of these technologies. This may reflect the fact that smaller, upper-level classes generally focus on content in the major and are more likely to be held in classrooms with computer connections for all students or at least for the instructor. In particular, respondents asked about these courses were more likely than average to have students make static electronic presentations (49% compared to 34%). They were also more likely than average to use digital content resources in class (50% compared to 36%), to have students use course-specific software (35% compared to 26%), and to make use of electronic feedback during class via handhelds, pushbuttons, etc (11% compared to 6%).

Respondents asked about large upper-level and all graduate-level classes were also more likely than average to report using static electronic presentations in class, although they reported this less often than instructors of small upper-level courses did. In contrast, the use of static electronic presentations was average for large lower-level courses, and below average for medium-sized and small lower-level courses. Instructors of large upper-level courses were much less likely than average to report using digital content resources (18% compared to the 36% average), in contrast to instructors of smaller upper-level courses who, as noted above, were more likely to use this technology.

The respondents' answers may reflect many issues and we should be cautious about interpreting them strictly in technological terms. For example, as noted above, respondents from CHASS and PAMS were less likely than those from other colleges to report using in-class technologies. The survey results also indicate that respondents from CHASS and PAMS were more likely than those from other colleges to say that the technologies are not available in their classrooms (a technological issue).<sup>4</sup> However, they are no more likely than respondents from other colleges to say that these technologies are not useful or applicable to their courses (a pedagogical issue) or that they'd use them if issues such as availability and applicability were resolved. More research into why these technologies are used less often in CHASS and PAMS is needed before deciding whether action is needed and, if so, what actions will be most effective. Similar caution should be applied whenever results from this survey are used in considering LITRE projects and activities.

### **Reasons for *not* using in-classroom technologies**

If a respondent did *not* indicate that she had used a particular technology, a later section of the survey asked why. The respondent could select one or more relevant reasons from a list (see Table 2) and could write in additional reasons or comments. The respondent was also asked whether it was likely she'd try these technologies in the future if the issues she'd indicated could be resolved.

**Table 2:** Response choices for the survey question “*Below we list a number of reasons why you might not have used a given technology for your courses in Fall 2002. For each technology, please check all the reasons you did not use it.*”<sup>5</sup>

I don't:	know how to use this
	like using this
Students don't:	know how to use this
	like using this
	like me to use this
I don't find this useful/applicable for these courses	
This is not available/supported:	at NC State
	in my department
	in the classrooms in which I typically teach these courses
I don't have time to:	do this in class/outside of class
	deal with students using this in their assignments
	develop assignments or classes using this
	teach students how to use this
I do not think I would be rewarded for this effort	

For all of the in-class technologies listed, the most frequent reason for *not* using the technology in the classroom was "I do not find it useful to the course." Averaged across all technologies, 50% of all respondents gave this as one of their reasons.<sup>6</sup> This is consistently the commonest reason across the technologies, reported by 44-56% of respondents depending on the technology. The second most frequent reason was "Not available or supported in my classroom" (average across all technologies: 30%). The other reasons were reported much less frequently (2-19%). In most colleges and course types, the most frequent of these were "I don't know how to use the technology" and "I don't have time to develop assignments" (19% and 17% respectively).

Respondents asked about graduate courses were more likely to say “I do not find this technology useful for these courses” than respondents asked about undergraduate courses were (58% vs. 47%). The other reasons tended to be slightly less frequent for graduate than for undergraduate courses.

Some reasons given for not using particular technologies were given more often by respondents from some colleges than from others. Table 3 shows issues with particularly high variation across colleges.

**Table 3:** Variability across colleges in reasons for not using particular in-class technologies

Type of in-class technology	Reasons with high variability across colleges
Static electronic presentations by students	<ul style="list-style-type: none"> <li>▪ Not available / supported in my classroom</li> <li>▪ Don't have time to develop assignments</li> </ul>

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Static electronic presentations by instructor	<ul style="list-style-type: none"> <li>▪ Not available / supported in my classroom</li> <li>▪ Don't have time to develop assignments</li> <li>▪ I do not find useful to course</li> <li>▪ I do not like to use</li> </ul>
Electronic presentation of concepts	<ul style="list-style-type: none"> <li>▪ Not available / supported in my classroom</li> <li>▪ Don't have time to develop assignments</li> <li>▪ I do not know how to use</li> </ul>
Instructor demonstrates web material	<ul style="list-style-type: none"> <li>▪ Not available / supported in my classroom</li> </ul>
Computerized exams / quizzes	<ul style="list-style-type: none"> <li>▪ Not available / supported in my classroom</li> </ul>
Electronic feedback to instructor via handheld, etc	<ul style="list-style-type: none"> <li>▪ Not available / supported in my classroom</li> </ul>
Instructor uses digital content resources	<ul style="list-style-type: none"> <li>▪ I do not know how to use</li> </ul>

In addition, individual colleges sometimes showed unique response patterns. For instance, an unusually high proportion of respondents from a particular college may have given the same set of reasons for not using a particular technology. An example is that Design respondents' to say they did not use static electronic presentations by students because they do not like this method (27% vs. 0-13%), because they do not have time to develop appropriate assignments (36% vs. 0-18%), and because they do not think they will be rewarded for their effort (27% vs. 3-14%). Another unusual pattern is a "contrary" response from one college with a higher than average proportion of its respondents choosing a reason that was given by average or lower than average proportions of respondents from other colleges. For example, 24% of COT respondents said that they do not have time in class to use course-specific software, compared to 6-14% of respondents from the other colleges and 11% of all respondents combined. Unusual response patterns like these were most frequent for Design, CNR, and COT.

In general, this variability indicates that it will be wise to examine the issues and potential solutions college by college rather taking a "one size fits all" approach.

**Resolving issues that lead respondents not to use in-class technologies<sup>7</sup>**

Respondents teaching PE/Music courses and from CVM and COM were more likely than those from other colleges to say that they probably wouldn't try these technologies even if their issues were resolved (32-37% vs. 14-24%). Respondents from CNR and COT were most likely to say that resolving their issues would make it very likely they'd try the technologies (33 & 35% vs. 16-28%).

It will be important to examine why colleges differ in the reasons their faculty members give for not using these technologies. Possibilities include pedagogical style, disciplinary differences in how technology is used, what college and building resources are available, and possibly other factors. As with the college-specific responses about which in-class technologies are used, mentioned above, variability in which reasons are given for not using the technologies means that solutions may not be simple or simply technological.

## Technologies used *outside* the classroom

The **outside-the-classroom** technologies asked about were:

- Learning management systems (e.g., Wolfware, WebCT)
- Electronic communication **with** students (e.g., email, chat groups, audio/visual conferences)
- Electronic communication **among** students (e.g., email, chat groups, audio/visual conferences)
- Work **submitted** electronically
- Student work **prepared with** a wordprocessor, spreadsheet, graphics program, etc.
- Use of digital content resources (e.g., online articles, digital images, multimedia, databases)
- Use of course-specific software (e.g., Maple, SAS, ALIAS, Design Studio, GIS tools, Java, etc.) for homework or out-of-class assignments

As with the in-class technologies, respondents had the opportunity to add types of technology that were not included in the list.

Communicating electronically **with** students (reported by 94% of the respondents) and having students **prepare** work electronically (80%), use digital content resources (71%), and **submit** work electronically (64%) were the most frequently-reported technologies.<sup>8</sup> They were reported more often than any of the **in**-class technologies (6-55%) or any of the other outside-the-classroom technologies (31-53%) . These four outside-the-classroom technologies are also among those that respondents most often expected students to know how to use whether or not the respondents required them in their courses.<sup>9</sup>

There was little variation across colleges or course types in the proportion of respondents reporting that they communicate electronically with students, except that only 75% of CVM respondents report this, compared with 89-99% of respondents from other colleges. Similarly, the proportion reporting that they have students use digital content resources in out-of-class assignments was consistently high except that only 29% of those teaching PE/Music courses and 41% of PAMS respondents report this, compared with 71-93% of respondents from other colleges.

Respondents teaching large classes were less likely to report having students prepare and submit work electronically than respondents teaching small and medium-sized classes (prepare: 60% vs. 84%; submit: 53% vs. 66%). Open-ended comments suggest this may be because some faculty feel that dealing with large amounts of electronic copy takes more effort than it's worth.

Learning management systems such as Wolfware and WebCT (42%) and having students use course-specific software (31%) were the technologies least often reported outside the classroom.<sup>10</sup> The results for learning management systems (LMSs) are consistent with data from DELTA (Distance Education and Learning Technology Applications) showing that 49% of the course sections taught in Fall 2002 used either Wolfware or WebCT. Results from the 2002-03

Graduating Senior Survey indicate that these are courses taken by a high proportion of our students; 83% of senior-survey respondents reported using LMSs in one or more of their junior- or senior-year courses.<sup>11</sup>

Respondents teaching large courses were more likely than others to report using LMSs (58% vs. 38%). Respondents from COE were more likely to report using LMSs (63%), and CVM respondents were less likely to report this (11%), than respondents from other colleges were (30-52%).

Respondents in Design, COE, and PAMS reported having students use course-specific software outside of class more often (52-61%), and respondents in CHASS, CVM, and teaching PE/Music courses reported it less often (0-13%), than faculty in other colleges did (23-40%). These differences may simply reflect the extent to which various disciplines use special-purpose software.

### **Reasons for *not* using outside-the-classroom technologies**

As with the in-classroom technologies, far and away the commonest reason given for not using an outside-the-classroom technology was that the respondent did not think it would be useful for the course.<sup>12</sup> Averaged across all the technologies not used, 44.9 % of respondents gave this reason. This is consistently the commonest reason across the technologies, reported by 30.0-50.8% of respondents depending on the technology. The next most frequently-given reasons for not using the technologies were that the respondent did not know how to use the technologies (average across all technologies: 17.2%), did not have time to develop assignments using these technologies (14.3%), and/or did not have time outside of class to work with them (12.6%). The rest of the reasons were given quite infrequently, each by less than 7.5% of respondents overall.

Respondents' answers suggest that while they are comfortable having students *prepare* assignments electronically (using word processors, spreadsheets, etc.), they are not as fond of having work *submitted* electronically (which means they must make sure students know how to submit their work properly and must read the student work on-screen or take time to print copies, etc.) As noted above, having students use basic computer applications to prepare their work is one of the most commonly used outside-the-class technologies (80%). Respondents who didn't have students do this were less likely to say that it was because they don't have time to develop assignments using the technology or to "do this" outside of class time than they were for other technologies. On the other hand, respondents were more likely than with other technologies to say that they don't have students *submit* their work electronically because they don't have time to deal with students doing this and because they (the faculty members) don't like to use this technology. Table 4 shows the two patterns.

**Table 4:** Comparison of reasons given for not having students prepare and submit work electronically

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Technology not used	Reason for not using	% Giving this reason	
		This technology	Other technologies
Students:			
Prepare work electronically	No time to develop assignments	8%	12-18%
	No time to do this outside of class	7%	10-19%
Submit work electronically	I don't like to use this technology	15%	3-9%
	No time to deal with students doing this	9%	3-7%

Respondents were more likely than with other technologies to say that they didn't use learning management systems (Wolfware, WebCT, etc.) for out-of-class work because they don't know how to use this technology (32% vs. 4-12%) and didn't have time to work with it outside of class (19% vs. 7-13%).

Some reasons given for not using particular technologies were given more often by respondents from some colleges than from others. As with the in-class technologies, this variability suggests that we should examine some issues and potential solutions college by college. Table 5a shows issues with particularly high variation across colleges.<sup>13</sup> Table 5b shows issues with particularly high variation across course types.<sup>13, 14</sup>

**Table 5a:** Variability across colleges in reasons for not using particular outside-the-classroom technologies

Out-of class technology	Reasons showing high variability across colleges
Learning management systems	<ul style="list-style-type: none"> <li>▪ I do not know how to use</li> </ul>
Electronic communication <b>among</b> students	<ul style="list-style-type: none"> <li>▪ Not useful to course</li> <li>▪ Will not be rewarded for using</li> </ul>
Students use digital content resources	<ul style="list-style-type: none"> <li>▪ Not useful to course</li> </ul>

**Table 5b:** Variability across course types in reasons for not using particular outside-the-classroom technologies

Out-of class technology	Reasons showing high variability across course types
Learning management systems	<ul style="list-style-type: none"> <li>▪ Not useful to course</li> </ul>
Electronic communication <b>among</b> students	<ul style="list-style-type: none"> <li>▪ Not useful to course</li> </ul>
Student work <b>submitted</b> electronically	<ul style="list-style-type: none"> <li>▪ Not useful to course</li> <li>▪ Will not be rewarded for using</li> </ul>
Student work <b>prepared</b> electronically	<ul style="list-style-type: none"> <li>▪ Not useful to course</li> </ul>

Across all the outside-the-classroom technologies, respondents from Design were consistently more likely than respondents from other colleges to say that they did not use a technology because they did not think they would be rewarded for the effort (80% vs. 6-49%). Respondents from Design were also more likely than those from other colleges to say that they did not have students submit work electronically because they did not think this was useful for their courses (71% vs. 36-59%) and because they did not have time to develop assignments that could be submitted this way (43% vs. 0-18%), teach students how to submit electronically (29% vs. 0-18%), and spend time out of class on this technology (43% vs. 5-27%).<sup>15</sup>

Respondents from CNR were more likely than those from other colleges to say that they did not have students use course-specific software outside of class because they (the respondents) didn't have time outside of class for this (30% vs. 2-21%), because students didn't know how to use these technologies (12% vs. 0-6%), and because their departments and the university didn't support this technology (24% vs. 0-18%). They were more likely than respondents from other colleges to say they didn't use learning management systems because they (the respondents) didn't know how to use them (64% vs. 17-39%).

Respondents asked about small- and medium-sized graduate courses were more likely than those asked about other types of courses to say that they did not use many of the technologies because they did not find them useful for the courses (51 & 57% vs. 27-40%).

### **Resolving issues that lead respondents not to use outside-the-class technologies<sup>16</sup>**

As with the in-class technologies, respondents teaching PE/Music courses and from CVM and COM were more likely than those from other colleges to say that they probably wouldn't try these technologies even if their issues were resolved (46-50% vs. 20-32%). Respondents from CED, COM, and COT were most likely to say that resolving their issues would make it very likely they'd try the technologies (22-26% vs. 5-19%). In their open-ended comments on this question, respondents from PE/Music, CVM, and COM were more likely than those from CED, COM, and COT to say that the technologies were not appropriate for their courses.

### **Were students prepared to use these technologies?**

Two sets of survey questions asked about student preparation. One set asked about the teaching/learning technologies the respondent used in or outside the classroom. Respondents were asked how well prepared they expected students to be at the start of the course to work with these technologies, how well prepared they found the students to actually be, and what they did if students were not as prepared as they had expected.

Expectations and the perceived level of actual preparation were both high.<sup>17</sup> Overall, nearly 90% of respondents expected students to be moderately or well prepared to for the technologies the respondents' courses used in or outside the classroom. A similar proportion reported that students actually were moderately or well prepared to use these technologies. In most cases, students' actual preparation to use the technologies was consistent with the faculty member's expectations. That is, most respondents who expected students to be moderately prepared also reported that they had been moderately prepared, etc. While there were some college and course-type differences – e.g., faculty teaching small and large graduate courses, and faculty in Design, tended to expect their students to be less well prepared to use in-class technologies than they actually were, while faculty in CNR, COT, and CVM tended to expect students to be more prepared to use out-of-class technologies than they actually were – in general, faculty expectations seem accurate.

When students were not as prepared as expected, respondents tended to rely on the resources over which they had the most control. They were most likely to report that they worked with the

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students themselves during or outside of class (38% and 45%, respectively) or encouraged students to help each other (42%). Most respondents did not expect students to teach themselves or to get help from university support services, although they were slightly more likely to expect upper level undergraduates to find assistance on their own. Open-ended comments indicate that faculty were more likely to refer students to library support services than to other university support services, but the comments are not detailed enough to indicate if this means simply that faculty are more likely to know that the libraries teach information-fluency skills than they are to know who can help students with particular software or hardware problems. More information will be needed to guide LITRE initiatives effectively and to adapt them to college and disciplinary needs and styles. For example, Design faculty were more likely than those in other colleges to teach course-related technologies in class (60% vs. 19-41%) while CNR faculty were more likely than others to work with under-prepared students outside of class (70% vs. 19-53%) or to encourage students to work together to learn these technologies (70% vs. 19-54%).

Overall, these data and results from the questions about why respondents did not use certain technologies suggest that faculty expectations about and experience with student preparation in general do not play a strong role in whether technologies are used or not. This raises the question of whether LITRE projects related to student preparation should address overall student technology fluency or should focus on assistance to under-prepared students and “just in time” help that’s available when students have problems as they work with discipline-specific technologies.

The survey did not ask whether the few students who did not meet faculty expectations at the outset of the course improved their proficiency with these technologies over the course of the semester and whether initial poor preparation may have contributed to poor overall performance in the course, and respondents’ open-ended comments do not give this information.

The second set of questions about student preparation asked what kinds of software and computer-based aids the respondents expected students to be able to use when they started these courses regardless of whether or not the courses used these or any electronic instructional or student-learning aids. Email, web browsing and searching for information, word processing, and basic computer skills (e.g., managing files, copy/paste, etc.) were selected most often.<sup>18</sup> There were some course-type and college differences, which seem consistent with course and discipline requirements. For example, faculty with drawing/illustration software and spreadsheets and statistical software were more likely to be expected in upper-division and graduate courses than in lower-division courses. Faculty in Design were most likely to expect faculty with web development, digital image editing, and multimedia/visualization/video production tools. Faculty in COE, CNR, COT, and COM were most likely to expect faculty with spreadsheets, and faculty in COM and PAMS were most likely to expect students to be able to use mathematical software. Table 6 shows these patterns.

**Table 6:** Course-type and college differences in expected preparation

Respondents expect facility with:	Course level		
	Lower-division	Upper-division	Graduate
Drawing/illustration	4-11%	21-25%	19-29%
Spreadsheets	20-27%	39-52%	29-53%
Statistical software	0-3%	3-11%	13-21%

College	Respondents expect facility with:	% Expecting this	
		These colleges	Other colleges
COE,CNR,COT,COM	Spreadsheets	57-72%	11-40%
COE,PAMS	Mathematical software	21-37%	0-13%
Design	Web development	21%	1-8%
	Digital image editing	46%	0-13%
	Multimedia production	32%	0-11%

The survey also asked, regardless of whether or not respondents' courses used electronic instructional or student-learning aids, if they ever discussed with their students any social or ethical issues related to using technology. About half of the respondents (53%) said the topic never came up in the courses about which they were asked. Respondents from Design, CED, CNR, and CHASS were least likely to say that it had never come up (25-39%, compared to 54-88% in the other colleges). Very few respondents (6%) said they had discussed the topic at length in their courses.<sup>19</sup>

### **What would make it easier to use these technologies?**

Respondents were asked what would make it easier to use the technologies that they **did** use in their courses.<sup>20</sup> Table 7 shows the possibilities that were listed for respondents to mark. They could mark as many as they wanted. They also had the opportunity to write in other changes that would make it easier to use these technologies.

**Table 7:** Response choices for the survey question “*In general, what would make it easier for you to use these technologies in your courses? (Mark the ones that are most important to you.)*”

If I knew more about them	
If I found versions that:	I like
	I think are useful and applicable to my courses
If they were available and supported:	at NC State
	in my department
	in the classrooms in which I typically teach these courses
If I had more time to:	do this in the classroom
	deal with students using this technology in their assignments
	develop assignments or classes using this technology
	more time to teach students how to use these technologies
If students were better prepared to use them	
If I knew I would be recognized and rewarded for this effort	

Most of the choices were marked by 20-30% of the respondents. “If they were available and supported in the classrooms in which I typically teach” and “if I had more time to develop assignments or classes with these technologies” were chosen most often, 37% and 36% of the time compared to 8-29% for the rest of the choices. Respondents were slightly more likely to say that *both* of these things would make it easier to use the technologies (20%) than to choose only one of them (18% and 17% respectively), but the difference is small. Most colleges and course-types show the same pattern.<sup>21</sup> CHASS and PAMS respondents, however, were noticeably more likely to want the technologies available and supported than to want more development time (22 & 26% of respondents from these colleges chose only “available and supported,” while only 13 & 16% chose only “development time”).

### The “old fogey” myth

Our results do **not** support the common assumption, based on anecdotal experience at NC State and elsewhere, that older faculty or faculty who have been teaching longer are less likely to use computer-based teaching/learning technologies than younger or “newer” faculty members are. Respondents’ age and number of years on the NC State faculty have very little relationship to the number of technologies used in courses. Together, age and experience account for only 1.6% of the variability in the number of technologies that respondents used.<sup>22</sup> Age and experience also have very little relationship to the number of technologies that respondents said they did not use because they did not find them useful for their courses.

## General conclusions, caveats, and next steps

The results from this first administration of the LITRE Faculty Survey and from the 2002-03 Graduating Senior Survey<sup>11</sup> are a general baseline that will help us monitor changes in the overall campus climate for and use of computer-based instructional and student-learning aids. More focused studies will probably be needed to guide individual LITRE projects.

The survey results indicate that faculty members do expect students to have some computer skills (email, web browsing and searching, word processing, basic computing skills such as file management, copy/paste, etc.) whether or not their courses use computer-based instructional and student-learning aids. These are also the skills called for by the out-of-the-classroom technologies that were reported most frequently. Respondents who did use in- or out-of-the-classroom aids reported that students' preparation to use them was generally high and consistent with the faculty members' expectations.

The most frequently used in-class technologies are ways to present course materials and concepts (e.g.: Powerpoint and other static presentations, web demonstrations, and animations and other non-static presentations), computer-based version of traditional presentation methods such as overhead projections, chalkboards, and handouts. The most frequently used out-of-the-classroom techniques (electronic communication with students and having students prepare and submit work electronically and use digital content resources) are computer-based versions of traditional assignments and interactions such as student-faculty conversations, term papers, and library research. This is not surprising and seems a reasonable way for faculty to begin using computer-based instructional and student-learning aids. These out-of-the classroom technologies are reported more frequently than the in-class technologies. This also is not surprising, since the frequently reported out-of-the classroom technologies require less change on the faculty members' part than the in-class technologies do.

The reason most often given for not using the technologies was that they were not useful or appropriate for the courses the respondent was asked about. That is, the respondents saw a mismatch between the available technologies and the pedagogical approaches they used in their courses. The next most common reasons were that in-class technologies were not available or supported in the classrooms where the respondent taught these courses.<sup>23</sup> These, and the variability among colleges and course-types about which reasons are related to which technologies, indicate that we should be cautious about interpreting the survey results in strictly technological terms. Instead, the results suggest a mix of technological, pedagogical, and resource issues.

For example, when faculty said that they do not find student electronic presentations of content useful and appropriate for their courses, were they telling us that they do not find student Powerpoints or other high-tech presentations useful or that they do not find *any kind* of student presentations appropriate for the courses they were asked about? We should try to find out more about why instructors don't find certain technologies useful in certain courses. Similarly, some reasons for not using particular technologies were given more often by respondents from some colleges than from others, and the colleges differed in the extent to which their respondents said their courses dealt with social and ethnical problems associated with technology. It will be useful

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to find out what's behind these differences. Comparing responses from different parts of the survey and reviewing the open-ended responses suggests some explanations, as noted earlier in this report, but they are incomplete and there may be other explanations not captured by this survey.

Further analysis and additional focused research is also needed to explore possible interactions between survey topics. For example, if faculty *were* convinced that that a particular technology were useful, would the other issues such as support, rewards, etc. be relevant? More complex analyses can compare results from those who did and didn't say that a given technology is not appropriate for their courses. Similarly, further comparisons of differences between the colleges that already have extensive classroom support/technology (COT & COM) and the other colleges may be instructive.

Other questions also require further research. For example, what kinds of help do students request from ITD and other central resources? What student support/help is available from those resources and how useful do the students find it? The existing sophomore and senior surveys provide only minimal information on these topics.<sup>24</sup> What specialized and discipline-specific assistance can and should central resources provide for students, and what must come from instructors, TAs, and departmental support? Similar questions can be asked about support for faculty using these technologies.

This survey asked about some general classes of technology. It will be useful to know what other technologies are in use already, or are desired but not available. The open-ended responses did not generate much information about this. In addition, focus groups or more focused surveys might clarify some of the issues mentioned elsewhere in this report such as why colleges differ in the reasons their faculty members give for not using these technologies and the relationships between use of these technologies and faculty members' pedagogical styles.

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## Notes

<sup>1</sup> Source: *Sample size and response rate* in the “Results” section of the on-line appendix to this report (see Table of Contents for URL).

*Margin of error* is the range within which the “true” percentage giving a particular answer will be found, at the 95% confidence level. That is, if 54% of all respondents say they used static electronic presentations in class, the margin of error of 1.4 percentage points tells us that we can be 95% sure the figure would have been between 52.6% (=54-1.4) and 55.4% (=54+1.4) if all faculty members had responded to the survey. Margin of error increases as sample size decreases, so results for subgroups such as respondents from a particular college or a particular course type are less precise (have larger margins of error) than results for all respondents combined.

<sup>2</sup> Categories with larger margins of error (ME)

Category	Sample size	Response rate	Margin of error (percentage points)
Large graduate courses	51	41%	±12.6
CVM	68	43%	±10.4
Design	56	50%	±9.3
CNR	56	52%	±8.8
PE/Music	51	55%	±8.4

<sup>3</sup> Source: *What in-class technologies did respondents use? (Questions B1-B9)* in the “Results” section of the on-line appendix to this report (see Table of Contents for URL).

<sup>4</sup> See “Reasons for *not* using in-class technologies” (pp. 5-7) and “What would make it easier to use these technologies?” (pp. 13-14).

<sup>5</sup> Respondents were asked only about technologies they had already indicated that they did not use, and only about reasons appropriate to each of those technologies.

<sup>6</sup> Source: *Reasons why respondents might not have used in-class technologies (Questions D2A\_2 - D4H\_14)* in the “Results” section of the on-line appendix to this report (see Table of Contents for URL).

<sup>7</sup> Source: *Likelihood of using these technologies if issues were resolved (Question D2)* in the “Results” section of the on-line appendix to this report (see Table of Contents for URL).

<sup>8</sup> Source: *What outside-the-classroom technologies did respondents use? (Questions B10-B17)* in the “Results” section of the on-line appendix to this report (see Table of Contents for URL).

<sup>9</sup> See the section **Were students prepared to use these technologies?**.

<sup>10</sup> “Other” was selected even less often, by only 26% of the 246 respondents who answered the “Other” question in this section of the survey. Information about *which* other technologies were used was too infrequent to analyze or interpret. There were only 63 open-ended comments accompanying the “Other” responses. 43 of them overlapped with other technology categories (e.g.: WebAssign can be a way for students to submit homework electronically). The remaining 20 cover a wide range of technologies and uses, from CD-ROMS that accompanied text books (mentioned 3 times) to having students generate web pages as a course project (mentioned twice).

<sup>11</sup> Questions about seniors’ experience with LMSs and in-class teaching/learning technologies were added to the Graduating Senior Survey for the first time in 2002-03. Results will be available on University Planning & Analysis’ website early in Fall 2003, at <http://www2.acs.ncsu.edu/UPA/survey/>.

<sup>12</sup> Source: *Reasons why respondents might not have used outside-the-classroom technologies (Questions D4A\_1 - D4G\_13)* in the “Results” section of the on-line appendix to this report (see Table of Contents for URL).

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<sup>13</sup> The data tables in the on-line Appendix show high variability in reasons given for not using electronic communication *with* students, but this is an artifact of the very small number of respondents who didn't use this technology. Therefore it is not included in Tables 5a and 5b. Neither are a few cases of apparent "high variability" that occur when a very low number of respondents from a single college did not use a particular technology.

<sup>14</sup> The small lower-division courses and the large graduate courses that respondents were asked about were primarily in a few of the colleges, so "course-type effects" involving these categories may also reflect college differences. 72% of the small lower-division courses that respondents were asked about were in CHASS (76 out of 105). 62% of the large graduate courses were in CVM (13 out of 21; the rest were in COE [5] and PAMS [3]).

<sup>15</sup> While there were relatively few respondents from Design, this pattern is reported because it was unusually consistent across reasons.

<sup>16</sup> Source: *Likelihood of using these technologies if issues were resolved (Question D5)* in the "Results" section of the on-line appendix to this report (see Table of Contents for URL).

<sup>17</sup> Source: *Were students prepared to work with technologies respondents used? (Questions C1-C4, C6)* in the "Results" section of the on-line appendix to this report (see Table of Contents for URL).

<sup>18</sup> Source: *General technological fluency (Questions E1A-E1U)* in the "Results" section of the on-line appendix to this report (see Table of Contents for URL).

<sup>19</sup> Source: *Social and ethical issues (Question E2)* in the "Results" section of the on-line appendix to this report (see Table of Contents for URL). The number of respondents who said they had discussed the topic at length is too small for college or course-type differences to be interpreted meaningfully.

<sup>20</sup> Source: *What would make it easier for respondents to use these technologies? (Questions C7A-C7N)* in the "Results" section of the on-line appendix to this report (see Table of Contents for URL).

<sup>21</sup> This applies to colleges and course-types where enough respondents gave these responses for the percentages to be trustworthy.

<sup>22</sup> Relationships between respondents' age, years at NC State, and the number of technologies used or the number not used because respondents did not consider them useful or appropriate for their courses.

	Age		Experience		Combined
	r =	R <sup>2</sup> =	r =	R <sup>2</sup> =	
# Technologies used	-0.078	0.006	-0.015	0.0002	0.016
# Technologies "not useful"	-0.126	0.015	-0.045	0.002	0.006

<sup>23</sup> Many of these respondents might have used the technologies if they had been available. Note, however, that about a quarter of all respondents indicated that in general they would not be likely to use the technologies the survey asked about even if their issues were resolved (in-class technologies: 21%; out-of-the-classroom technologies: 31%).

<sup>24</sup> Information about and from these surveys is available at University Planning & Analysis' survey research web site, <http://www2.acs.ncsu.edu/UPA/survey/index.htm>.

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