

Research Brief

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Faculty Use of Technology Survey 1994

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Highlights

Current Use of Technology. Faculty reported using technology resources in their capacities as teachers, researchers, and administrators, though traditional resources still far outweigh uses of technology. This gap appears to be narrowing, as respondents listing resources they would *like* to use (but currently are not) placed computer and technology resources at the top of the list. For example, textbooks were used by 80% of faculty, while computer software was used by only 21%. However, an additional 13% of faculty said they would like to use computer software; other computer resources had similar levels of desired future use.

Importance of Technological Resources. Faculty involved primarily in research attached greater importance to technological resources than their teaching counterparts. A majority of research faculty cited six such resources as important, whereas only one resource was rated as important by a majority of teaching faculty. Word processing was rated the most important technological resource by both groups of faculty.

Benefits of Technology. Faculty perceived technology resources to be of increasing value to their work. Faculty were asked to list the benefits of technology over the past five years and over the next five years. In every category, the expected benefits were higher than past benefits, in some cases doubly so. Higher productivity as a researcher and increased access to information were among the top benefits listed.

Problems with Technology. Faculty ranked lack of funds to purchase or upgrade computer hardware and software, as well as inadequate training, to be the major problems associated with the use of technology.

Sources of Information. Faculty reported receiving information about the use of technology mainly through "informal" channels. Only 22% of faculty cited formal training as an important source of information about computing and information technology. Most faculty cited departmental colleagues, followed by family and friends, and clerical/support staff.

National Trends and Data. As of 1994, IUPUI lagged behind national rates of technology use. The upcoming Faculty Survey will include technology questions allowing further comparisons to this and other national surveys.

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Introduction

This edition of Research Brief summarizes a national survey conducted by the James Irvine Foundation Center for Scholarly Technology at the University of Southern California. In early 1994, IUPUI faculty and faculty at over 200 campuses from across the country participated in the study, which was designed to gather information about the way in which faculty use technology in their work and how technology influences the teaching and learning environment. The survey also collected data about faculty needs and perspectives on the use of technology in instruction and scholarship. This report provides an institutional profile for IUPUI based on survey responses. The report focuses on responses disaggregated by the following categories: all faculty, women, men, full and part-time, school affiliation, and principal activity (teaching, research, or administration).

The questionnaire was distributed in February 1994. Due to a variety of setbacks, IUPUI did not receive the results from the Irvine Foundation Center for nearly 14 months. During that time, many technology-related campus initiatives were undertaken which may have affected faculty attitudes and uses of technology. Due to the high velocity of technological innovation, this report will focus more on the relatively stable issues of faculty attitudes and the importance of technology to faculty

work rather than on use of specific products or systems. Even so, the report should be read with an understanding of the effects of the lag time between data collection and reporting, and the "shelf-life" of technology.

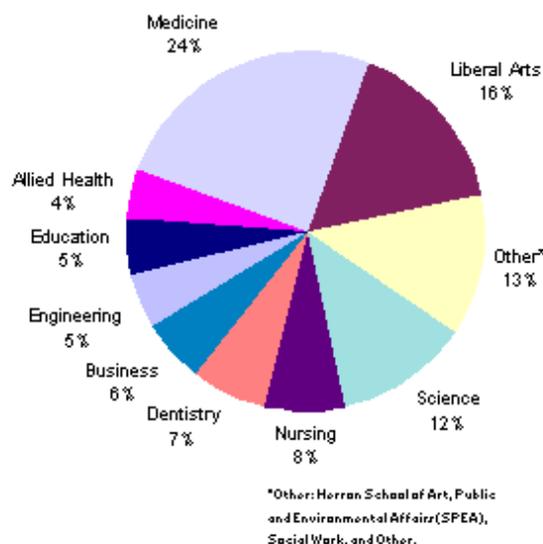
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Survey Results

Demographics

The total number of respondents to the survey was 736, which represents 28.4% of the 2,590 total full and part-time 1994/95 IUPUI faculty (1994/95 Indiana University Fact Book). The respondents were a representative sample of IUPUI faculty with respect to gender and age. Of the respondents, 63.2% were men and 36.8% were women, virtually identical to the 64% male and 36% female composition of the IUPUI faculty in 1994. The age of respondents closely corresponded to the ages of the total full-time faculty as of the 1994/95 academic year: 24% of those answering the survey were less than 40 years old, 36% in their 40s, 28% in their 50s, 11% in their 60s, and 1% were 70 years old or more. The survey respondents were less representative of faculty on campus with respect to full-time / part-time status, and school affiliation. Full-time faculty were over-represented, comprising 78% of survey respondents while only 64% of IUPUI faculty are considered full-time. The School of Medicine was under-represented among respondents, while the Schools of Business, Nursing, Science, and Liberal Arts were slightly over-represented. The schools with which respondents were affiliated are detailed below in Display 1.

Display 1. School Affiliation of Respondents



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The principal activities of responding faculty in their 1994 positions were: 59.3% teaching, 21.4% research, 13.4% administration, and 5.1% service to students, faculty, or the university. Schools with the highest percentage of respondents indicating teaching as their principal activity were Herron (91.7%), Engineering and Technology (81.1%) and SPEA (80.0%). Over one-fourth of the Social Work and Nursing respondents indicated that their principal activity was administration (33.3% and 25.5% respectively); 41.8% of the respondents from Medicine declared research as their principal activity and 33.0% were primarily teachers in 1994. More women than men indicated their principal

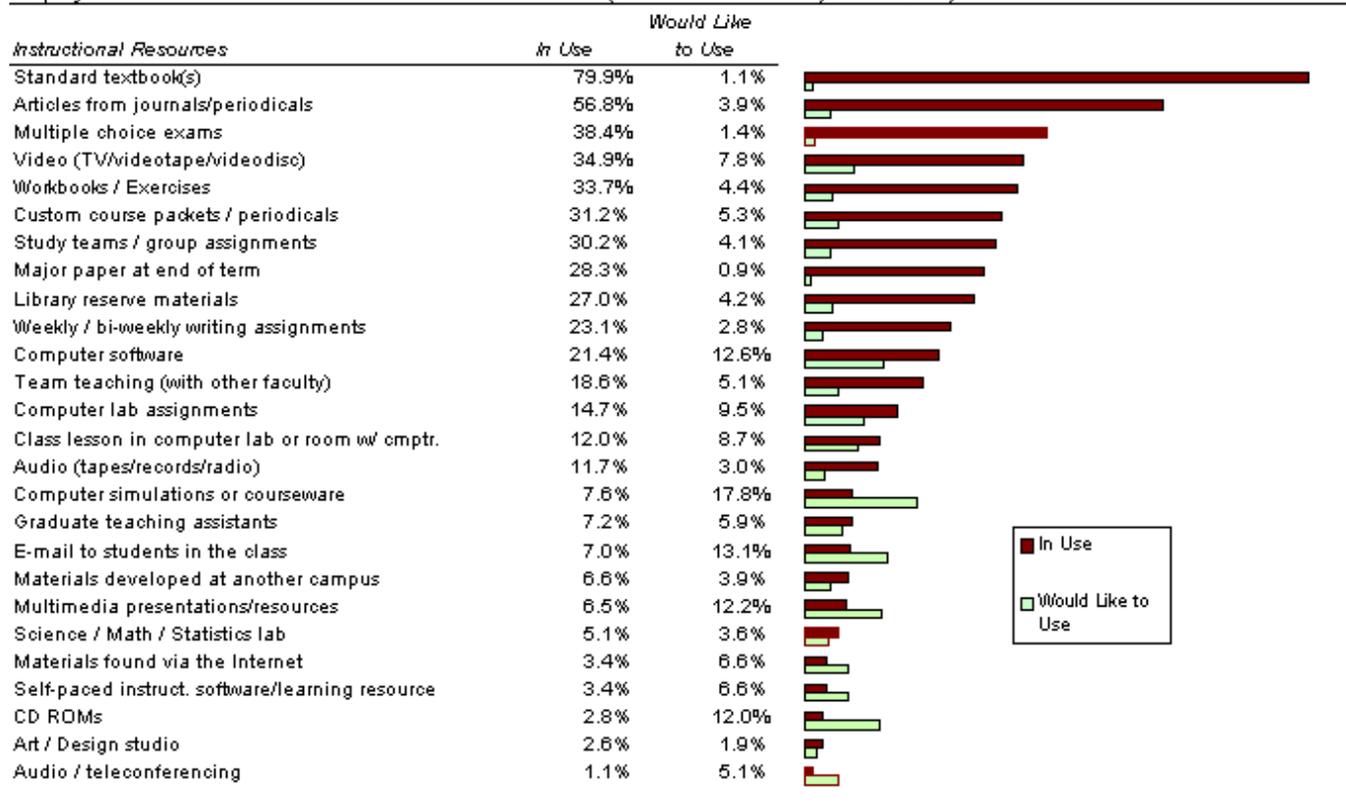
activity to be teaching (66.9% versus 54.9% for men). Faculty whose principal activity was administration were evenly distributed: 13.3% for women and 13.5% for men.

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Teaching Resources and Activities

Display 2 below shows faculty responses to questions regarding which instructional resources and course activities they were using in their "first course taught each week this term," and which resources or activities they would like to use but currently were not.

Display 2. Instructional Resources and Course Activities In Use (and Would Like to Use) for all Faculty*



* Respondents were asked to select all applicable resources/activities that apply; percentages sum to more than 100%.

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Use of traditional resources far outweighed the use of technology, with nine of the ten highest rated resources falling within the traditional realm. Video (including TV, videotape and videodisk) was the highest ranked technological resource, ranked fourth with 34.9% of faculty currently using this resource. There were no computer-related resources among the ten rated highest; the nearest was computer software, which ranked eleventh with a 21.4% rate of current use.

Though traditional resources currently predominate, there are signs that technological resources will be making inroads into IUPUI classrooms. When asked which instructional resources they would *like* to use but currently were not, faculty placed computer-related resources on the top of the list. For example, only 7.6% of faculty reported current use of computer simulations or courseware, but 17.8% said they would *like* to use this resource.

The standard textbook was the primary resource employed by most faculty, with nearly 70% of respondents citing it as the single resource providing 50% or more of assigned course work. Textbooks were used most often for the majority of course content by faculty from Law, Business,

Science and SPEA. Textbooks were least used by Herron, Medicine and Dentistry. While journal articles and course packets were used by a majority of faculty, these resources were not often used in great depth (defined as providing 50% or more of the course content or assigned reading for the course). Instructional software or computer courseware was reportedly used by faculty from all schools except Herron, Law and SPEA. The most significant incidence of the use of these technologies was reported by faculty from Business (20.5% of respondents used courseware), Science (16.9% used courseware, 7.2% used instructional software), Engineering and Technology (14.3% used courseware), and Education (9.1% used instructional software). Only 7.7% of the faculty reported having instructional software on their office computers, but for those who did, the rate of use was quite high (57.7%).

There were only small differences between men and women and full-time/part-time status in their use of technology in instruction. Several interesting differences were reported, however. Women used video resources more than men (42.1% versus 30.5% for men), and men used computer software more than women (23.6% versus 17.8% for women). Compared to full-time faculty, part-time faculty used video resources in instruction more often (39.9% and 33.4% for full-time faculty).

Upon examining data on the technology faculty would *like* to use but currently were not, it was found that more women than men wanted to use e-mail to communicate with students (16.9% versus 10.8% for men). In addition, more full-time faculty wanted to use CD-ROMs (12.9% versus 9.2% for part-time faculty), multimedia presentations/resources (13.3% versus 8.5%), and self-paced instructional software (15.4% versus 10.5%) than their part-time counterparts. In contrast, more part-time faculty wanted to hold class sessions in a computer lab or in classrooms with computer equipment than did full-time faculty (12.4% versus 7.6% for full-time).

Instructional resources currently used were also reported by the principal activity of faculty. The six highest rated resources are shown in Display 3, by respondents listing teaching and research as their principal activity.

Display 3. Instructional Resources / Course Activities

In Use, by Principal Activity (six highest rated).

<i>Resource/Activity</i>	<i>Teaching</i>	<i>Research</i>
Standard textbook(s)	85.0%	68.6%
Articles from journals/periodicals	55.0%	54.2%
Multiple choice exams	42.1%	39.0%
Video (TV/wideotape/videodisc)	39.3%	22.9%
Workbook/exercises	36.9%	24.6%
Custom course packets/reprints	32.9%	26.3%

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One interesting difference between faculty who reported research as their principal activity and those who principally taught in 1994 deals with the way they used teamwork. Of the faculty who primarily taught, 31.7% reported use of group assignments or study teams, but only 16% reported using team teaching. These results are reversed for faculty who declared research to be their principal activity; 30.5% reported use of team teaching, but only 19.5% used group assignments or study groups.

In the 1994 survey, terms were not operationally defined. The terms "courseware", "instructional software", and "computer software" have different meanings for different people. All three appeared in some questions, implying differences between them. In other questions, the terms were grouped together in various combinations. The terms appear, in some form, in nine different questions. It would be interesting to ask about the differences faculty perceived between the terms and how this

might have affected their answers to questions containing those terms.

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Benefits and Challenges of Technology

The survey addressed faculty perceptions of both the benefits and problems associated with the use of technology. The positive aspects of technology were gauged by measuring the relative importance of resources and the benefits derived by faculty currently, over the past five years, and those expected over the next five years. The problems encountered in the use of technology were also measured; the most common problems cited were lack of funds to purchase computer hardware and software.

Benefits. Faculty were asked to rate a list of technological resources in terms of their importance to professional work. Responses are summarized in Display 4.

Display 4. Importance of Resources to Professional Work*

<i>Resource</i>	<i>All Respondents</i>
Word processing	86.8%
Preparing presentations for class	51.1%
Preparing graphs/charts/drawings	42.7%
Managing research/scholarly work	41.0%
Maintaining bibliography/references/resources	37.7%
Access to IUPUI library on-line catalog	35.0%
Using on-line information services	33.7%
Statistical analysis	31.1%
E-mail to colleagues at other campuses	30.1%
E-mail to IUPUI colleagues	28.0%
Managing teaching activities	27.2%
Desktop publishing	23.4%
Access to materials via the Internet	18.5%
Instructional resource for classes	17.3%
Using commercial databases	16.8%
Document delivery from library or service	15.8%
Mathematical modeling/analysis	14.9%
Financial analysis/budgeting	13.8%
Using authoring tools to create courseware	11.1%
Using digital image collections	10.3%

* Percentage responding '4' or '5' on 5-point scale, 5='Very Important'.

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Word processing received the highest rating in terms of importance (86.8% for all faculty), followed distantly by the preparation of presentation materials for class (51.1%). The ratings were fairly consistent by gender for the various resources. The biggest differences were that women gave higher ratings than men to the preparation of presentation materials for class (58.1% versus 47.0% for men), and maintaining bibliography/ references/ resources (40.1% versus 36.3% for men). Men gave higher ratings than women to the use of statistical analysis (34.2% versus 25.9% for women) and the preparation of graphs/ charts/ drawings (46.9% versus 35.5% for women). Full-time faculty rated each of the resources as more important than did part-time faculty.

Major differences appeared when the importance of technology resources was analyzed on the basis of the principal activity of the faculty. Faculty involved primarily in research activities rated technological resources as much more important than did teaching faculty, and cited a greater

number of resources as being important as well. Word processing was the only resource rated as important by a majority of teaching faculty, while **six** resources were rated as important by over half of the research faculty. These differences are summarized in Display 5.

Display 5. Importance of Resources by Principal Activity*

<i>Resource</i>	<i>Teaching</i>	<i>Research</i>
Word processing	82.0%	96.2%
Preparing graphs/charts/drawings	31.2%	75.2%
Managing my research/scholarly work	33.0%	61.8%
Maintaining bibliography/references/resources	28.7%	58.6%
Using on-line information services	26.5%	50.3%
Statistical analysis	19.4%	65.6%
E-mail to colleagues at other campuses	20.7%	43.3%
E-mail to colleagues on my campus	19.4%	35.9%
Managing my teaching activities	30.8%	19.1%
Access to materials via the Internet	12.1%	26.1%
As an instructional resource for my classes	18.9%	10.8%
Using commercial databases	13.4%	24.8%
Mathematical modeling/analysis	8.4%	39.1%
Financial analysis/budgeting	9.6%	14.6%

* Percentage responding '4' or '5' on 5-point scale, 5='Very Important'

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Faculty responded that computers and information technology resources had a positive impact on a number of teaching and research activities. The most frequently-cited responses for teaching/instructional activities are listed in Display 6.

Display 6. Teaching Benefits of Use of Technology (5 highest rated) *

<i>Benefit</i>	<i>Percent</i>
Enjoyment of teaching	32.8%
Creativity in presenting material to students in new ways	30.9%
Access to new resources for teaching	29.7%
Overall quality of teaching	27.2%
Enhanced contact with colleagues at other campuses	23.7%

* Percentage responding '4' or '5' on 5-point scale, 5='Major Benefit'.

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It is interesting to note that faculty rated scholarship and research related benefits much higher than those related to teaching and instruction. The highest rated scholarly benefit, "scholarly productivity", was cited as a benefit by almost twice the number of faculty as was the highest rated teaching related benefit, "enjoyment of teaching". The research/scholarly activities cited most frequently are listed in Display 7.

Display 7. Scholarly Benefits of Use of Technology (5 highest rated) *

<i>Benefit</i>	<i>Percent</i>
Scholarly productivity	58.8%
Enjoyment of scholarly work	47.4%
Overall quality of scholarly work	44.7%
More timely access to information in field	44.0%
Creativity in examining data in new ways	40.9%

* Percentage responding '4' or '5' on 5-point scale, 5='Major Benefit'.

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It is also interesting to note which computer and information technology resources the faculty rated as having "no benefit" to their teaching and scholarly activities. With regard to teaching or instructional activity, 65.9% of the faculty reported that technology provided no benefit in their ability to work with disabled students, 62.1% said that technology did not benefit their ability to work with a more diverse group of students, and 56.7% found no benefit in helping students experiencing problems with course materials.

Faculty were also asked to comment on their perceptions of the benefits of technology over the last five years, and their expectations of benefits over the next five years. In general, faculty see technology benefiting their work much more over the next five years than over the previous five years. The highest rated past benefit involves productivity as a scholar or researcher, but this benefit falls to third when addressing future benefits, behind access to information resources and the quality of IUPUI's library resources and services. Faculty ratings of perceived benefits over these time periods are summarized in Display 8.

Display 8. Benefits of Computers/Information Technology, Over Past Five Years, and Over Next Five Years *

Benefit	All Respondents		
	Past 5 yrs.	Next 5 yrs.	
Productivity as a scholar or researcher	54.1%	58.4%	
Quality of library resources and services at IUPUI	52.8%	66.1%	
Access to information resources	49.0%	67.4%	
Intellectual development in field	40.2%	52.9%	
Graduate education in field	37.5%	47.1%	
Productivity as a teacher	35.4%	45.4%	
Orientation towards research	34.4%	49.2%	
The way classes are taught	32.2%	44.8%	
Contact with colleagues at other institutions	28.7%	47.7%	
Quality of academic programs in department/unit	26.7%	45.4%	
Overall reputation of IUPUI	25.3%	45.1%	
Materials selected for classes	22.7%	42.7%	
Quality of academic programs at IUPUI	22.7%	41.3%	
Opportunities to work with faculty from other campuses	19.8%	42.7%	
Undergraduate education in field	19.1%	31.9%	
Orientation to graduate education	16.9%	27.1%	
Opportunities to work with other IUPUI departments	14.7%	36.9%	
Orientation to undergraduate education	12.2%	20.5%	

* Percentage responding '4' or '5' on 5-point scale, 5='Great Benefit'.

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Research productivity was felt to be a benefit of technology over the past five years by a significant percentage of the faculty from Nursing (71.4%), Medicine (64.3%), and SPEA (63.2%). Quality of library resources and services was the most frequently mentioned benefit by faculty from Education (64.3%), Social Work (54.5%), and Engineering and Technology (54.3%). Number one for faculty from Liberal Arts was access to information resources. The greatest percentage of faculty from Business reported "the way classes are taught" as a benefit of technology over the past five years, the only school to rank a teaching-related outcome so highly. In all schools except Engineering and Technology, productivity as a researcher was rated as a benefit of technology by a larger percentage of faculty than productivity as a teacher.

Some schools appeared to be more optimistic than others regarding future benefits of technology, with Nursing and Social Work among the most optimistic. Faculty from Allied Health, Business, Engineering and Technology, SPEA, and Social Work in particular, expected great benefits in the way they teach their classes and materials selected for classes.

Viewed on the basis of principal activity, productivity as a scholar ranked as the number one or two benefit of technology over the past five years regardless of the principal activity reported by the faculty member. In general, faculty who indicated that research was their principal activity rated the

outcomes of technology more highly than faculty primarily engaged in teaching or administration.

On the basis of principal activity declared by the faculty member, the number one future benefit of technology for research faculty was productivity as a researcher (86.8%); the top future benefits for teaching faculty was access to information resources and quality of library resources and services (both with 60.9%); and number one future benefit for administrative faculty was access to information resources (79.1%). Across all outcomes listed by the survey, more faculty expect greater benefits over the next five years than perceived benefits over the past five years.

Problems and Challenges. On the negative side, faculty perceived a number of problems and challenges with respect to technology. Display 9 contains the factors listed most frequently by faculty as being problems or barriers to their use of technology.

Display 9. Most Common Problems with Using Technology*

<i>Problem</i>	<i>Percent</i>
Lack of funds to purchase or upgrade hardware	48.1%
Lack of funds to purchase or upgrade software	47.7%
Inadequate training	41.8%
No access to CD-ROM and multimedia	36.1%
Lack of technical assistance/user support	35.8%
No incentives and rewards for innovation	32.6%
Low technology skills of IUPUI faculty	27.8%
Incorrect equipment set-up/connection	27.3%
No network access/connection	26.3%
Low technology skills of IUPUI students	25.6%
Incompatible computer systems/software	24.7%
Lack of support from senior administration	24.5%
No access to instructional classrooms	21.6%
Software problems	19.4%
Lack of departmental support	18.1%
No access to student computer labs	16.5%

* Percentage responding '4' or '5' on 5-point scale, 5='Major Problem'.

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The problems listed were ranked virtually the same by women and men. However, the percentage of female faculty responding that these items were problems was higher in all cases than the percentage of male faculty who perceived the same problems. For example, 58.3% of the female respondents reported major problems at IUPUI with funding to purchase or upgrade hardware, whereas 42.2% of the male respondents reported the same problem. The three general areas of concern for faculty can be grouped into (1) obtaining funding for hardware and software, (2) training and support, and (3) access to CD-ROM and multimedia. Nursing faculty reported the highest levels of concern with all of these issues, followed by faculty from Allied Health. Law and Science faculty were among the least concerned with these problem areas.

General concern about the technology skills of the faculty and students at IUPUI was low overall (27.8% for faculty skills and 25.6% for student skills). However, more than half of the Nursing and Social Work faculty were strongly concerned about such skills. Law and SPEA faculty expressed very little concern.

The three areas of least concern for faculty were (1) student access to labs, (2) departmental support for efforts to integrate technology into instruction, and (3) software problems. Even in these areas of least concern, Nursing faculty were more likely to perceive problems than faculty from other schools. In fact, Nursing faculty were among the most concerned with all 16 problems listed in the survey, with one exception: incentives and rewards for innovation. The incentive issue was reported

to be a major problem by over half of the respondents from Dentistry and Engineering and Technology, but only 36.4% of the Nursing faculty expressed major concern with incentives. Law faculty reported the least concern in all areas.

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Sources of Information

Faculty rated various sources of information about computing and information technology on the basis of general and field-specific sources. Display 10 below lists the eight highest rated general sources of information, with the corresponding ratings shown also by gender and full-time/part-time status.

Display 10. Sources of General Information About Computing and Information Technology *

Source	All	Male	Female	Full-Time	Part-Time
Colleagues in department	47.2%	46.6%	48.2%	51.0%	32.6%
Family and friends	30.5%	22.7%	44.1%	26.6%	45.4%
Clerical/support staff	29.4%	26.7%	34.1%	31.5%	21.1%
Computer magazines	23.7%	28.2%	15.8%	26.1%	14.7%
Instructional technology or faculty development	22.4%	17.7%	30.6%	23.8%	16.7%
Campus computer center	21.5%	19.1%	25.8%	22.8%	16.8%
Faculty in other departments	21.1%	18.3%	25.9%	23.7%	10.8%
E-mail and Internet resources	19.2%	19.4%	18.8%	20.9%	12.3%

* Percentage responding '4' or '5' on 5-point scale, 5="high importance".

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When disaggregated by school, "colleagues in department" was rated important by the highest percentage of faculty in all schools except Nursing, where departmental colleagues were ranked fifth as an important resource (36.7%), and SPEA and Business, where departmental colleagues were ranked second (40% and 33.3% respectively). The greatest percentage of Nursing and SPEA faculty rated clerical and support staff as important (50% and 47.4% respectively). Clerical and support staff were ranked highly (top five) by all schools except Engineering and Technology (eighth) and Law (twelfth). Instructional technology or faculty development was rated important by higher percentages of faculty from the following schools than the overall faculty percentage of 22.4%: Social Work, 63.6%, Education, 46.9%; Nursing, 40.8%, SPEA, 36.8%; Herron, 33.3%; and Liberal Arts, 29%. Compared to other schools, Social Work faculty rated more resources as important or highly important. Relatively few faculty from Herron and Allied Health rated the general resources as important or highly important.

When asked to rate the same resources as **specific** sources of information about computing and information technology in their **field or specialization**, "colleagues in department" rated number one across all genders, for full- and part-time faculty, and for all schools except Nursing (ranked fourth), Education, and Engineering and Technology (ranked second). Instructional technology or faculty development was rated as important by very few faculty from Business, Medicine or Science. Family and friends were rated as important sources by 35.5% of the faculty from Business, possibly a reflection of the high percentage of part-time faculty among the Business respondents to the survey.

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Faculty Observations and Opinions

IUPUI Faculty responded to a number of statements relative to their observations and opinions about technology. The percentages of faculty who agreed to each of the 25 statements appear in Display 11 below. Other notable faculty observations include the findings that 75.6% of IUPUI faculty perceived no problems with the support of senior administration in efforts to integrate technology into instruction, 81.9% reported that support at the departmental level was not a problem, and 77.4% saw no serious problems with incentives and rewards for innovation.

Display 11. Faculty Observations and Opinions - Percentage Agreeing with Statement.

Faculty here should be able to copy materials from almost any book or journal if they use the material for classes.	83.5%
IUPUI has been generally supportive of faculty efforts to enhance instruction with information technology.	78.6%
I often find myself using a computer to do work formerly done by clerical staff.	77.9%
IUPUI's library system does a good job of providing electronic data resources for students and faculty.	75.3%
Computers have done much to enhance faculty productivity at IUPUI.	69.1%
Expanding the campus network should be a top priority for IUPUI.	64.8%
IUPUI provides adequate technology training and support for students.	59.4%
I have adequate access to information technology resources to support my scholarly activities.	59.4%
I have adequate access to information technology resources to support my teaching activities.	56.5%
Compared to other departments at similar campuses, IUPUI is doing pretty well integrating information technology.	55.8%
My computer and technology skills are adequate given my needs.	53.8%
IUPUI provides adequate technology training and support for faculty.	50.6%
IUPUI rewards innovative teaching.	49.6%

Faculty at IUPUI have been actively involved in campus planning for the use of information technology.	48.9%
Electronic journals represent the future of scholarly communication in my field.	47.0%
IUPUI has a good strategic plan for the use of information technology.	46.5%
My colleagues seem to spend more time working at home now because they have a home computer.	45.1%
I've made a real effort to learn to use technology resources for my classes.	42.5%
Graduates of my program are generally well-prepared to use computers and other kinds of information resources.	42.0%
My students seem to know far more about computers than I do.	37.8%
My faculty colleagues seem to spend a lot of time using their computers without producing much for their efforts.	24.8%
I depend on students and clerical staff to do a lot of the computer work that my colleagues often do for themselves.	19.0%
Book publishers have been an important source of technology resources for my classes.	16.9%
Electronic journals are an important source of information for me.	13.5%
We spend too much time and money teaching basic computer skills to students.	10.7%

Percentage responding '3' or '4' on 4-point scale, 4='Strongly Agree'.

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National Trends and Data

According to Kenneth Green of the James Irvine Foundation Center at the University of Southern California, national data from another 1994 technology survey revealed very slow movement of information technology into the classroom, with IUPUI lagging behind the national figures. Nationally, 16% of faculty reported using computer labs or classrooms for courses, compared to 12% at IUPUI; and 10% said they used computer-based simulations and exercises, compared to 7.6% at IUPUI. E-mail as an instructional resource or tool to communicate with students was reportedly used by 8.3% of faculty nationally, while 7% of the IUPUI faculty acknowledge using e-mail to communicate with students.

Green observed little growth in instructional technology projects nationally from 1990 to 1994, though preliminary reports from a more recent survey by Green show a large jump from 1994 to 1995. It will soon be possible to compare this national trend to changes at IUPUI through analysis of the results of the upcoming IUPUI Faculty Survey, currently in production.

A separate 1994 study of communications technology by the Corporation for Public Broadcasting reported that 80% of the faculty who responded to the survey felt that their productivity as teachers and researchers had benefited from computers and instructional technology. At IUPUI, 54.1% of the faculty reported perceiving a benefit from technology with regard to scholarly productivity, and 35.4% perceived a benefit in teaching productivity.

The Public Broadcasting survey also reported that funding represents the most significant barrier to the use of technology across all institutions and all groups of respondents. This mirrored 1994 survey findings at IUPUI, where the most serious concern or problem reported by the IUPUI faculty dealt with funding for hardware and software. Green reported that budget cuts affecting academic computing slowed dramatically in the 1994/95 academic year, particularly at public universities and four-year colleges. However, Green also pointed out that few institutions had any kind of financial plan with regard to purchase and replacement of computer-related hardware or software. Only 20% reported formal budget plans for acquiring and retiring equipment, or for amortizing the cost of capital equipment.

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Implications

Given the considerable potential, as well as expense of technology, IUPUI schools and programs would benefit from the development of a comprehensive plan for purchase, utilization, retirement and upgrade of hardware and software. It is known that hardware lasts approximately 24-30 months before replacement is necessary and software only 12-16 months. A formal plan would avoid many of the fiscal and operational problems of the more usual problem-by-problem, lab-by-lab approach. In 1994, one third of the IUPUI faculty indicated that their office computers were more than three years old. Nearly 38% had machines less than two years old at that time. Amortization schedules provide for a more systematic write-off of costs than a one-time expense approach, and underscore the benefits of planning. The velocity of innovation in the field of technology both complicates and makes necessary the development of long-term goals relative to the effective use of technology. Clear goals for the use and development of software, and instructional and scholarly applications must be set by departments and individual faculty members. Without such a plan, hardware and software may be purchased haphazardly, with little connection to need and levels of faculty and student use.

The university will also benefit from current efforts to work with faculty to forge connections between technology and learning. The ever-developing realm of technology will continue to be an important tool in the teaching and learning environment, although an effective instructor with a piece of chalk should not be disregarded because the delivery is "low tech." The potential for the use of technology to help our most vulnerable students, students with disabilities, and students who are in academic difficulty, is enormous. Most faculty have built their careers on the foundations of lifelong learning and the pursuit of excellence. If technology can be integrated to affect that foundation positively, it will most likely be embraced. Otherwise, it may function simply as an efficient typewriter and mailbox.

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