Technology in the Undergraduate Accounting Curriculum

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Abstract

Computer technology may be used in a variety of ways to evoke student interest in accounting and to enhance the quality of the teaching-learning process. This study surveys AACSB accredited and unaccredited, undergraduate programs in the U.S., attempting to: (1) discover how and to what extent technology is used in accounting instruction at undergraduate level, (2) identify the factors influencing the adoption of technology, and (3) define those factors that impede the adoption of technology. The questionnaire used in this survey was sent to each department chair in accounting, listed in Hasselback's 1994 Accounting Faculty Directory. Results indicate that accounting faculties, in general, still rely upon technology that has been available for the past twenty years, such as practice sets, test banks, and lecture enhancement videos. The newest technologies, decision support systems, expert systems, electronic transparencies, hypercard, and CD ROM are used only to a limited extent in the classroom. The failure to introduce technological change at colleges and universities is evident. Faculty who have initiated change perceive quality of instruction and recognition for innovation in teaching as primary motivating factors. The lack of technological resources and time requirements serve to discourage the introduction of new technology. In general, incentives for innovation are related to such factors as institutional, program, and instructional characteristics, while disincentives are uniformly experienced regardless of those factors.

I. Introduction

Computer technology may be used in a variety of ways to evoke student interest in accounting and to enhance the quality of the teaching-learning process. This study surveys AACSB accredited and unaccredited, undergraduate programs in the U.S., attempting to: (1) discover how and to what extent technology is used in accounting instruction at undergraduate level, (2) identify the factors influencing the adoption of technology in a department or school, and (3) define those factors that impede the adoption of technology in a department or school.

According to the Big-Eight "Perspectives" paper (1989, p. 8):

Given the rapid pace of change in the business world, public accountants must understand the methods for creating and managing change in

organizations. The professional environment is also characterized by rapidly increasing dependence on technological support. No understanding of organizations could be complete without attention to the current and future roles of information technology in client organizations and accounting practice. (Emphasis added.)

The Accounting Education Change Commission (1990, p. 309) observes:

Students must be active participants in the learning process, not passive recipients of information. They should identify and solve unstructured problems that require use of multiple information sources. Learning by doing should be emphasized. Working in groups should be encouraged. Creative use of technology is essential. (Emphasis added.)

Prudent use of technology can be beneficial to the instructional process, especially with weaker students (Fetters, McKenzie, and Callaghan, 1986, p. 76) and with conceptually difficult topics in accounting (Boer and Livnat, 1990, p. 116). Indeed, the introduction of technology can engender a positive change in student attitudes (Abraham, Loughrey, and Whalen, 1987, p. 1).

II. Methodology

To determine the impact of technology on accounting instruction and identify the factors influencing the adoption of technology, a self-administered survey was used. Surveys are ideal instruments for descriptive, explanatory, and exploratory research. A survey is probably the best method available to collect original data for the purposes of describing a population too large to observe directly (Babbie, pp. 315-316).

The questionnaire used in this study was sent to each department chair in accounting, listed in Hasselback's 1994 *Accounting Faculty Directory*. (Cover letter and questionnaire are available upon request from the authors.) They were mailed with a pre-addressed, stamped envelope to 750 chairs and area heads. Of the questionnaires sent out, 141 useable questionnaires were returned; a response rate of 18.8%. The questionnaire was designed to gather data describing: 1) the college and university; 2) the department; 3) its accounting program; 4) application of technology in the accounting curriculum; and 5) incentives and disincentives to the introduction of technology in the curriculum. Additionally, respondents were encouraged to provide comments to open-ended questions addressing student and faculty reaction to the use of technology, identifying change resulting from the implementation of technology, and requesting advice from faculty in the introduction of new technology in the classroom.

III. Results

SPSS/PC+ is used to analyze survey results. Frequency distributions are used to describe the characteristics of the sample, and crosstabs are employed to analyze the relationships between variables. ANOVA and the Tukey method of multiple comparisons are used to determine the effect of various factors upon the application of technology and the naming of incentives and disincentives to its introduction. Detailed statistical test results are available from the authors.

Institutional Characteristics

Among survey respondents, both public (58%) and private (42%) schools are represented. Nearly 60% of these institutions are located in either urban or suburban areas, a large majority of which are on the semester system (83.8%). Over 40% possess some level of AACSB accreditation, either business (24.8%) or business and accounting (16.8%). Table 1 summarizes the relationships among institutional characteristics. A modest relationship exists between type of institution (public/private) and institutional environment (urban/suburban/rural). Public institutions are more frequently located in urban or rural environments, while private institutions are found in urban, suburban, and rural locations. A very modest relationship between type of institution and academic system (semester/quarter/trimester) also exists. Table 1,

however, indicates a strong relationship between type of institution and level of accreditation (AACSB and Accounting/AACSB/neither). Public institutions are more likely than private institutions to be accredited. The table depicts modest relationships between institutional environment, academic system, and accreditation.

Program Characteristics

The number of accounting majors at respondent schools ranges from 0 to 1475, with 500 reported as the modal value by 12 schools, and 200 reported by 10 schools. The number of full-time faculty ranged from 2 to 32, with 4, 3, and 9 the three most typically-cited numbers in that order. Class size ranges from 20 to 200, with 35 and 30 the numbers most frequently given.

The number of courses in the introductory sequence varies from 1 to 6, with 2 most typical, furnished by 116 (89.9%) of the responding schools. Credit hours per course ranged from 2 to 5 with 3 most typical, provided by 101 (77.1%) of the schools. Regarding whether students are required to have their own personal computers (PCs), only 2 (1.5%) schools said yes; 131 (98.5 percent) said no. The number of PCs in colleges and universities from 12 to 500, with 60 and 100 given by 19 (15.3%) schools and 16 (12.9%) schools, respectively, the most typical responses.

To investigate the relationship between institutional and program characteristics, program characteristics, such as number of majors, number of faculty, class size, and number of PCs, were reclassified by quartiles. Table 2 considers the relationship between institutional and program characteristics. In general, these results indicate that there is a relationship between number of majors and type of institution, as well as institutional environment and accreditation. Public institutions and accredited institutions tend to graduate larger numbers of majors each year. As might be expected, the number of faculty is related to these factors--namely, type of institution, institutional environment, and accreditation. Relative to class size, a relationship exists between type of institution and accreditation. Larger institutions and accredited institutions may have larger class sizes. Another program characteristic, number of PCs, is related only to type of institution, with public institutions having a larger number of PCs available to business students. Interestingly, there is no relationship between accreditation and number of PCs . The ratio of PCs to majors is also considered. This ratio may be a better indicator of the availability of computer resources to the student. This ratio was calculated, and the sample then was divided into quartiles. Subsequently, crosstabs were used to analyze the relationship between institutional characteristics and this adjusted program characteristic. Results show that when considering the ratio of PCs to majors, private institutions have significantly more resources. Again, there is no relationship between accreditation and this adjusted measure of the availability of computer resources.

Schools responding to the survey were requested to rank research, teaching, and service as factors in performance evaluation. Thirty four (25.8 percent) cite research as the principal factor in performance evaluation, 68(51.5 percent) as the second factor, and 30 (22.7 percent) as the third factor in performance evaluation. One hundred eight schools (81.2 percent) cite teaching as the principal factor, 23 (17.3 percent) as the second factor, and only 2 (1.5 percent) not surprisingly as the third factor. Not one school cites service as the principal factor, as expected. However, 37 (27.8 percent) cite service as the second factor, while 96 (72.2 percent) cite it as the third factor.

Table 3 analyzes the relationship between institutional characteristics and factors considered in performance evaluation. Clearly, accreditation is related to the emphasis placed upon research, teaching, and service among the responding institutions. Also, when considering the emphasis placed upon research or service at these schools, the type of institution, public or private, is a related factor.

Table 1
Institutional Characteristics

Variables	Chi Square (Pearson)	DF	Sig.
Type of Institution by Institutional Environment	6.6323	2	.03629
Type of Institution by Academic System	4.68535	2	.09607
Type of Institution by Accreditation	8.42922	2	.01478
Institutional Environment by Academic System	10.59443	4	.03152
Institutional Environment by Accreditation	10.49031	4	.03292
Academic System by Accreditation	2.66456	4	.61543

Table 2
Program Characteristics

Variables	Chi Square (Pearson)	DF	Sig.
Number of Majors by Institutional Environment	16.40449	6	.01174
Number of Majors by Academic System	3.34625	6	.76430
Number of Majors by Accreditation	29.41263	6	.00005
Number of Faculty by Type of Institution	34.21146	3	.00000
Number of Faculty by Institutional Environment	14.63299	6	.02331
Number of Faculty by Academic System	3.85179	6	.69672
Number of Faculty by Accreditation	66.17016	6	.00000
Class Size by Institution	23.42081	3	.00003
Class Size by Institution Environment	2.03342	6	.91660
Class Size by Academic System	5.83981	6	.44137
Class Size by Accreditation	32.90082	6	.00001
Number of PCs by Type of Institution	8.72771	3	.03314
Number of PCs by Institutional Environment	.55525	6	.99710
Number of PCs by Academic System	6.41561	6	.37828
Number of PCs by Accreditation	6.91974	6	.32833
Ratio of PCs to Students by Type of Institution	26.86026	3	.00001
Ratio of PCs to Students by Institutional Environment	11.23317	6	.08143
Ratio of PCs to Students by Academic System	4.60854	6	.59491
Ratio of PCs to Students by Accreditation	8.71761	6	.19009

Table 3
Academic Priorities

Variables	Chi Square (Pearson)	DF	Sig.
Research Priority by Type of Institution	18.59565	3	.00009
Research Priority by Institutional Environment	3.41365	4	.49113
Research Priority by Academic System	3.41365	4	.49113
Research Priority by Accreditation	35.24414	6	.00000
Teaching Priority by Type of Institution	4.03987	2	.13266
Teaching Priority by Institutional Environment	.56734	4	.96662
Teaching Priority by Academic System	4.74609	4	.31436
Teaching Priority by Accreditation	12.23252	6	.01570
Service Priority by Type of Institution	11.08226	2	.00087
Service Priority by Institutional Environment	3.59692	2	.16555
Service Priority by Academic System	3.52364	2	.17173
Service Priority by Accreditation	19.49389	2	.00006

Instructional Characteristics

Information about the instructional characteristics of the schools was also gathered. Respondents were asked to indicate if and when courses in introductory information systems/computer science, introductory accounting, accounting information systems, and auditing were taken. Results are as expected. Students generally take introductory accounting classes as freshmen or sophomores. Also, they tend to take introductory information systems courses as sophomores. AIS is usually taken in the junior or senior year. Auditing in most cases is a senior-level course.

Application of Technology in Courses

In addition, the application of various technologies across the accounting curriculum was investigated. Table 4 shows the application of technology in specific accounting courses. Of all accounting courses, technology is used most frequently in introductory financial accounting, followed closely by introductory managerial accounting. As might be expected, technology is used least frequently in policy courses. What is especially paradoxical in these results is the low usage of technology in accounting information systems (AIS) courses, second only to the policy course.

Viewed from a different perspective, results described in Table 5 show the application of specific technology to all accounting courses. In rank order, practice sets, test banks, lecture enhancement videos, student tutorials, and CD ROM are the most frequently cited applications of technology in the accounting education. While practice sets are more frequently found in at least one course, test banks are more often used in all courses in the curriculum. Technologies that are not widely accepted in accounting education are custom publishing and electronic transparencies. Publishers' representatives generally indicate that custom publishing is primarily used for ancillary materials in accounting. Unlike the sciences, which make extensive use of custom publishing

Table 4
Application of Technology to Specific Accounting Courses

Number of Applications of Technology in Courses

Course	0	1	2	3	4	5	6	7	Total
Financial	26	30	41	27	8	7	2	0	141
	18%	21%	29%	19%	6%	5%	1%	0%	100%
Managerial	33	38	34	22	10	2	1	1	141
	23%	27%	24%	16%	7%	1%	1%	1%	100%
Intermediate	36	50	32	13	8	1	1	0	141
	26%	35%	23%	9%	6%	1%	1%	0%	100%
Advanced	62	56	17	4	1	0	1	0	141
	44%	40%	12%	3%	1%	0%	1%	0%	100%
Cost	45	50	27	15	2	1	0	1	141
	32%	35%	19%	11%	1%	1%	0%	1%	100%
Tax	47	45	29	12	5	2	1	0	141
	33%	32%	21%	9%	4%	1%	1%	0%	100%
Audit	41	43	38	10	7	1	1	0	141
	29%	30%	27%	7%	5%	1%	1%	0%	100%
AIS	71	28	21	13	3	1	3	1	141
	50%	20%	15%	9%	2%	1%	2%	1%	100%
Policy	0	20	7	3	1	0	0	0	141
	0%	14%	5%	2%	1%	0%	0%	0%	100%

Table 5
Application of Specific Technology to Accounting Courses

Number of Courses in Which Technology Was Used

Technology	0	1	2	3	4	5	6	7	8	9	Total
Custom Publishing	117	13	6	2	0	1	1	1	0	0	141
	83%	9%	4%	1%	0%	1%	1%	1%	0%	0%	100%
Closed Circuit TV	130	3	3	1	1	1	1	1	0	0	141
	92%	2%	2%	1%	1%	1%	1%	1%	0%	0%	100%
Tutorials	70	18	26	15	4	3	2	1	1	1	141
	50%	13%	18%	11%	3%	2%	1%	1%	1%	1%	100%
Test Bank	46	4	8	8	4	4	8	27	17	15	141
	33%	3%	6%	6%	3%	3%	6%	19%	12%	11%	100%
Electronic	104	10	6	4	4	0	0	6	5	2	141
Transparencies	74%	7%	4%	3%	3%	0%	0%	4%	4%	1%	100%
Lecture Enhance-	65	31	22	11	2	2	1	3	1	3	141
ment Videos	46%	22%	16%	8%	1%	1%	1%	2%	1%	2%	100%
Practice Sets	44	40	29	21	6	0	1	0	0	0	141
	31%	28%	21%	15%	4%	0%	1%	0%	0%	0%	100%
Decision Support	109	22	8	0	1	1	0	0	0	0	141
Systems	77%	16%	6%	0%	1%	1%	0%	0%	0%	0%	100%
Expert Systems	122	15	2	2	0	0	0	0	0	0	141
	87%	11%	1%	1%	0%	0%	0%	0%	0%	0%	100%
Hypercard	131	9	1	0	0	0	0	0	0	0	141
	93%	6%	1%	0%	0%	0%	0%	0%	0%	0%	100%
CD ROM	85	42	9	3	0	1	0	1	0	0	141
	60%	30%	6%	2%	0%	1%	0%	1%	0%	0%	100%

services, traditional accounting texts are not designed to be "modularized." Two suggested causes for the lack of acceptance of electronic transparencies are the high cost of projection equipment and the inability of users to customize these transparencies.

Table 6 shows the application of specific technology in nine specific courses. The principal applications in the introductory financial accounting course are in order of usage -- test banks, student tutorials, and practice sets; in the intermediate accounting courses -- test banks, practice sets, and student tutorials; in advanced accounting -- test banks and electronic transparencies; in cost accounting -- test banks, lecture enhancement videos, and practice sets: in taxation -- test banks, CD ROM, and electronic transparencies; in auditing -- test banks, lecture enhancement videos, and practice sets; in AIS -- test banks, practice sets, and to a lesser extent decision support systems, expert systems, and hypercard; in policy -- test banks and, to a much lesser extent, lecture enhancement videos. Student tutorials are used primarily in introductory financial and managerial as well as intermediate courses, but not in the other courses. We should expect usage of decision support systems in cost accounting, but that has not been the case, presumably because those who ranges teach the course are either not familiar with such technology or because the expected costs of using it exceed the benefits. The same reasons may explain the lack of usage of expert systems in the taxation course. The policy course does not use much technology, which is not surprising. While there is an unexpectedly low usage of technology in AIS, this course uses, at least to a limited extent, the most sophisticated applications of technology, including decision support systems, expert sys-

Table 6
Use of Specific Technology in Individual Accounting Courses

Course	Technology											
	Custom Publish.	Closed Circuit TV	Tutorials	Testbank	Elect. Trans.	Lect. Enh. Videos	Prac. Sets	DSS	Expert Sys.	Hyper card	CD ROM	Total
Financial	12	5	62	91	21	31	48	0	0	1	1	272
Managerial	7	6	52	86	25	33	21	3	0	0	2	235
Intermediate	2	4	26	79	15	18	37	4	1	0	2	188
Advanced	5	2	8	66	15	9	1	1	0	0	5	112
Cost	7	5	15	72	18	26	19	6	0	0	7	175
Tax	3	5	7	67	18	12	9	7	1	0	3	132
Audit	6	4	4	68	17	40	27	6	7	1	6	186
AIS	4	3	6	38	17	10	28	19	15	8	4	152
Policy	3	0	2	21	4	9	1	1	1	1	3	46
Total	49	34	182	588	150	188	191	47	25	11	33	1498

tems, and even hypercard.

Incentives and Disincentives to Technological Innovation

Also considered in this study are factors often identified as incentives or disincentives to introduction and use of technology in the accounting classroom. Incentives for the introduction of technology include: accreditation, demand by the university, quality of instruction, and awards for innovation. Disincentives to the introduction of technology are: lack of faculty reward, lack of technological resources, poor software quality, inadequate documentation, inadequate vendor support, lack of training, lack of faculty resources, and excessive time and effort involved in change. Table 7 describes the relative importance of each factor.

With respect to technological innovation incentives, most schools replied that accreditation was not a significant factor; nor is university demand a factor. However, quality of instruction, in particular, and recognition by awards are definite factors. As for key disincentives, they are: lack of technological resources, lack of faculty resources, and time needed to develop the applications. Moderate disincentive factors for non-adoption of technology include: lack of training and lack of faculty reward. Minor disincentive factors include: lack of available documentation, poor quality of software, and lack of vendor support.

Factors Influencing the Use of Technology in the Classroom

Data gathered in this study indicates that technology has not yet made significant inroads into the accounting classroom. Yet questions that require further exploration are the identification of characteristics or factors that may be related to the use and acceptance of technology in the classroom. Among the questions that call for investigation are: (1) What institutional, program, and instructional characteristics are related to the use of technology in the classroom?; (2) Do these characteristics affect the perceived incentives and

Table 7
Incentives/Disincentives to the Introduction of Technology

	Significant Influence		Moderate Influence		Not a Factor	Total Responses
Incentives	1	2	3	4	5	
Accreditation	14 12%	12 10%	25 21%	18 15%	49 42%	118 100%
Demand by University	10 8%	19 16%	33 28%	19 16%	37 31%	118 100%
Quality of Instruction	28 23%	32 27%	28 23%	15 13%	17 14%	118 100%
Reward for Innovation	12 10%	18 15%	36 31%	14 12%	38 32%	118 100%
Disincentives						
Lack of Reward	14 11%	28 22%	35 28%	17 14%	31 25%	118 100%
Lack of Technical Resources	46 37%	31 25%	22 17%	13 10%	14 11%	118 100%
Poor Quality of Software	10 8%	22 18%	35 28%	29 23%	28 23%	118 100%
Inadequate Documentation	6 5%	26 21%	26 21%	32 26%	33 27%	118 100%
Inadequate Vendor Support	11 9%	16 13%	25 20%	37 30%	34 28%	118 100%
Lack of Training	19 15%	41 33%	28 22%	21 17%	16 13%	118 100%
Lack of Faculty Resources	44 35%	44 35%	22 17%	9 7%	7 6%	118 100%
Excessive Time	42 34%	46 37%	18 14%	13 10%	6 5%	118 100%

disincentives to the introduction of new technology? To investigate these relationships, analysis of variance and Tukey's method of multiple comparisons are used.

Institutional Characteristics

The relationship of "institutional characteristics" (type of institution, institutional environment, academic system and accreditation) and the application of technology in the accounting program was evaluated. Schools were classified into four groups based upon the number of applications used in the accounting curriculum. Low users had four or less applications; low moderate, five to nine; high moderate, ten to fifteen; and high, more than fifteen. Only main effects were considered because of the number of cases with incomplete data. Analysis of variance indicates no significant relationship between adoption of technology and any institutional characteristics. Also considered was the relationship of institutional characteristics to incentives and disincentives in adoption of new technology. Analysis of variance indicates a relationship between several institutional characteristics and incentives for adoption--specifically, type of institution and accreditation ($F=5.695$, $p=.019$). Public institutions view accreditation as a more significant incentive than private institutions. Type of institu-

tion has a moderate effect on "university demand" (F=4.020, p=.048), again with private institutions perceiving these as less of an incentive. Academic system is related to "quality of instruction" (F= 2.430 p=.094). Semester schools indicate that "quality of instruction" is a more significant incentive for the introduction of technology. Academic system is also related to the incentive "recognition awards for innovation in teaching" (F=6.074 p=.006). Faculty at semester schools view that factor as a greater incentive. Accreditation also influences the significance of "recognition awards for innovation in teaching" (F=2.791 p=.066), with faculty at accredited schools citing this factor as a greater influence. There was no apparent relationship between institutional factors and disincentives.

Program Characteristics

"Program characteristics" include number of majors, number of faculty, class size, number of PCs, and the ratio of PCs to students. Those characteristics also consider the relative emphasis placed by the faculty on research, teaching, and service activities. Programs are divided into four groups on the basis of characteristics. Analysis of variance indicates again a lack of relationship between program characteristics and adoption of technology. The only incentive or disincentive influenced by program characteristics is accreditation, which is affected by number of faculty (F=3.687, p=.016).

In general, faculty at smaller schools consider this factor to be a less important incentive. The relative emphasis placed by faculty upon research, teaching, and service is also unrelated to the adoption of technology, along with most incentives and disincentives with the exception of "excessive time and effort involved in change." This disincentive is related to both emphasis placed by faculty on research (F=3.473 p=.034) and service (F=9.770 p =.002). Typically, faculty who emphasize research and de-emphasize service perceive excessive time and effort involved in changes as a greater disincentive.

Instructional Characteristics

"Instructional characteristics" in this study is used to describe the sequence followed when students take particular courses in a program. The sequencing of four courses is identified in the survey. They are: introductory information systems/computer science; introductory accounting, accounting information systems, and auditing. Analysis of variance was used again to investigate the relationship between the sequencing of those courses and the adoption of technology in the curriculum as well as incentives and disincentives to adoption. Data indicate no relationship between such variables and the adoption of technology, as well as disincentives to adoption. The only incentive to adoption that is influenced by course sequencing is "recognition awards for innovation in teaching," which is affected by IS sequencing (F=2.386, p=.031). Faculty at schools offering information systems in the first year view "recognition awards for innovation in teaching" as a greater incentive for the adoption of technology.

Opinions

The instrument used to survey schools provided respondents with the opportunity to comment as well on a variety of issues impacting the adoption of technology in today's classroom.

***Question 1:** Advice to Faculty*

A number of respondents stressed the time-consuming nature of introducing technological applications. It takes a large investment of time and effort to alter teaching methods and styles. Specific advice offered includes: (1) Request a course reduction and development funds., (2) Stress personal development, innovation, and interact with other innovators, (3) Get advice from other users before doing your own innovation, (4) Be prepared to assist students one-on-one, (5) Use commercially available materials, (6) Research each application in depth, and plan ahead carefully, (7) Plan to spend considerable time with the faculty, especially veteran faculty, (8) Begin preparation early, and anticipate prob-

lems, (9) Do a trial run before using software package in the classroom, because many of them are inadequately prepared, and (10) Move in small increments.

When preparing specific application, faculty should examine the needs of the profession for the future, and not only consider its current state. Furthermore, faculty should avoid sacrificing theory and concepts for fancy presentations. They should use technology to enhance the teaching-learning process. Some additional caveats that respondents furnished: (1) Have all the faculty involved in the decision making process, (2) Be sure to have the MIS and accounting faculty working together, and (3) Do not trust solution manuals.

As one respondent advises: "Just do it. You will like it." "The lecture method will soon become a thing of the past." Another respondent, reflecting the views of several others, cautions: "Be concerned with tenure -- do research" as your first priority. Technological innovation requires great investment of time and energy, which might be better spent." Nevertheless, a few respondents argue the rewards of innovation outweigh the costs of doing it.

***Question 2:** Specific Applications*

Respondents mentioned spreadsheets, especially in cost accounting and AIS, which have been favorably received by students and faculty, alike. Also simulations, templates, and word-processing were frequently noted.

Several respondents observed higher standards today for assignments, which deal considerably more with data interpretation than generation -- i.e., less emphasis on number-crunching. Thus, there is less stress placed on memorization/regurgitation assignments and more emphasis on creative "brain" work, interactive learning, and critical thinking. As a result, "teaching is moving away from chalk-talk and note-taking." More emphasis is placed on cases, sensitivity analysis, and group projects. However, one respondent observed that real changes in the nature of problem sets and tests are not significant at this time.

***Question 3:** Student Reaction*

Although many who answered this question observed a positive reaction by students, some noted a mixed reaction. A minority observed a negative reaction. Though reluctant at first, many students accept and enjoy using the technology to enhance their learning process. At some schools, students display a low threshold for frustration especially with software glitches. Several respondents observed that students resent the time required to use the technology. Overall, it appears from those responding to this question that students tend to exhibit a more enthusiastic reaction to the technology than the faculty.

***Question 4:** Faculty Reaction*

Some were enthusiastic, others on the fence, still others resistant to change and slow to adapt. Some believe that technological applications are more time-consuming to prepare and use than they are worth. One respondent said that faculty are willing to work on such applications only if funds are available for software, training, and course development. Several respondents observed a lack of adequate facilities and funds to support technological innovations. Cost accounting and AIS faculty seem to be more enthusiastic than other accounting faculty.

One respondent (a dean) asserted that in view of the emphasis on the CPA examination, the tenured faculty do not become involved in technological innovation. Another respondent noted "that there are 'believers' and 'skeptics,' the latter viewing the introduction of technology as a conspiracy to eliminate faculty and create a TV tech university." Still another respondent remarked: "I do not believe that the real power of technology can be realized in a classroom until there is software which recognizes handwriting (or speech). Anything else is too rigid -- whether the teacher is out of it (students on computer) or the students are out of it (a teacher presenting slides prepared in advance)."

IV. Concluding Comments

While the recommendations of the Big Eight "Perspectives" paper (1989) and the Accounting Education Change Commission (1990) have called for the application of technology in the classroom, those recommendations have gone unheeded. Accounting faculties, in general, have been using technology available for the past twenty years, such as practice sets, test banks, and lecture enhancement videos. The newest technologies -- decision support systems, expert systems, electronic transparencies, hypercard, and CD ROM -- are used only to a limited extent in the classroom. The failure to introduce technological change is evident. Faculty who have initiated change perceive quality of instruction and recognition for innovation in teaching as motivating factors. They are also discouraged by the lack of technological resources, lack of faculty resources, and time requirements. In general, incentives for innovation are related to such factors as institution, program, and instructional characteristics, while disincentives are uniformly experienced regardless of those factors.

V. Implications for Future Research

The results of this study indicate that we cannot generalize relative to university or college, department or program, about the characteristics that should make a curriculum a model of technological innovation. In the future, researchers should further examine the backgrounds and interests of individual faculty who serve as catalysts for innovation in their department. For now, accounting educators must recognize the need to reexamine their curriculum to meet the changing educational needs of the profession.

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