Factors that may influence or hinder use of instructional technology among accounting faculty

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Abstract

Purpose – To determine what factors influence faculty's decisions to use technology in their classes, what factors prevent them from use, and whether there are differences among faculty by gender, ethnicity, rank, sub-areas, etc. in using instructional technology.

Design/methodology/approach – A survey instrument was used to measure attitudes toward technology among accounting educators. The instrument included three separate sections. The first section was devoted to examining factors that could influence faculty's opinion to use technology for teaching. The second section focused on issues that could possibly discourage faculty from use of technology. For these two sections a five-point Likert scale was developed with possible responses ranging from "not important" to "critically important". The third and final section was designed to provide demographic information for classification purposes and testing of the research questions.

Findings – The results demonstrate that while accounting faculty value technology greatly and do use it in teaching, significant differences exist in their views toward it. Several factors were found to influence faculty's attitudes toward integration of technology. Conversely, there are other factors that tend to hamper widespread integration.

Research limitations/implications – The research was conducted among US accounting faculty, which perhaps limits its usefulness elsewhere or in other disciplines

Practical implications – University-sponsored incentive programs and financial support could encourage faculty to further incorporate technology and its various dimensions in their classes. Furthermore, administrators should make the necessary arrangements for faculty to attend training seminars designed to provide them with technical support.

Originality/value – This study provides empirical evidence that is useful to both faculty and administrators in integrating technology in education.

Keywords Academic staff, Computer based learning, Teaching, Accountancy, United States of America

Paper type Research paper

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The Accounting Education Change Commission, in its *Position Statement No. One*, points out "because organizations are affected by rapidly increasing dependency on *technology*, accounting professionals must understand the current and future roles of *information technology* in organizations" (Accounting Education Change Commission, 1990). Likewise, the Association to Advance Collegiate Schools of Business in its accreditation standards requires that appropriate instructional technology be available and utilized by business schools' faculty (AACSB International, 1993). Similar demands are made by professional accounting organizations such as the American Institute of Certified Public Accountants, which announces that, to enter the profession,

individuals must acquire the necessary skills to use technology tools effectively and efficiently (American Institute of Certified Public Accountants, 1998). These and similar pronouncements place a heavy burden on the faculty, requiring integration of appropriate applications of technology into the accounting curriculum.

However, accounting literature offers relatively little research findings on whether there are real benefits in using technology to deliver accounting instructions. While applications of technology are widespread, anecdotal evidence indicates that adoption by accounting faculty varies by gender, ethnicity, sub-areas, class sizes, and faculty ranks. Thus, the questions remain as to what factors can influence faculty to use technology in their classes? What factors prevent them from use? And, what differences, if any, exist among faculty, programs, and sub-areas in using technology for teaching? This research is designed to provide some answers to these questions.

Use of technology in education

There are those who believe that introduction of technology in the education arena is as large a change as when the printed book was first introduced (Drucker, 1997). They go as far as predicting that big university campuses will not survive as a residential institution. Instead, future educational institutions will deliver more lectures and classes off campus via satellite or two-way video (Drucker, 1997). Technological advancements and training are believed to be instrumental in the development of emerging cities as implementers of innovation and knowledge-value neighborhoods with strong residential, retail, and cultural components (Kotkin and DeVol, 2001).

Public opinion polls encourage the use of technology in the classroom. A survey found that 98 percent of parents believe it is important for students to learn how to use computers even before they graduate from high school (Chmielewski, 1997). Teachers expressed even a stronger sentiment. In a separate survey, US teachers ranked computer skills as more important than the study of European history, biology, chemistry, and physics; than learning practical job skills; and than reading modern and classic American literature (Oppenheimer, 1997).

With such enthusiasm, it should be of no surprise that computer-assisted instructions capture nearly all classrooms (Alavi *et al.*, 1990; Jones and Petre, 1994; Mason and Hyinka, 1998). Universities, colleges, and other educational institutions across the country spend a great deal of time and resources on teaching computer skills to their students. In some cases, computers sit on every student's desk, in others, millions of dollars are spent on developing huge computer labs, equipped with the state of the art presentation equipment, multimedia facilities, software, and hardware (Oppenheimer, 1997).

However, preliminary research concerning the importance of information technology does not yield conclusive evidence about the benefits of technology in education. Some believe that computer-enhanced learning results in higher levels of perceived skill development, self-reported learning, and utility than the traditional teaching styles (Alavi *et al.*, 1990). Helms *et al.* (1991) and Kaufman (1993) find that students prefer computer-enhanced courses and exhibit more motivation for learning by attending class more regularly. Jensen and Sandlin (1992) report that computers enhance students' understanding of course materials. Others claim that with the use of instructional technology students spend more time on tasks, they become more independent learners, and family participations in teaching and learning increases

(*New York Beacon*, 2000). Also, more recently the corporate world has started to employ instructional technology for training employees. Primary motivations include lower cost, higher student achievement, and more consistency of material being delivered (Perry, 2003).

Others, though, recognize the importance of educational technology, and are concerned about the caveats of using technology to the central issues of classroom presentations (Mason and Hyinka, 1998). By applying presentation software programs, these authors believe that the field of educational technology is yet to lend support to those who see a need to increase student voice and empowerment by putting software in the hands of students. Their conclusion is that computer presentation programs add to classrooms what there is too much of: teacher-centered, pre-planned, lockstep delivery of information, primarily through words.

There are some who argue that there is no evidence to suggest that technology-based education improves student achievements. For example, Chmielewski (1997) contends that students in the most technologically advanced classrooms perform no better than their peers on general standardized tests. Others are concerned that as students concentrate on how to manipulate software instead of on the subject at hand, learning can diminish rather than grow:

> There's a real risk, though, that the thoughtless practices will dominate, slowly dumbing down huge numbers of tomorrow's adults (Oppenheimer, 1997, p. 4).

> Even in success stories important caveats continually pop up. The best educational software is usually complex – most suited to older students and sophisticated teachers. In other cases the schools have been blessed with abundance – fancy equipment, generous financial support, or extra teachers – that is difficult if not impossible to duplicate in the average school. Even if it could be duplicated, the literature suggests, many teachers would still struggle with technology. Computers suffer frequent breakdowns; when they do work, their seductive images often distract students from the lessons at hand – which many teachers say makes it difficult to build meaningful rapport with their students. (Oppenheimer, 1997, p. 11).

Another study of the effects of technology on students' performance in exams indicates that computer assisted instructions do not appear to result in real educational benefits and fail to bring about higher test scores (Angrist and Lavy, 2002). Most recently, Green (2003) examined faculty's fascination with technology and the role of campus infrastructure in integration of instructional technology. It was concluded that instructional technology results in frequent disruptions in organizational policy, practice, and process.

Finally, some fear that computers are replacing much of teacher-student interactions and could potentially harm the learning that would otherwise result through personal contacts (Hawarth, 1997). In an unprecedented move aimed to protest the increasing use of technology in education, Vaughan Stapleton, Professor of Political Science at California State University, Chico, refused to accept his "Teacher of the Year" award. He noted:

> Since 60 percent of human communication is nonverbal, I cannot imagine remote learning as being anything but a second best choice – and a poor one at that (Stapleton, 1997, p. 3).

As was observed nearly two decades ago, educators may never really embrace the new technology, bringing such issues as the lack of interest, relevance to course materials,

administrative support, or contribution to the faculty member's advancement (Culan, 1986). Considering the notion of resistance to the use of technology in education, it is the purpose of this research to investigate accounting faculty's attitudes toward technology.

Differences in use of technology

It has been documented that some differences exist in attitudes toward the use of technology among males and females, older and younger people, as well as people with different levels of education (Robichaux, 1994; Qureshi and Hoppel, 1995; Whitley, 1997; American Association of University Women, 1998). Females, older and people with low levels of education are reported to exhibit less favorable attitudes toward technology than men, younger people, and more educated individuals, respectively (Morris, 1988/9, 1992; Williams *et al.*, 1993). Several studies reveal that males tend to be more interested in computers than females and that males use computers more than females at a younger age (Meunier, 1994; Robinson *et al.*, 1998). According to these studies, family, school, media, and role models are significant factors for experiencing differences among genders in using technology.

A 1998 report by the American Association of University Women (AAUW) concluded that while women have made serious gains in enrollment and test scores in science and math over the past several years, female students seem to demonstrate less interest and more anxiety towards computers than males (American Association of University Women, 1998). In another study of 310 undergraduate students to measure attitudes toward computers, Qureshi and Hoppel (1995) concluded that among other things, male students demonstrate stronger feelings toward computer technology compared to their female counterparts.

Some argue that preference of male users for technology may stem from socio-economical and cultural issues. It has been observed that parents buy computers and video games for their sons more than for their daughters (Levin and Gordon, 1989). Computer software and games designed for children are essentially targeted to a male audience, perhaps because of the notion that males have traditionally enjoyed more buying power than females (Jones, 1987; Forsyth and Lancy, 1989; DiMona and Herndon, 1994). An empirical study of 377 individuals, including 154 male and 223 female students, revealed that males are more likely than females to own a computer, to have played with computer games, and to take more computer courses in college. In addition, male users demonstrated greater competence in adapting to computer technology and one's experience seemed directly correlated with attitudes toward computers for both males and females (Williams *et al.*, 1993).

Other studies suggest that technology-related attitudes are indeed multi-faceted and include components related to competency, cultural differences, attitudes about society, and anxiety towards technology. In a study of attitudes toward computers and sex-role stereotyping, Whitley (1997) found that while gender differences of computer use exist, they are based on varied attitudinal components. Males see computers as more appropriate for themselves than females, males show more computer competence, and males demonstrate an overall positive attitude toward computers.

However, with the recent gender switch in both college enrollment and the employment market, conditions may have changed. According to the Bureau of Labor Statistics, in 1998 nearly 51 percent of the college enrollments represented female

students (Bureau of Labor Statistics, 1998a, b). In recent decades there has been an influx of women into the traditionally male fields of medicine, law, and accounting. While in 1970, less than 10 percent of all bachelor's degrees in accounting were awarded to women, by the mid-1990s this number exceeded 50 percent (Koretz, 1997). In 1997, women accounted for 55 percent of all bachelor's degrees in accounting and 77 percent of associate's degrees compared to about 25 percent of medical and law degrees (Koretz, 1997).

In addition to gender, age and education are also believed to have a significant impact on people's attitudes toward technology. In a study of 380 randomly selected individuals, Morris (1988/9) investigated the relationships between age, experience, and education, among other factors, with attitudes toward computers. The age of the participants ranged from 17 to 90 years old. The results revealed that all three of these factors are strongly correlated with computer use. Younger and more experienced individuals seem to express more positive attitudes toward the use of technology. It was found, however, that education exhibits even a stronger correlation with computer use than age.

In another research study, a non-random group of computer literacy workshop participants was selected to study computer anxiety and attitudes, as well as other factors related to resistance to computers (Sievert *et al.*, 1988). The results indicated that individuals with more experience have significantly stronger positive attitudes toward computer use than those who have worked for fewer years. In a similar investigation, Qureshi and Hoppel (1995) concluded that class status (i.e. freshman, sophomore, etc.) significantly influences students' views toward computers.

In yet another study, Daigle and Morris (1999) investigated whether computer-related attitudinal differences exist among students taking accounting courses. A non-random sample of 642 students in four accounting information system courses was selected to participate in this study. The courses ranged from freshman level to graduate level. The results showed that gender differences were more prevalent among students in freshman courses compared to those enrolled in the higher-level courses. It was concluded that differences in attitudes seem to diminish as individuals gain more experience and move to a higher status. Also, it has been argued that more computer experiences make individuals more comfortable and result in positive attitudes towards technology (Akbaba and Kurubacak, 1998).

Finally, the relationship between ethnicity and use of technology has not yet been fully investigated. Anecdotal evidence indicates that use of modern technology is widespread among all ethnic groups regardless of their race, culture, and national background. In another study, Sexton *et al.* (1999) concluded that attitudes of African American students were not significantly different from those of white students.

The study

As technology continues to revolutionize our educational systems, it is of particular interest to investigate the impact of the new tools and techniques on individuals and groups who are placed in a position to introduce them to our future professionals. One of such groups is the university faculty. Differences among faculty with respect to the use of technology in teaching and course management could potentially impact students' preparation and possibly lead to educational disparities. Prior studies tend to document that significant differences exist among individuals (e.g. male and female,

young and old, etc.) in their views toward technology. With the increasing role of business education and the importance of a consistent strategy toward development of technology-based curricula, an overall administrative policy toward integration of the new tools is of paramount importance.

This study is designed to use a survey instrument to measure attitudes toward technology among accounting educators. The instrument has been developed based on the work of previous researchers (Sievert *et al.*, 1988; Morris, 1988/9; Williams *et al.*, 1993; Qureshi and Hoppel, 1995; Whitley, 1997; American Institute of Certified Public Accountants, 1998). The questionnaire includes three separate sections. The first section is devoted to examining factors that could influence faculty's opinion to use technology for teaching. The second section focuses on issues that could possibly discourage faculty from using technology in their courses. A five-point Likert scale has been developed for these two sections, with possible responses ranging from "not important" to "critically important". The third and final section is designed to provide demographic information for classification purposes and testing of the research questions.

The sampling frame contains accounting faculty teaching at four-year colleges and universities across the USA. The sample includes 800 accounting faculty, randomly selected from the 2001-2002 *Accounting Faculty Directory* (Hasseback, 2001) using a statistical sampling design.

Research results and analysis

A total of 271 faculty participated in the survey, providing a response rate of 34 percent. Table I contains some statistics about the sample. The ratio of male to female faculty participants was nearly two to one. The majority of respondents (75 percent) were between the ages of 35 and 54 years. Their work experience ranged from one to more than 31 years, with majority reporting between six and 25 years of experience. Further analysis of the results indicated that most of the respondents were associate professors (38.4 percent) while 31 percent were full professors, 25.7 percent assistant professors, and 4.9 percent lecturers. As for the sample's ethnic background, the majority of faculty responding to the survey were white, with only as few as 13 percent representing other ethnic groups. Among sub-areas of accounting, financial accounting was the prevalent subject taught by nearly two-fifths of faculty, and business law was the rarest subject, taught only by less than 2 percent of the faculty.

Among the universities represented, more than one third (36.5 percent), offer only baccalaureate degrees, with another three eighths (37.9 percent) granting master's degrees and the remaining 23 percent awarding doctorate degrees. Also, the ratio of responses from the AACSB-accredited to non-accredited schools was three to one. Only one third of the AACSB schools were also separately accredited for their accounting programs.

Table II contains the mean ratings of factors influencing use of technology and percentages of faculty responses ranked by mean rating. Among the 14 factors examined, the effects of technology on improved student learning received the highest ratings, with a mean rating of 4.13. The next highly rated factor was equipment availability, with a mean rating of 4.08, followed by the advantages of technology over traditional delivery (4.04), and compatibility with course materials (3.95). A closer look at Table II reveals that several major factors that were initially thought to bring about

	Percentage
Gender	
Female	33.6
Male	66.4
Total	100.0
Age	
25-34 years	3.0
35-44 years	25.8
45-54 years	49.1
55 and over	22.1
Total	100.0
Experience	
1-5 years	8.8
6-10 years	17.8
11-15 years	21.9
16-20 years	20.5
21-25 years	16.6
26-30 years	9.1
31 and over	5.3
Total	100.0
Rank	
Lecturer	4.9
Assistant Professor	25.7
Associate Professor	38.4
Professor	31.0
Total	100.0
Ethnicity	
Hispanic	0.4
African American	1.9
Caucasian American	87.2
Middle Eastern	4.1
Asian-Pacific Islander	2.3
Other	4.1
Total	100.0
Teaching area	
Accounting information systems	6.6
Auditing	12.5
Business law	1.5
Financial accounting	38.2
Government (not-for-profit)	6.6
Cost/managerial	19.6
Taxation	13.0
Others	2.0
Total	100.0

Table I.
Profile of faculty participants

(*continued*)

	Percentage
Degree offered	
Baccalaureate	36.5
Master's	37.9
Doctorate	23.0
Others	2.6
Total	100.0
Accreditation	
Non-AACSB accredited	36.6
AACSB business accredited	40.3
AACSB business/accounting accredited	23.1
Total	100.0

Table I.

Rank	Factors influencing use	Mean ratings	Percentage of responses "not important"	Percent of responses "very important" to "critically important"
1	Improved student learning	4.13	0.4	78.9
2	Equipment availability	4.08	2.1	76.6
3	Clear advantages over traditional delivery	4.04	1.1	77.5
4	Compatibility with course materials	3.95	1.7	73.4
5	Compatibility with existing materials	3.83	1.8	66.7
6	Release time needed for course development and preparation	3.74	2.8	62.5
7	Funds for necessary materials	3.74	5.3	60.6
8	Increased student interest	3.74	1.1	63.6
9	Ease of use	3.73	1.4	61.8
10	Demands of the marketplace	3.56	6.6	57.0
11	Availability of training and technical support for faculty	3.56	7.0	57.3
12	Personal interest in technology	3.07	8.0	35.7
13	Frequent use by department colleagues	2.13	32.5	10.1
14	Administrative pressure	1.84	43.2	6.7

Note: For ratings, 1 = not important, 5 = critically important

Table II.
Factors influencing the use of instructional technology ranked by mean ratings

quicker acceptance of technology by educators, such as its acceptance and frequent use by department colleagues or administrative pressure, were viewed relatively unimportant by faculty, with mean ratings of 2.13 and 1.84, respectively.

Table III includes factors preventing faculty from use of instructional technology. Among these factors, lack of time is by far the most significant deterrent in using technology, with a mean rating of 3.50. Over half of the respondents (56.1 percent) rated this factor very to critically important, with only a small group (6.7 percent)

Rank	Barrier to use	Mean ratings	Percentage of responses "not important"	Percentage of responses "very important" to "critically important"
1	Lack of time	3.505	6.7	56.1
2	Lack of required software	3.220	17.4	47.5
3	Lack of technological support	3.218	16.1	45.6
4	Lack of relevance to my course materials	2.993	20.1	38.7
5	Lack of latest hardware	2.796	24.3	35.2
6	Lack of administrative support	2.758	26.0	34.4
7	Lack of contribution to professional advancement	2.333	34.0	18.2
8	Lack of interest in technology	1.914	47.3	9.7

Note: For ratings, 1 = not important, 5 = critically important

Table III.
Barriers to using instructional technology ranked by mean ratings

considering it unimportant. The next two top rated factors were related to logistics, including the lack of required software and technological support, with mean ratings of 3.22 and 3.218, respectively. Nearly one half of the respondents found these factors very to critically important. A few other factors were somewhat important in preventing faculty using technology. These factors included the lack of relevance to course materials, which might stem from faculty's lack of time to redesign the course materials for a technology-enhanced teaching, lack of hardware, and administrative support, with the mean ratings of 2.993, 2.8, and 2.76, respectively. The two least important factors were the lack of technology's contribution to the faculty member's advancement, with a mean rating of 2.3, and the lack of interest in technology, with a mean rating of 1.9. It is important to note that there are still those who have little or no interest in using technology. Nearly 10 percent of the respondents rated this factor very important.

The final phase of this research has been denoted to the analyses of responses for the detection of possible differences among faculty by gender, age, work experience, rank, ethnicity, teaching area, degree offered, and AACSB accreditation.

The testing methodology employed was the analysis of variance, where the grouping attributes (e.g. gender) represented the dependent variable and factors influencing or hindering use of technology formed the independent variables. Statistical t values were calculated to test any observed correlations between the dependent and independent variables.

Gender

Research question 1 was designed to test whether there were any significant differences between male and female accounting faculty in their attitudes toward technology. Table IV demonstrates the mean ratings of factors influencing or hindering use of technology among faculty, classified by gender. While the overall results demonstrate that male and female faculty hold similar views towards technology-related issues, further analysis of individual questions shows that female faculty rate availability of equipment as their number one concern, while male faculty find improved student learning as their most important consideration.

	Mean ratings	
	Female ($N = 90$)	Male ($N = 178$)
Factors influencing use		
Ease of use	3.70	3.71
Clear advantages over traditional delivery	4.02	4.02
Compatibility with existing materials	3.93	3.74
Compatibility with course materials	4.01	3.89
Increased student interest	3.84	3.77
Improved student learning	4.10	4.14
Personal interest in technology	3.07	3.06
Frequent use by department colleagues	2.21	2.11
Administrative pressure	1.89	1.84
Equipment availability	4.19	4.00
Availability of funds for necessary materials	3.76	3.68
Availability of training and technical support for faculty	3.52	3.53
Demands of the marketplace	3.50	3.59
Time needed for course development and preparation	3.83	3.68
Overall	3.54	3.49
Barriers to use		
Lack of time	3.60	3.43
Lack of interest in technology	1.98	1.92
Lack of relevance to course materials	3.08	2.94
Lack of contribution to professional advancement	2.52	2.39
Lack of latest hardware	2.88	2.73
Lack of technological support	3.34	3.10
Lack of administrative support	2.84	2.68
Lack of required software	3.28	3.17
Overall	2.94	2.80

Notes: For ratings, 1 = not important, 5 = critically important, N = number of responses

Table IV.
Mean ratings of factors influencing or hindering faculty's decision to use instructional technologies by gender

Among factors hindering use, lack of time received the highest ratings from both male and female faculty, although minor disagreements abound with respect to other factors.

Age

The next research question was designed to examine possible age-related differences among faculty in ratings of factors influencing or hindering use of technology. Table V contains the mean ratings of these factors by age group. Examination of Table V reveals that while younger faculty view compatibility of technology with existing materials as the most important factor influencing use of technology, their older colleagues rate improved student learning as their top choice.

Significant differences by age group were found in two factors influencing use and one factor hindering use of technology ($p < 0.05$). These differences were detected in attitudes toward availability of funds necessary for technology materials as well as

	Mean ratings			
	25-34 years old ($N = 8$)	35-44 years old ($N = 70$)	45-54 years old ($N = 133$)	55 and older ($N = 60$)
Factors influencing use				
Ease of use	3.87	3.80	3.71	3.65
Clear advantages over traditional delivery	4.12	4.03	4.05	3.96
Compatibility with existing materials	4.25	3.69	3.89	3.71
Compatibility with course materials	4.12	3.89	4.01	3.79
Increased student interest	3.62	3.71	3.79	3.61
Improved student learning	3.87	4.12	4.09	4.26
Personal interest in technology	3.50	2.99	3.07	3.10
Frequent use by department colleagues	2.87	2.09	2.09	2.26
Administrative pressure	2.00	1.70	1.89	2.00
Equipment availability	4.12	3.94	4.14	4.07
Funds for necessary materials	3.37	3.57	3.72	3.96*
Availability of training and technical support for faculty	3.37	3.34	3.47	3.98*
Demands of the marketplace	3.25	3.54	3.68	3.36
Time needed for course development and preparation	3.75	3.81	3.70	3.69
Overall	3.58	3.44	3.52	3.58
Barriers to use				
Lack of time	3.87	3.60	3.52	3.26*
Lack of interest in technology	1.87	1.83	1.95	2.04
Lack of relevance to course materials	2.75	2.94	3.08	2.88
Lack of contribution to professional advancement	2.12	2.53	2.24	2.32
Lack of latest hardware	2.50	2.56	2.90	2.90
Lack of technological support	3.00	2.93	3.32	3.22
Lack of administrative support	2.87	2.47	2.88	2.75
Lack of required software	2.87	2.88	3.37	3.35
Overall	2.73	2.72	2.91	2.84

Notes: 1 = not important, 5 = critically important, N = number of responses; $^{*}p < 0.05$

Table V.
Mean ratings of factors influencing or hindering faculty's decision to use instructional technologies by age

training and technical support, where older faculty placed greater importance on these factors than those in the younger age groups. Conversely, younger faculty found the lack of time for using technology significantly more important than their older colleagues ($p < 0.05$). Perhaps younger faculty's preoccupations with retention, tenure, and promotion leave little time for the development of a technology-based curriculum. It was also noted that older faculty exhibit somewhat less interest in using technology than their younger counterparts ($p < 0.10$).

Experience

The relationship between teaching experience and attitudes towards technology is comparable with that of age (see Table VI). Less experienced faculty seem to favor the use of technology if they perceive improved student learning, compatibility with the course materials, and clear advantages over traditional methods, with mean ratings of 4.17, 4.17, and 4.09, respectively. However, more seasoned faculty, while concerned about students' learning, also view availability of equipment and training as critical for their decisions to use technology. On the other hand, as with age, lack of interest in technology is stronger among more experienced faculty compared with those who have recently joined the profession ($p < 0.05$).

Academic rank

Differences among users of technology by status or rank are areas that have received little or no attention. The question, however, is particularly important in academia since faculty's rank is characterized by certain rights and privileges. As shown in Table VII, significant differences were found among faculty by rank in several areas. For example, lecturers seem to be more concerned with the compatibility of technology with their course materials than all other faculty at $p < 0.05$. Also, they rate administrative pressure significantly higher than the other academic ranks ($p < 0.05$). Compatibility with the existing materials was another factor that received higher ratings from the lecturers compared to all other faculty ($p < 0.10$). Apparently lecturers are more concerned about the possibility having to revise their teaching materials in an effort to move from an existing curriculum to a more technology-based approach.

Among factors hindering use, the lack of time was the highest rated factor by all faculty respondents, particularly lecturers. This is due to the fact that many lecturers are hired on a per need basis, and may have little interest in – or time for – investing an excessive amount of time to prepare for a temporary assignment. As for other differences, lack of technological and administrative support were rated significantly more important by lecturers than all other academic ranks ($p < 0.05$).

Ethnicity

The next research question examined the relationships between ethnicity and use of technology. Table VIII reveals that significant differences exist among several ethnic groups with respect to a few of the factors influencing or hindering use of technology. However, any generalization must be made with extreme caution due to a low quantity of responses in all but one of the classification groups. While Caucasians' primary reasons for using technology for instruction were improved student learning, equipment availability, and clear advantages over traditional delivery, African Americans seemed to be more concerned about the availability of training and equipment, and the demands of the marketplace. On the other hand, comparisons of the Middle-Eastern and Asia-Pacific faculty showed that although the primary reason for using technology for the former was improved student learning, compatibility with course materials was the main consideration for the latter group. Among the barriers, significant differences were found by ethnicity only in one factor – lack of contribution to professional advancement ($p < 0.05$), where African Americans rated this factor lower than all other ethnic groups.

Table VI.
mean ratings of factors influencing or hindering faculty's decision to use instructional technology by number of years of teaching experience

Factors influencing use	Mean ratings						
	1-5 years ($N = 23$)	6-10 years ($N = 47$)	11-15 years ($N = 58$)	16-20 years ($N = 54$)	21-25 years ($N = 44$)	26-30 years ($N = 24$)	31 or more years ($N = 14$)
Ease of use	3.48	3.81	3.65	3.78	3.68	3.83	3.21
Clear advantages over traditional delivery	4.09	4.08	3.96	4.00	4.04	3.83	3.86
Compatibility with existing materials	3.56	3.87	3.86	3.63	3.84	3.50	3.14
Compatibility with course materials	4.17	3.89	3.95	3.87	3.98	3.71	3.57
Increased student interest	3.74	3.79	3.67	3.85	3.54	3.42	3.07
Improved student learning	4.17	4.15	4.17	3.87	4.18	4.29	3.86
Personal interest in technology	2.83	3.36	2.81	3.20	2.93	2.96	3.00
Frequent use by department colleagues	2.35	2.32	2.10	1.94	2.11	2.08	2.36
Administrative pressure	1.65	1.77	1.83	2.04	1.89	1.87	1.93
Equipment availability	3.56	4.04	4.22	4.15	4.14	3.87	3.64
Funds for necessary materials	3.26	3.57	3.91	3.55	3.82	3.75	3.50
Availability of training and technical support for faculty	2.83	3.55	3.60	3.41	3.50	3.62	4.00*
Demands of the marketplace	3.30	3.49	3.59	3.74	3.73	3.21	3.07
Time needed for course development and preparation	3.70	3.47	3.83	3.65	3.75	3.71	3.43
Overall	3.33	3.51	3.54	3.48	3.51	3.40	3.26
Barriers to use							
Lack of time	3.39	3.23	3.46	3.67	3.43	3.33	3.29
Lack of interest in technology	1.87	1.62	1.78	2.09	1.79	2.04	2.57*
Lack of relevance to course materials	3.04	2.77	3.02	3.18	2.59	2.71	3.43
Lack of contribution to professional advancement	2.61	2.47	2.10	2.31	1.91	2.46	3.00
Lack of latest hardware	2.17	2.62	2.86	2.92	2.61	2.42	3.07
Lack of technological support	2.48	3.00	3.34	3.24	3.18	3.00	3.43
Lack of administrative support	2.13	2.49	3.03	2.67	2.70	2.79	2.86
Lack of required software	2.52	3.06	3.45	3.31	2.89	3.08	2.93
Overall	2.53	2.66	2.88	2.92	2.64	2.73	2.97

Notes: 1 = not important, 5 = critically important; N = number of responses; $^{*}p < 0.05$

	Mean ratings			
	Lecturer ($N = 13$)	Assistant professor ($N = 69$)	Associate professor ($N = 103$)	Professor ($N = 83$)
Factors influencing use				
Ease of use	3.54	3.66	3.68	3.87
Clear advantages over traditional delivery	3.92	4.01	3.94	4.17
Compatibility with existing materials	4.08	3.62	3.93	3.78**
Compatibility with course materials	4.31	4.00	3.90	3.87*
Increased student interest	3.69	3.78	3.73	3.70
Improved student learning	4.31	4.12	4.08	4.21
Personal interest in technology	3.46	3.03	3.11	3.04
Frequent use by department colleagues	2.69	2.25	2.07	2.08
Administrative pressure	2.46	1.81	1.85	1.82*
Equipment availability	4.08	4.03	4.08	4.16
Funds for necessary materials	3.92	3.75	3.67	3.75
Availability of training and technical support for faculty	3.61	3.30	3.49	3.77
Demands of the marketplace	3.54	3.48	3.70	3.49
Time needed for course development and preparation	3.92	3.74	3.76	3.68
Barriers to use				
Lack of time	3.69	3.47	3.54	3.48
Lack of interest in technology	2.17	1.85	1.94	1.97
Lack of relevance to course materials	3.17	2.88	3.01	3.06
Lack of contribution to professional advancement	2.17	2.55	2.28	2.29
Lack of latest hardware	2.83	2.65	2.88	2.82
Lack of technological support	3.50	2.96	3.28	3.26*
Lack of administrative support	3.23	2.61	2.80	2.78*
Lack of required software	3.50	3.20	3.26	3.12
Overall	3.03	2.77	2.87	2.86

Notes: 1 = not important, 5 = critically important; N = number of responses); *$p < 0.05$; **$p < 0.10$

Table VII.
Mean ratings of factors influencing or hindering faculty's decision to use instructional technology by academic rank

Teaching area

Teaching area is the grouping variable with the most number of significant differences among faculty (see Table IX). Consistent with our untested presumptions, the overall results demonstrate significant differences among faculty's attitudes toward technology depending on what subject matters they teach. While time needed for course development and preparation was rated as the most important influential factor for using technology in teaching accounting information systems, this factor received significantly lower ratings from all other areas with the exception of business law professors. Likewise equipment availability, which received one of the highest ratings from faculty teaching accounting information systems, auditing, not-for-profit, cost

Table VIII.
Mean ratings of factors influencing or hindering faculty's decision to use instructional technology by ethnicity

	Mean ratings					
	Hispanic ($N = 1$)	African American ($N = 5$)	Caucasian American ($N = 232$)	Middle Eastern ($N = 11$)	Asian-Pacific Islander ($N = 6$)	Other ($N = 11$)
Factors influencing use						
Ease of use	3.00	4.20	3.67	3.91	3.83	4.36*
Clear advantages over traditional delivery	4.00	4.40	4.03	4.07	4.00	4.00
Compatibility with existing materials	4.00	4.50	3.81	3.82	3.67	3.82
Compatibility with course materials	4.00	3.80	3.93	3.64	4.50	4.00
Increased student interest	4.00	4.40	3.70	4.00	3.17	3.82*
Improved student learning	4.00	4.40	4.14	4.36	3.83	4.00
Personal interest in technology	2.00	4.00	3.03	3.64	2.83	3.27*
Frequent use by department colleagues	2.00	3.00	2.16	2.00	2.33	2.00
Administrative pressure	2.00	2.20	1.80	2.00	1.67	1.82
Equipment availability	3.00	4.60	4.08	4.18	3.67	4.09*
Funds for necessary materials	3.00	4.20	3.76	3.80	3.50	3.09
Availability of training and technical support for faculty	3.00	4.80	3.53	3.73	3.33	3.45*
Demands of the marketplace	3.00	4.60	3.53	4.09	2.83	3.54*
Time needed for course development and preparation	3.00	4.20	3.74	3.82	3.50	3.36
Overall	3.14	4.09	3.49	3.65	3.38	3.47
Barriers to use						
Lack of time	3.00	3.00	3.50	3.82	3.50	2.91
Lack of interest in technology	3.00	1.40	1.94	1.70	2.33	1.45
Lack of relevance to course materials	2.00	1.80	3.01	2.91	2.83	3.27
Lack of contribution to professional advancement	2.00	1.00	2.36	2.27	2.33	2.36*
Lack of latest hardware	3.00	2.60	2.78	3.27	2.67	2.54
Lack of technological support	3.00	3.80	3.15	3.54	2.50	3.64
Lack of administrative support	3.00	3.20	2.69	3.27	2.67	2.91
Lack of required software	3.00	3.40	3.21	3.27	3.00	3.27
Overall	2.75	2.52	2.83	3.01	2.73	2.79

Notes: 1 = not important, 5 = critically important; N = number of responses; $^*p < 0.05$

Table IX. Mean ratings of factors influencing or hindering faculty's decision to use instructional technology by primary teaching area

	Mean ratings							
	Accounting information systems ($N = 26$)	Auditing ($N = 49$)	Business law ($N = 6$)	Financial accounting ($N = 150$)	Government (not-for-profit) accounting ($N = 26$)	Cost/managerial accounting ($N = 77$)	Taxation ($N = 51$)	Other ($N = 8$)
Factors influencing use								
Ease of use	3.85	3.82	4.00	3.70	3.58	3.71	3.72	4.25
Clear advantages over traditional delivery	3.88	3.98	3.50	3.99	3.88	4.03	4.04	4.00*
Compatibility with existing materials	3.88	3.92	3.00	3.86	3.50	3.65	3.71	3.87*
Compatibility with course materials	4.15	3.96	3.00	3.95	3.92	4.01	3.78	3.75*
Increased student interest	3.64	3.65	3.33	3.72	3.81	3.78	3.51	4.12*
Improved student learning	4.04	3.98	4.33	4.21	3.50	4.12	4.06	4.25*
Personal interest in technology	3.50	3.08	2.83	3.08	3.04	2.96	3.00	3.62
Frequent use by department colleagues	2.38	2.16	2.00	2.22	1.88	1.99	2.10	2.50*
Administrative pressure	1.73	1.77	1.33	1.89	1.77	1.77	1.84	1.50
Equipment availability	4.31	4.31	3.17	4.07	4.27	4.01	4.18	3.62*
Availability of funds for necessary materials	3.84	3.98	3.17	3.73	3.77	3.52	3.94	3.62
Availability of training and technical support for faculty	3.58	3.75	2.67	3.54	3.54	3.51	3.69	3.50*
Demands of the marketplace	4.00	3.71	3.17	3.58	3.77	3.44	3.67	3.00*
Time needed for course development and preparation	4.32	3.90	4.17	3.78	3.69	3.52	3.69	2.87*
Overall	3.65	3.57	3.12	3.52	3.42	3.43	3.49	3.46

(*continued*)

Table IX.

	Mean ratings							
	Accounting information systems ($N = 26$)	Auditing ($N = 49$)	Business law ($N = 6$)	Financial accounting ($N = 150$)	Government (not-for-profit) accounting ($N = 26$)	Cost/managerial accounting ($N = 77$)	Taxation ($N = 51$)	Other ($N = 8$)
Barriers to use								
Lack of time	3.81	3.53	4.00	3.46	3.38	3.49	3.55	2.87*
Lack of interest in technology	1.92	1.92	3.00	1.95	1.96	1.83	1.96	1.37*
Lack of relevance to course materials	2.65	2.86	3.17	2.97	2.77	2.78	3.23	2.37*
Lack of contribution to my professional advancement	2.38	2.49	2.50	2.33	1.96	2.23	2.22	1.87
Lack of latest hardware	2.77	3.14	2.33	2.76	2.96	2.74	3.02	2.62*
Lack of technological support	3.38	3.49	3.67	3.13	3.35	3.09	3.37	2.62
Lack of administrative support	2.73	3.12	3.50	3.76	2.81	2.70	2.92	2.12
Lack of required software	3.23	3.57	2.83	3.14	3.54	3.04	3.55	2.62
Overall	2.86	3.01	3.12	2.94	2.84	2.74	2.98	2.31

Notes: 1 = not important, 5 = critically important; N = number of responses; $^{*}p < 0.05$

accounting, and taxation, received significantly lower ratings from those who teach business law. Compatibility with course materials, improved student learning, and demand of the marketplace were the next three major factors that seem to influence use of technology in teaching accounting information systems. Among these factors, only improved student learning was rated highly by the business law professors. The other two factors were considered far less significant in teaching business law than all other teaching areas.

As for factors inhibiting use of technology, regardless of the area of teaching, the greatest deterrent was undoubtedly the lack of time. Within the subject areas, business law professors seem significantly more concerned about the lack of time, lack of interest in technology, and lack of relevance to course materials than all other faculty.

Degree offered

Unlike other groupings no significant differences were observed in attitudes toward use of technology by degrees. As Table X demonstrates, the first highly rated reasons for use of technology by faculty teaching in all business degrees are:

(1) improved student learning;

(2) clear advantages over traditional delivery; and

(3) equipment availability.

Among barriers to use, lack of time, lack of technological support, and lack of required software are the three most important factors.

AACSB accreditation

The final analysis was conducted to determine whether there were any differences in faculty's attitudes toward technology between the AACSB-accredited and non-accredited schools. Table XI compares the mean ratings of non-AACSB accredited schools with those of accredited schools in both business and accounting programs. The overall results demonstrate no significant differences between these programs. Further analysis showed that while equipment availability was the most important factor influencing use for the non-accredited programs, improved student learning received the highest ratings by the AACSB-accredited programs. Improved student learning was rated as the second most important factor by the non-accredited schools.

As for barriers to use, while both non-accredited and accredited programs rated the lack of time as their most important inhibiting factor, the non-accredited group rated most of the factors in this category somewhat higher than the accredited groups.

Discussion and conclusion

The first research question examined faculty attitudes towards use of technology in accounting education by gender. Examination of the mean ratings of factors influencing or hindering use indicated that unlike previous research findings, which had documented differences by gender among students (Robichaux, 1994; Qureshi and Hoppel, 1995; Whitley, 1997; American Association of University Women, 1998), there are no evidence that attitudes of male and female faculty toward technology differ significantly. Both male and female faculty view issues such as equipment availability, improved student learning, advantages over traditional delivery, and compatibility with existing materials highly important factors in influencing their decisions to use

	Mean ratings			
	Baccalaureate ($N = 157$)	Master's ($N = 163$)	PhD (DBA) ($N = 98$)	Other ($N = 12$)
Factors influencing use				
Ease of use	3.72	3.66	3.62	3.67
Clear advantages over traditional delivery	4.04	3.95	4.03	3.92
Compatibility with existing materials	3.86	3.74	3.68	3.33
Compatibility with course materials	4.00	3.93	3.87	3.75
Increased student interest	3.77	3.69	3.62	3.75
Improved student learning	4.20	4.07	4.04	3.83
Personal interest in technology	3.06	3.10	3.03	3.58
Frequent use by department colleagues	2.21	2.28	2.07	2.25
Administrative pressure	1.88	1.93	1.80	1.58
Equipment availability	4.08	4.02	3.99	3.83
Availability of funds for necessary materials	3.63	3.55	3.57	3.58
Availability of training and technical support for faculty	3.56	3.51	3.44	3.50
Demands of the marketplace	3.58	3.56	3.44	3.75
Time needed for course development and preparation	3.66	3.65	3.79	3.67
Overall	3.52	3.47	3.43	3.43
Barriers to use				
Lack of time	3.46	3.36	3.54	3.25
Lack of interest in technology	1.80	1.77	1.96	2.08
Lack of relevance to course materials	2.97	2.93	3.01	2.83
Lack of contribution to professional advancement	2.22	2.22	2.49	2.33
Lack of latest hardware	2.79	2.70	2.62	3.16
Lack of technological support	3.22	3.10	2.99	3.33
Lack of administrative support	2.73	2.70	2.64	2.67
Lack of required software	3.21	3.04	2.95	3.08
Overall	2.80	2.73	2.77	2.84

Note: 1 = not important, 5 = critically important; N = number of responses in each area

Table X.
Mean ratings of factors influencing or hindering faculty's decision to use instructional technology by business degree offered

technology in education. On the other hand, lack of time, lack of technological support, lack of required software, and lack of relevance to course materials are cited as the most important factors inhibiting use of technology.

The second research question was derived from the proposition that younger people tend to hold a more positive attitude toward technology than older individuals. Younger faculty seem to rate most factors somewhat higher than their older colleagues. Our findings support Morris's (1988/9) contention that age is directly associated with attitudes toward computers. Considering the fact that academic institutions are at the cutting edge of technological developments, appropriate training, technological support and administrative pressure may prove to be some effective tools to bring older faculty up to pace with the new developments in instructional technology.

Consistent with the age-related differences, similar relationships are found between teaching experience and attitudes toward technology. These results support the earlier

	Mean ratings		
	Not AACSB accredited ($N = 117$)	AACSB accredited in business programs ($N = 129$)	AACSB accredited in accounting ($N = 74$)
Factors influencing use			
Ease of use	3.82	3.54	3.55
Clear advantages over traditional delivery	3.97	4.01	3.96
Compatibility with existing materials	3.09	3.66	3.62
Compatibility with course materials	3.91	3.89	3.88
Increased student interest	3.76	3.60	3.54
Improved student learning	4.11	4.09	4.05
Personal interest in technology	3.04	3.09	3.08
Frequent use by department colleagues	2.11	2.20	2.12
Administrative pressure	1.79	1.92	1.93
Equipment availability	4.15	3.98	3.96
Availability of funds for necessary materials	3.93	3.64	3.35
Availability of training and technical support for faculty	3.61	3.46	3.34
Demands of the marketplace	3.54	3.55	3.70
Time needed for course development and preparation	3.70	3.70	3.66
Overall	3.47	3.45	3.41
Barriers to use			
Lack of time	3.53	3.36	3.58
Lack of interest in technology	2.04	1.83	1.90
Lack of relevance to course materials	3.11	2.96	2.85
Lack of contribution to professional advancement	2.28	2.37	2.28
Lack of latest hardware	3.09	2.58	2.24
Lack of technological support	3.44	3.00	2.72
Lack of administrative support	2.95	2.71	2.27
Lack of required software	3.53	2.93	2.61
Overall	3.00	2.72	2.56

Notes: 1 = not important, 5 = critically important; N = number of responses

Table XI.
Mean ratings of factors influencing or hindering faculty's decision to use instructional technology by school accreditation

research findings of Sievert *et al.* (1988), which concluded that use of computers is significantly influenced by years of experience.

Relationships between academic rank and attitudes toward technology were the subject of the next investigation. As was previously expected, significant differences were found among lecturers and other university faculty (i.e. assistant professors, associate professors, and full professors). Unlike other faculty, lecturers seem to be highly concerned about compatibility of technology applications with course materials. In addition, administrative pressure is considered significantly more important for lecturers compared to all other ranks. Among factors inhibiting use, lack of technological and

administrative support are rated significantly higher by lecturers than all other groups. These findings tend to suggest that prior to hiring temporary faculty and lecturers, university administrators or program directors should seek ways to evaluate the candidates' overall technology and computer skills, commensurate with the overall goals and expectations of the university. In addition, appropriate levels of technological and administrative supports should be available to all faculty. It is highly important that individuals responsible for using technology in teaching have proper training, disposition, and objectives, which are consistent with the overall institutional philosophy.

Investigating differences by ethnicity was the subject of the next analysis. It was observed that African Americans' ratings of six factors were significantly different than all other groups. These factors included ease of use of technology, increased student interest, personal interest in technology, equipment availability, availability of training and technical support, and demands of the marketplace. In all of these cases African Americans rated these factors higher than all other ethnic groups. Among barriers for use, it was noted that lack of technology contribution to professional advancement received significantly lower ratings from African Americans than all other ethnic groups. The results herein somewhat corroborate earlier findings demonstrating significant differences between African Americans and white students in attitudes towards use of computers (Sexton *et al.*, 1999).

Significant differences were found among faculty responses by teaching area. For example, while the amount of time needed for course development and preparation was rated most important by those faculty teaching accounting information systems, this factor received significantly lower ratings from all other areas, with the exception of business law professors. Likewise equipment availability, which received one of the highest ratings from professors teaching accounting information systems, auditing, not-for-profit, cost accounting, and taxation, were rated significantly lower by those who teach business law. As with factors inhibiting use of technology, regardless of the area of teaching, lack of time was the highest rated factor.

The final two research questions, examining faculty responses by degree and by AACSB accreditation, showed no significant differences among attitudes toward technology.

At a time when technology is continually changing the way business is being conducted, university faculty and administrators are grappling with the issue of how to provide students with the skills necessary for success in this technology-supported arena. The results of this study demonstrate that while accounting faculty value technology greatly and do use it in their classes; significant differences exist among them in their views toward technology. With the wrong attitude toward technology, it is likely that faculty will resist integration, resulting in a negative impact on students' job preparation and career. As we move forward toward further development of a technology-supported educational system we should not discount faculty concerns regarding the move towards integration. To facilitate this move, administrators may offer appropriate workshops and training seminars designed to provide technical support to all of those who need training and assistance with the use of technology. Faculty with demonstrated evidence of success in integrating technology may lead such seminars. In addition, university-sponsored incentive programs and financial support can be used to encourage faculty to further pursue the use technology and its various dimensions in their classes.

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