
PATTERNS OF INSTRUCTIONAL TECHNOLOGY USE BY FACULTY IN MARKETING: AN EXPLORATORY INVESTIGATION

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ABSTRACT

The present study was undertaken in order to gain a preliminary perspective on the use of technology in academic instruction in Marketing in the United States. The sampling frame consisted of professors and others interested in marketing. A questionnaire addressing usage of various types of classroom hardware, software, and distance education activity, was modified from a previous study of finance professors. A “call for participants” was posted on the American Marketing Association’s e-mail list service (ELMAR) during the fall of 2003. Marketing faculty members were requested to respond to the questionnaire through an Internet homepage, which was accessible via a provided hotlink. Usable responses were received from 102 marketing faculty.

The results indicated that the process of adoption of technology for marketing instruction in the United States is well underway. With respect to hardware, it was found that more than 92% of the respondents employ front-orientation computer projection systems, and over half used the systems in over eighty percent of the class meetings. Very high usage rates were found for presentation and spreadsheet software. It was also discovered that roughly one out of three respondents have taught one or more courses by distance education.

Interesting variations were found among the respondents with respect to implementation of technology as a function of gender and years of teaching experience.

INTRODUCTION

Worldwide, colleges and universities are rapidly accelerating the development of technology-based infrastructures in order to facilitate the use of various forms of technology for instructional purposes. Indeed, a recent survey conducted on behalf of the Campus Computing Project (2003) indicated that U.S. universities are rapidly adopting a variety of technology – based options. As just one example, the results of this survey indicated that 77.2% of participating institutions reported the use of wireless LANS in 2003, as compared to 67.9 % in 2002 and 29.6 % in 2000.

Correspondingly, the literature in Higher Education is replete with reference to the adoption and use of various forms of technology for educational purposes. Nowhere is this trend more apparent than in Colleges of Business. At present, however, there appears to be some difference of opinion concerning the implementation of instructional technology in Higher Education in general and in business curricula in particular. Whereas some authors wholeheartedly embrace the use of technology for instructional purposes (e.g. Reeves, 1998), others voice concern, suggesting that the educational benefits to the student have yet to be adequately assessed and that faculty costs in time may outweigh the benefits of learning new technologies for pedagogical purposes (e.g. Smith, 2001).

Educators in the field of marketing have not remained outside of the debate taking place in higher education more broadly. Like their peers in other fields, marketing faculty are moving toward greater and greater reliance on “technology-enhanced” course instruction (Evans, 2001; Ferrell and Ferrell, 2002). As is true elsewhere in higher education, however, there is little empirical evidence assessing the potential benefits of instructional technology to teach marketing (Malhotra, 2002). Within the marketing education literature, it has been proposed that discussions concerning the merits of implementing instructional technology often suffer from a lack of consensus concerning just what is meant by the term, “Instructional Technology” (Peterson et al., 2002; Malhotra, 2002). Indeed, a variety of specific technology-based techniques have been employed and their relative efficacies discussed. A partial list of technologies employed in marketing instruction includes presentation software such as PowerPoint, faculty websites, e-mail, BlackBoard and WebCT, in classroom and out of classroom use of the Internet, etc. Until there is agreement concerning the meaning of the term “Instructional Technology,” it will be difficult if not impossible to empirically assess the utility and effectiveness of various methods often subsumed under this umbrella. A definition proposed by Malhotra (2002) would appear to capture what may be an emerging consensus within the field of marketing education: “Instructional technology includes hardware and software, tools and techniques that are used directly or indirectly in facilitating, enhancing, and improving the effectiveness and efficiency of teaching, learning, and practicing marketing knowledge”(p.1).

Since a variety of technologies are being employed in an attempt to enhance marketing education and since the relative effectiveness of these techniques may be expected to vary, it would be useful to discover the extent to which these various technologies have penetrated the marketing academy. Although there have been a number of small scale studies assessing the extent of use of various technologies at specific universities (see, for example, the April 2001 issue of the *Journal of Marketing Education* that was devoted to technology and distance learning), there has been little effort directed toward assessing the extent of use by marketing faculty as a whole. A recent qualitative study by Peterson et al. (2002) is noteworthy. This study was based on the response of 61 marketing faculty members to six open-ended questions assessing the use of technology for marketing instruction. Among the findings were that approximately two-thirds of the respondents indicated use of some form of technology (self-defined) for instructional purposes. The present study

represented an effort to conduct a quantitatively based survey of the extent of usage of technology for marketing instruction.

METHODOLOGY

A technology questionnaire containing four sections that address usage of various types of classroom hardware, software usage, distance education activity, and respondent demographics, respectively, was closely patterned after one used in a study of finance faculty (see Cudd, Tanner, and Lipscomb, in press). A “call for participants” message was posted on the American Marketing Association’s e-mail list service (ELMAR, which, at the time of the survey, consisted of 3,200 members). ELMAR subscribers consist of marketing faculty and others who are interested in the field of marketing. The list service was chosen due to its convenience and the lack of funding for conducting a mail survey. ELMAR also provided a means of reaching a current listing of members of the target population. Marketing faculty members were requested to respond to the questionnaire through an Internet homepage, which was accessible via a provided hotlink. Usable responses were received from 102 marketing faculty for a response rate of more than three percent.

RESULTS

Respondent Demographics

The demographic characteristics of the respondents are shown in Table 1. As can be seen from the table, almost three-fourths of the respondents taught at state-supported, public universities, with more than fifty-three percent teaching at schools with enrollments of fifteen thousand students or less; however, more than thirty-two percent were at schools of more than twenty thousand students. With respect to business students, more than fifty-two percent were at schools with two thousand or more students enrolled in the College of Business.

More than eighty percent of the respondents were at universities that are accredited by the AACSB. Forty-seven percent held the rank of assistant or associate professor, and thirty-two percent were full professors. Fifty-nine percent had ten years or less college teaching experience, and more than fifty-four percent were women.

Crosstabulations and chi-square analysis revealed that male respondents tended to be full professors while female respondents tended to be assistant professors, $\chi^2 = 55.68$, $p < .01$. Male professors also tended to have been teaching more than 10 years whereas female professors tended to have been teaching less than 10 years ($\chi^2 = 54.25$, $p < .01$).

Table 1: Sample Demographics			
		n	%
Type of University	State	73	73.0%
	Private	27	27.0%
University Enrollment	Less than 5000	13	12.9%
	5001 – 10000	25	24.7%
	10001 – 15000	16	15.8%
	15001 - 20000	14	13.9%
	More than 20000	33	32.7%
AACSB Accreditation	Accredited	79	80.6%
	Not accredited	19	19.4%
College of Business Enrollment	≤ 1000	14	14.4%
	1000-2000	32	33.0%
	Over 2000	51	52.6%
Academic Rank	Assistant professor	20	20.0%
	Associate professor	27	27.0%
	Full professor	32	32.0%
	Instructor/Lecturer	21	21.0%
Gender	Male	46	45.5%
	Female	55	54.5%
Years Teaching	1-5 years	36	36.0%
	5-10	23	23.0%
	10-15	13	13.0%
	15-20	8	8.0%
	Over 20 years	20	20.0%

Hardware Usage in Marketing Instruction

Table 2 shows the amount of usage of various types of hardware per class during a given semester or quarter by these marketing faculty members. Transparencies have long been used in many classrooms, and the inexpensive and non-technical nature of transparencies likely contributes to their significant usage. However, more than forty-two percent of the marketing faculty do not use these at all, and more than forty-four percent only use it twenty percent of their class time or less.

Types of Hardware Used During Class Time	Percentage of Respondents					
	None of the Time	1-20% of the Time	21-40% of the Time	41-60% of the Time	61-80% of the Time	81-100% of the Time
Overhead Transparencies	42.2	44.1	4.9	5.9	0.0	2.9
VCRs	17.6	75.5	6.9	0.0	0.0	0.0
Camcorders/Digital Cameras	76.2	18.8	3.0	1.0	1.0	0.0
Front-Orientation Computer Projection Systems (e.g., cart-mounted, ceiling-mounted, portable computer projectors, etc.)	7.9	4.0	10.9	10.9	10.9	52.4
Rear-Orientation Computer Projection Systems (e.g., SmartBoards, whiteboards, wall-mounted plasma displays, etc.) Note: These look like an oversized TV.	82.4	7.8	2.0	3.9	1.0	2.9
Wall-Mounted Plasma Display Panels Note: These look like a thin-line TV.	96.0	2.0	1.0	0.0	1.0	0.0
Digital Image Capture Systems (e.g., document camera "Elmo," scan converters, etc.)	61.8	30.4	2.9	2.9	1.0	1.0
Networked Computer Labs	40.6	27.7	14.8	2.0	5.0	9.9

With respect to videocassette recorder (VCR) usage, more than eighty-two percent of the faculty used it forty percent of the time or less in their classes, while more than seventeen percent made no use of them at all. Even though a large part of class time was not used, the wide use of VCRs in marketing classes is not surprising, since many marketing classes focus on promotion, and a study of advertising in various media forms is almost mandatory.

The use of camcorders and digital cameras was less widespread, with more than seventy-six percent not using them at all. Only five percent used them more than twenty percent of their class time.

The extensive shift in marketing instruction to the use of computer image projection is evidenced by the extremely high percentage of marketing faculty employing some variation of this type of device (i.e., front-orientation, rear-orientation, or wall-mounted). Over ninety-two percent of the respondents employ front-orientation computer projection systems, and over half used the systems in over eighty percent of the class meetings.

Front-orientation computer projection systems are the less expensive method of providing computer image projection, and typically involve no more than a computer and projector mounted on a cart for a total cost of roughly \$3,000-4,000. More expensive computer projection system alternatives include rear-orientation systems resembling free standing, over-sized television sets, and wall-mounted plasma display panels that resemble thin-line television sets. These devices often provide digital chalkboard capabilities that enable the instructor to write electronically directly on the image, as well as slightly better imagery. Their excessive costs, which fall in the \$15,000-to-\$25,000 range, contributes to their scarcity and the subsequent low rates of faculty usage indicated in the survey. Only slightly over seventeen percent of the responding faculty report any usage of rear-orientation computer projection systems, and less than four percent employ wall-mounted plasma display units.

Digital image capture systems (also known as document cameras or “Elmos”) function as closed-circuit television cameras and bear a physical resemblance to an overhead transparency projector. Unlike overhead transparency projectors that simply project a visual image through a magnifying lens, digital image capture systems electronically scan the image, convert it to digital form, and then project it to a viewing screen. This process enables the instructor to simply place a newspaper or book under the camera to project an enlarged image electronically. A digital image document camera is typically included as an adjunct to an existing front-orientation projection cart. The relatively high cost of this item as an auxiliary device, roughly \$1,000-2,500, contributes to its scarcity. The simplicity of use, however, makes it attractive to less technologically oriented faculty. Survey responses indicate that slightly more than thirty-eight percent of the respondents use digital image capture systems, and more than seven percent of the responding faculty use such systems in more than twenty percent of the class meetings. The greater availability of digital images that may be captured via the Internet today may also contribute the low usage of digital image capture systems by marketing faculty.

Networked computer labs permit the instructor to guide students through statistical analyses associated with marketing research and other activities for specific marketing course, as well as other coordinated in-class activities requiring computer access. Approximately half of the respondents provide some instruction in networked computer labs, but the bulk of the usage involves no more than 20% of the semester class meetings. Most computer labs are generic with standard spreadsheet software, rather than being specifically dedicated to use by marketing classes, which enhances their availability. Consequently, the use of computer labs for marketing instruction is largely driven by faculty need.

Software Usage in Marketing Instruction (other than distance education software)

Table 3 shows classroom usage percentages of the various types of software (other than distance education software) by the marketing faculty respondents. Ninety-five percent of

responding faculty employ computer presentation software (e.g., PowerPoint), which is consistent with the high usage of front-orientation computer presentation hardware noted earlier. Interestingly, sixty-four percent of the respondents use this type software more than sixty percent of the time in their classes. The use of presentation software is especially beneficial in marketing courses that require graphs tables, pictures, charts, and even slides of notes. Students typically come to class with advanced hard copies of the presentation slides, which permits student attention to be directed to the instructor's lecture, rather than focusing on copying down the projected images. Textbook publishers have also fueled the popularity of presentation software by supplying author-written presentation software for many textbooks.

Types of Software Used During Class Time	Percentage of Respondents					
	None of the Time	1–20% of the Time	21–40% of the Time	41–60% of the Time	61–80% of the Time	81–100% of the Time
Computer Presentation Software	5.0	4.0	8.0	19.0	17.0	47.0
Spreadsheet Software	30.3	56.6	8.1	3.0	0.0	2.0
Database Management Software	85.0	10.0	2.0	1.0	0.0	2.0

While some might argue that spreadsheet analysis is not the primary tool of the marketing manager, the use of spreadsheets is still important when doing statistical comparisons and analyses, such as the comparison of sales figures for different areas and/or making sales forecasts under different conditions. Thus, the relatively high percentage of more than seventy percent of responding faculty using spreadsheet software is expected. Publishers also commonly provide student disks with spreadsheet templates for cases and problems. Consequently, the most common usage rate, which was greater than fifty-six percent, occurs with the minimum of class meetings.

Database management software (e.g., Access) should be of some value in some marketing courses (such as advertising, research, and logistics); however, eighty-five percent of the responding marketing faculty did not use database software at all in their classes. Also, of the fifteen percent that use this type software ten percent use it the minimum of class time.

Distance Education Software and Activity in Marketing Instruction

Some universities are dedicated to course offerings delivered exclusively through distance education (e.g., University of Phoenix). Virtually all universities provide distance education delivery for selected courses, and the trend appears to be toward increasing the percentage of

curricula available online. A breakdown of the number of marketing courses delivered via distance education is displayed in Table 4. Roughly one out of every three marketing faculty members teaches any courses in a distance education environment. Almost seventeen percent of the respondents conduct marketing instruction via distance education for one class, and only around eleven percent conduct distance education for more than one class. The questionnaire, however, did not obtain fractional course information concerning distance education. For example, some courses are offered on a 50/50 basis (i.e., 50% online and 50% in a traditional classroom mode). Consequently, it is possible that some of the above participation percentages may reflect fractional online course activity.

# Distance Education Courses Taught Per Term	Percentage of Respondents
0 Courses	71.6%
1 Course	16.8%
2 Courses	7.4%
3 Courses	0.0%
4 Courses	0.0%
More than 4 Courses	4.2%

In addition to traditional correspondence courses and course lectures offered via the Public Broadcasting System, there are three newer technology-based methods of distance education course delivery. First, many universities sponsor local sites for course offerings managed by intranet software (e.g., BlackBoard or WebCT). This provides an online environment for each student to submit questions, obtain responses (from the instructor or other students), obtain course documents (such as course syllabi, presentation software files, spreadsheet files, data management files, special readings documents, etc.), hold chat sessions with other students, obtain course assignments, submit completed assignments, and check grade status. The accompanying whiteboard software also provides the ability for students and faculty to simultaneously write on the same electronic document. This type of online visual aid supports virtual class meetings held online. Whiteboard software only offers practical support of spontaneous student written replies (i.e., a Socratic environment) if each student is equipped with an electronic writing tablet.

Second, textbook publishers provide similar homepages for each specific textbook offering. These Internet sites provide the same services and offerings as intranet pages, except the publisher provided homepages are national or international in scope, and students nationwide will not all be covering the same chapters at the same time.

A third method of offering courses via distance education is through video conferencing (i.e., compressed video). Compressed video conferencing software (e.g., PictureTel, PolyCom, Net Meeting, etc.) enables students to attend a local physical classroom and receive and interact with an instructor at a remote location through two-way video and audio hardware and software. One deterrent to this mode of distance education is the relatively high cost of offering courses in this manner, which include the usage cost of the communications lines, remote classrooms, and compressed video equipment at all classroom sites.

Table 5 shows the results for distance education activity in instruction. These results may reflect faculty who are offering part or all of their coursework online, as well as those who use the software as a supplement to traditional classroom delivery. Twenty-nine percent of the marketing faculty does not engage in distance education through their local intranet, and only thirty-two percent use this media for supporting more than 40% of the class meetings. Nineteen percent of the faculty who use this media for almost all of the class meetings likely reflects instruction of purely online courses.

Delivery Method	Percentage of Respondents					
	None of the Time	1–20% of the Time	21–40% of the Time	41–60% of the Time	61–80% of the Time	81–100% of the Time
Distance Education Software-Intranet	29.0	31.0	8.0	11.0	2.0	19.0
Distance Education Software-Internet	28.9	39.2	14.4	10.3	1.0	6.2
Distance Education Software-Video Conferencing	91.9	4.1	3.0	1.0	0.0	0.0

More than seventy-one percent of these marketing faculty members use Internet-based software for course instruction, with more than thirty-two percent using the Internet for twenty percent or less of their class meetings. The greater popularity of publisher-based textbook Internet sites may be attributed to several factors. The sites come already tailor-made for the specific textbook, when enhances the ease of their use. Such sites may also offer downloadable author-prepared computer presentation slides and online study quizzes, in addition to the types of materials available with more generic intranet-based homepages.

Video conferencing is rarely practiced in the delivery of finance courses, with only slightly more than eight percent of the faculty using this mode of course delivery, and only four percent using it for more than twenty percent of the class meetings. Again, the relatively high cost may

inhibit this method of course delivery. Lastly, although not included in Table 5, almost one-third of the respondents stated that they used e-mail as their only form of distance education software.

Comparison Tests of Usage

In addition to overall usage rates of various types of hardware, software, and distance education delivery method by marketing faculty, tests of significance were made to determine if usage differed by gender, academic rank, type of institution (i.e., whether the respondent taught at private or public universities), and years of teaching experience. Table 6 shows the results of significance tests of usage as a function of gender. Because certain usage categories had a limited number of respondents, the highest four usage categories were collapse into one “More than 20% of the time” category, so as to facilitate the use of chi-square independence of classification analysis. This will be the case for all subsequent analyses. The analysis revealed that significantly more of the female marketing faculty members reported using transparencies in their classes in the 1-20 percent category, and significantly more males using overheads in the more than 20 percent category ($\chi^2 = 6.287$, $p = .043$). No other significant differences in classroom usage frequency as a function of gender for hardware were found. It is apparent, however, that, overall, both genders made relatively high use of VCRs and front-orientation computer projection systems, while little use was made of such hardware items as camcorders/ digital cameras, rear-orientation computer projection systems, wall-mounted plasma display panels, and digital image capture systems.

Both female and male marketing faculty make extensive use of computer presentation software and spreadsheet software. However, neither gender spent much time on database management software in their classes.

Females make significantly greater use of the intranet software in their distance education classes ($\chi^2 = 8.0$, $p = .018$). In fact, more than forty percent of the males did not use the intranet at all. Also, more than seventy-five percent of the females and sixty-five percent of the males made some use of the internet, while very little use of video conferencing software for distance education was made by either gender.

Table 6: Comparison of Technology based on Gender				
	Percent of Respondents		χ^2	p-value
	Females	Males		
Types of Hardware Used During Class Time				
Overhead Transparencies:				
0 percent of the time	43.6%	41.3%	6.287	.043*
1 – 20% of the time	50.9%	37.0%		
More than 20% of the time	5.5%	21.7%		

Table 6: Comparison of Technology based on Gender				
	Percent of Respondents		χ^2	p-value
	Females	Males		
VCRs:				
0 percent of the time	16.4%	19.6%	0.662	.718
1 – 20% of the time	78.2%	71.7%		
More than 20% of the time	5.5%	8.7%		
Camcorders/Digital Cameras:				
0 percent of the time	70.9%	82.2%	2.190	.334
1 – 20% of the time	21.8%	15.6%		
More than 20% of the time	7.3%	2.2%		
Front-Orientation Computer Projection Systems (e.g., cart-mounted, ceiling-mounted, portable computer projectors, etc.):				
0 percent of the time	9.1%	6.7%	5.188	.075
1 – 20% of the time	0.0%	8.9%		
More than 20% of the time	90.9%	84.4%		
Rear-Orientation Computer Projection Systems (e.g., SmartBoards, whiteboards, wall-mounted plasma displays, etc.; note: These look like an oversized TV.):				
0 percent of the time	80.0%	84.8%	4.434	.109
1 – 20% of the time	12.7%	2.2%		
More than 20% of the time	7.3%	13.0%		
Wall-Mounted Plasma Display Panels (Note: These look like a thin-line TV.):				
0 percent of the time	96.4%	95.7%	0.033	.983
1 – 20% of the time	1.8%	2.2%		
More than 20% of the time	1.8%	2.2%		
Digital Image Capture Systems (e.g., document camera “Elmo,” scan converters, etc.):				
0 percent of the time	61.8%	60.9%	0.070	.966
1 – 20% of the time	30.9%	30.4%		
More than 20% of the time	7.3%	8.7%		
Networked Computer Labs:				
0 percent of the time	41.8%	37.8%	1.180	.554
1 – 20% of the time	23.6%	33.3%		
More than 20% of the time	34.6%	28.9%		

Table 6: Comparison of Technology based on Gender				
	Percent of Respondents		χ^2	p-value
	Females	Males		
Types of SOFTWARE Used During Class Time				
Computer Presentation Software:				
0 percent of the time	1.9%	8.9%	4.194	.123
1 – 20% of the time	1.9%	6.7%		
More than 20% of the time	96.2%	84.4%		
Spreadsheet Software:				
0 percent of the time	26.4%	35.6%	1.037	.595
1 – 20% of the time	60.4%	51.1%		
More than 20% of the time	13.2%	13.3%		
Database Management Software:				
0 percent of the time	85.2%	84.4%	0.548	.760
1 – 20% of the time	11.1%	8.9%		
More than 20% of the time	3.7%	6.7%		
Delivery Method (For Distance Education)				
Distance Education Software-Intranet:				
0 percent of the time	16.7%	42.2%	8.000	.018*
1 – 20% of the time	35.2%	26.7%		
More than 20% of the time	48.1%	31.1%		
Distance Education Software-Internet:				
0 percent of the time	24.5%	34.9%	1.598	.450
1 – 20% of the time	43.4%	37.8%		
More than 20% of the time	32.1%	32.6%		
Distance Education Software-Video Conferencing:				
0 percent of the time	94.3%	88.9%	5.495	.064
1 – 20% of the time	5.7%	2.2%		
More than 20% of the time	0.0%	8.9%		
*Significant at $\alpha=.05$				

Table 7 shows the results of significance tests for differences in usage by academic rank. The two groups were full professors and associate professors (the higher/senior ranking faculty)

versus assistant professors and instructors or lower (the lower/junior ranking faculty). With respect to hardware, the full professors and associate professors use rear orientation computer projection systems more than the assistant professor and lower-ranked faculty, ($\chi^2 = 7.068$, $p = .029$) although neither group makes what could be termed extensive use of such hardware. More than half of both groups make some use of overhead transparencies, and more than eighty percent of both groups make some use of VCRs and front-orientation projection systems in their classes, while neither group makes much use of wall-mounted plasma display panels or digital image capture systems.

With respect to software usage, marketing faculty of upper and lower ranks make relatively extensive use of computer spreadsheet software and spreadsheet software with no significant difference between the two groups. Neither group made extensive use of database management software.

With respect to delivery methods used for distance education, marketing faculty at both the higher and lower academic ranks were relatively evenly-distributed concerning the use of intranet and internet delivery systems while neither group made very much use of video conferencing.

Table 7: Comparison of Technology based on Rank				
Types of Hardware Used During Class Time	Percent of Respondents		χ^2	p-value
	Full/Assoc. Professors	Assistant Professors or Lower		
Overhead Transparencies:				
0 percent of the time	44.7%	41.5%	3.873	.144
1 – 20% of the time	36.2%	50.9%		
More than 20% of the time	19.1%	7.6%		
VCRs:				
0 percent of the time	17.0%	18.9%	0.340	.844
1 – 20% of the time	74.5%	75.5%		
More than 20% of the time	8.5%	5.6%		
Camcorders/Digital Cameras:				
0 percent of the time	72.3%	78.7%	0.655	.821
1 – 20% of the time	21.3%	17.3%		
More than 20% of the time	6.4%	3.8%		

Table 7: Comparison of Technology based on Rank				
Types of Hardware Used During Class Time	Percent of Respondents		χ^2	p-value
	Full/Assoc. Professors	Assistant Professors or Lower		
Front-Orientation Computer Projection Systems (e.g., cart-mounted, ceiling-mounted, portable computer projectors, etc.):				
0 percent of the time	12.8%	1.9%	5.970	.051
1 – 20% of the time	6.4%	1.9%		
More than 20% of the time	80.8%	86.2%		
Rear-Orientation Computer Projection Systems (e.g., SmartBoards, whiteboards, wall-mounted plasma displays, etc.; note: These look like an oversized TV.):				
0 percent of the time	76.6%	88.7%	7.068	.029*
1 – 20% of the time	6.4%	9.4%		
More than 20% of the time	17.0%	1.9%		
Wall-Mounted Plasma Display Panels (Note: These look like a thin-line TV.):				
0 percent of the time	91.4%	100.0%	4.699	.095
1 – 20% of the time	4.3%	0.0%		
More than 20% of the time	4.3%	0.0%		
Digital Image Capture Systems (e.g., document camera “Elmo,” scan converters, etc.):				
0 percent of the time	59.6%	62.3%	2.867	.239
1 – 20% of the time	27.7%	34.0%		
More than 20% of the time	12.7%	3.7%		
Networked Computer Labs:				
0 percent of the time	32.6%	47.2%	2.307	.317
1 – 20% of the time	30.4%	26.4%		
More than 20% of the time	37.0%	26.4%		
Types of SOFTWARE Used During Class Time				
Computer Presentation Software:				
0 percent of the time	8.7%	1.9%	3.806	.149
1 – 20% of the time	6.5%	1.9%		
More than 20% of the time	84.8%	96.2%		

Table 7: Comparison of Technology based on Rank				
Types of Hardware Used During Class Time	Percent of Respondents		χ^2	p-value
	Full/Assoc. Professors	Assistant Professors or Lower		
Spreadsheet Software:				
0 percent of the time	37.8%	23.1%	2.648	.266
1 – 20% of the time	48.9%	63.4%		
More than 20% of the time	13.3%	13.5%		
Database Management Software:				
0 percent of the time	80.4%	88.5%	2.418	.299
1 – 20% of the time	10.9%	9.6%		
More than 20% of the time	8.7%	1.9%		
DELIVERY METHOD (for distance education):				
Distance Education Software-Intranet:				
0 percent of the time	34.0%	23.5%	1.448	.485
1 – 20% of the time	27.7%	35.3%		
More than 20% of the time	38.3%	41.2%		
Distance Education Software-Internet:				
0 percent of the time	33.3%	26.0%	1.207	.547
1 – 20% of the time	33.4%	44.0%		
More than 20% of the time	33.3%	30.0%		
Distance Education Software-Video Conferencing:				
0 percent of the time	87.0%	96.0%	2.659	.265
1 – 20% of the time	6.5%	2.0%		
More than 20% of the time	6.5%	2.0%		
*Significant at $\alpha=.05$				

Table 8 shows the results of significance tests for difference in usage as a function of teaching at public, state-supported universities or at private universities. Marketing faculty respondents at private universities make significantly more use of VCRs ($\chi^2 = 8.091$, $p = .017$) and camcorders/digital cameras ($\chi^2 = 7.422$, $p = .024$) than do their counterparts at the public, state-supported universities. Other than these two types of hardware there were no significant differences by type of hardware, software, or distance education software delivery used. Faculty at both public and private universities make relatively heavy use of front-orientation computer projection systems

and computer presentation software, and relatively light use of wall-mounted plasma display panels, digital image capture systems, spreadsheet and database management software, and videoconferencing as a means of delivering distance education.

Table 8: Comparison of Technology based on Type of University

Types of Hardware Used During Class Time	Percent of Respondents		χ^2	p-value
	Public	Private		
Overhead Transparencies:			1.849	.397
0 percent of the time	42.5%	44.5%		
1 – 20% of the time	47.8%	37.0%		
More than 20% of the time	9.7%	18.5%		
VCRs:			8.091	.017*
0 percent of the time	20.6%	11.1%		
1 – 20% of the time	76.7%	70.4%		
More than 20% of the time	2.7%	18.5%		
Camcorders/Digital Cameras:			7.422	.024*
0 percent of the time	79.2%	66.7%		
1 – 20% of the time	19.4%	18.5%		
More than 20% of the time	1.4%	14.8%		
Front-Orientation Computer Projection Systems (e.g., cart-mounted, ceiling-mounted, portable computer projectors, etc.):				
0 percent of the time	9.7%	3.7%	1.926	.382
1 – 20% of the time	2.8%	7.4%		
More than 20% of the time	87.5%	88.9%		
Rear-Orientation Computer Projection Systems (e.g., SmartBoards, whiteboards, wall-mounted plasma displays, etc.; note: These look like an oversized TV.):				
0 percent of the time	84.9%	74.1%	2.476	.290
1 – 20% of the time	5.5%	14.8%		
More than 20% of the time	9.6%	11.1%		
Wall-Mounted Plasma Display Panels (Note: These look like a thin-line TV.):				
0 percent of the time	97.2%	92.6%	1.118	.572
1 – 20% of the time	1.4%	3.7%		
More than 20% of the time	1.4%	3.7%		

Table 8: Comparison of Technology based on Type of University				
Types of Hardware Used During Class Time	Percent of Respondents		χ^2	p-value
	Public	Private		
Digital Image Capture Systems (e.g., document camera "Elmo," scan converters, etc.):				
0 percent of the time	61.6%	59.3%	0.488	.783
1 – 20% of the time	31.5%	29.6%		
More than 20% of the time	6.9%	11.1%		
Networked Computer Labs:				
0 percent of the time	38.4%	46.2%	2.855	.240
1 – 20% of the time	24.7%	34.6%		
More than 20% of the time	37.0%	19.2%		
Types of Software Used During Class Time				
Computer Presentation Software:				
0 percent of the time	4.2%	7.4%	1.528	.466
1 – 20% of the time	2.8%	7.4%		
More than 20% of the time	93.0%	85.2%		
Spreadsheet Software:				
0 percent of the time	28.6%	37.0%	0.887	.642
1 – 20% of the time	58.6%	48.1%		
More than 20% of the time	12.9%	14.8%		
Database Management Software:				
0 percent of the time	87.3%	77.8%	2.878	.237
1 – 20% of the time	7.0%	18.5%		
More than 20% of the time	5.6%	3.7%		
DELIVERY METHOD (for distance education)				
Distance Education Software-Intranet:				
0 percent of the time	25.4%	33.3%	0.836	.658
1 – 20% of the time	33.8%	25.9%		
More than 20% of the time	40.8%	40.8%		
Distance Education Software-Internet:				
0 percent of the time	27.5%	30.8%	0.285	.867
1 – 20% of the time	40.6%	34.6%		
More than 20% of the time	31.9%	34.6%		

Types of Hardware Used During Class Time	Percent of Respondents		χ^2	p-value
	Public	Private		
Distance Education Software-Video Conferencing:				
0 percent of the time	91.4%	92.6%	0.035	.983
1 – 20% of the time	4.3%	3.7%		
More than 20% of the time	4.3%	3.7%		
*Significant at $\alpha=.05$				

Table 9 shows the results of significance tests on amount of usage of hardware, software, and distance education delivery software as a function of years of teaching experience by the marketing faculty respondents. Although both faculty with more than ten years teaching experience and those with ten years or less experience make relatively low use of classroom time using rear-orientation computer projection systems, those with relatively more experience use this type hardware significantly more than those with ten years experience or less ($x^2 = 6.084$, $p = .048$). Similarly, those faculty members with relatively more teaching experience make more frequent use of wall-mounted plasma displays ($x^2 = 5.996$, $p = .05$). With respect to all other types of hardware, software, and all types of distance education delivery software, no significant differences were found between the more experienced marketing faculty respondents and those with less experience.

Types of Hardware Used During Class Time	Percent of Respondents		χ^2	p-value
	10 Years or Less	More than 10 Years		
Overhead Transparencies:				
0 percent of the time	40.7%	46.4%	0.714	.700
1 – 20% of the time	47.4%	39.0%		
More than 20% of the time	11.9%	14.6%		
VCRs:				
0 percent of the time	18.6%	17.1%	0.818	.664
1 – 20% of the time	76.3%	73.2%		
More than 20% of the time	5.1%	9.7%		

Table 9: Comparison of Technology based on Years of Teaching Experience				
Types of Hardware Used During Class Time	Percent of Respondents		χ^2	p-value
	10 Years or Less	More than 10 Years		
Camcorders/Digital Cameras:				
0 percent of the time	75.9%	75.6%	0.876	.645
1 – 20% of the time	20.7%	17.1%		
More than 20% of the time	3.4%	7.3%		
Front-Orientation Computer Projection Systems (e.g., cart-mounted, ceiling-mounted, portable computer projectors, etc.):				
0 percent of the time	3.4%	12.2%	5.014	.081
1 – 20% of the time	1.7%	7.3%		
More than 20% of the time	94.8%	80.5%		
Rear-Orientation Computer Projection Systems (e.g., SmartBoards, whiteboards, wall-mounted plasma displays, etc.; note: These look like an oversized TV.):				
0 percent of the time	86.4%	78.0%	6.084	.048*
1 – 20% of the time	10.2%	4.9%		
More than 20% of the time	3.4%	17.1%		
Wall-Mounted Plasma Display Panels (Note: These look like a thin-line TV.):				
0 percent of the time	100.0%	90.2%	5.996	.050
1 – 20% of the time	0.0%	4.9%		
More than 20% of the time	0.0%	4.9%		
Digital Image Capture Systems (e.g., document camera “Elmo,” scan converters, etc.):				
0 percent of the time	62.7%	58.5%	1.665	.435
1 – 20% of the time	32.2%	29.3%		
More than 20% of the time	5.1%	12.2%		
Networked Computer Labs:				
0 percent of the time	45.8%	32.5%	1.928	.381
1 – 20% of the time	27.1%	30.0%		
More than 20% of the time	27.1%	37.5%		

Table 9: Comparison of Technology based on Years of Teaching Experience				
Types of Hardware Used During Class Time	Percent of Respondents		χ^2	p-value
	10 Years or Less	More than 10 Years		
Types of Software Used During Class Time				
Computer Presentation Software:				
0 percent of the time	1.7%	10.0%	5.628	.060
1 – 20% of the time	1.7%	7.5%		
More than 20% of the time	96.6%	82.5%		
Spreadsheet Software:				
0 percent of the time	22.4%	41.0%	3.998	.135
1 – 20% of the time	63.8%	46.2%		
More than 20% of the time	13.8%	12.8%		
Database Management Software:				
0 percent of the time	84.5%	85.0%	1.247	.536
1 – 20% of the time	12.1%	7.5%		
More than 20% of the time	3.4%	7.5%		
Delivery Method (for distance education):				
Distance Education Software-Intranet:				
0 percent of the time	21.1%	39.0%	3.775	.151
1 – 20% of the time	35.1%	26.8%		
More than 20% of the time	43.9%	34.1%		
Distance Education Software-Internet:				
0 percent of the time	25.5%	35.0%	1.047	.592
1 – 20% of the time	41.8%	35.0%		
More than 20% of the time	32.7%	30.0%		
Distance Education Software-Video Conferencing:				
0 percent of the time	91.2%	92.5%	0.566	.753
1 – 20% of the time	5.3%	2.5%		
More than 20% of the time	3.5%	5.0%		
*Significant at $\alpha=.05$				

DISCUSSION

As expected, the results indicate that, in general, marketing faculty have begun to make considerable use of technological innovations to supplement their instructional efforts. Indeed, in some cases, the product adoption process appears to be well underway. For example, among those members of the AMA who responded, an extraordinarily high percentage (92.1%) makes some regular use of front-oriented computer projection devices in the classroom. Clearly, the nature of equipment provided by the university is a major factor in the adoption of the technology by faculty. Although beyond the scope of the present study, it would be interesting to explore the process of institutional adoption of technology at universities in order to discover how purchasing decisions are made. For example, how much impact do faculty have in equipping labs and classrooms? The current results indicate that relatively more expensive projection systems such as rear-oriented and wall-mounted systems are used by much smaller percentages of faculty members. Cost barriers are likely a major factor in this trend. Front-orientation computer projection systems are the less expensive method of providing computer image projection, and typically involve no more than a computer and projector mounted on a cart for a total cost of roughly \$3,000-4,000. More expensive computer projection system alternatives include rear-orientation systems resembling free standing, over-sized television sets, and wall-mounted plasma display panels that resemble thin-line television sets. These devices often provide digital chalkboard capabilities that enable the instructor to write electronically directly on the image, as well as slightly better imagery. Their relatively high costs, which fall in the \$15,000-to-\$25,000 range, likely contributes to their scarcity and the subsequent low rates of faculty usage indicated in the survey.

The present results also indicate a low rate of usage for digital image capture systems (also known as document cameras or “Elmos”). Such systems function as closed-circuit television cameras and bear a physical resemblance to an overhead transparency projector. Unlike overhead transparency projectors that simply project a visual image through a magnifying lens, digital image capture systems electronically scan the image, convert it to digital form, and then project it to a viewing screen. This process enables the instructor to simply place a newspaper or book under the camera to project an enlarged image electronically. A digital image document camera is typically included as an adjunct to an existing front-orientation projection cart. The relatively high cost of this item as an auxiliary device, roughly \$1,000-2,500, likely contributes to its scarcity as well. The simplicity of use, however, may make it relatively attractive to less technologically oriented faculty. Approximately half of the respondents reported some degree of use of networked computer labs in their courses. The majority of these reported patterns of usage of less than 20% of the course. Networked computer labs permit the instructor to guide students through statistical analyses associated with marketing research and other activities for specific marketing courses, as well as other coordinated in-class activities requiring computer access. Most universities provide more

generically oriented lab facilities appropriate for use by multiple disciplines and not specific to the marketing profession.

With respect to software, 95% of those responding indicated the regular use of computer presentation software such as PowerPoint. Of these, 64% reported using such software more than 60% of the time in their courses. This suggests the utility of such a delivery method in teaching marketing concepts. Textbook publishers have also fueled the popularity of presentation software by supplying complimentary presentation software for many textbooks. Lindstrom (1998) notes that PowerPoint controls over 93% of the presentation software market in the world.

While some might argue that spreadsheet analysis is not the primary tool of the marketing manager, the use of spreadsheets is still important when doing statistical comparisons and analyses, such as the comparison of sales figures for different areas and/or making sales forecasts under different conditions. Publishers also commonly provide student disks with spreadsheet templates for cases and problems. Nearly 70% of respondents indicated some degree of usage of such software. By the same token, much lower percentages of use were reported for database management software (e.g. Access). Since availability is likely not an issue, this suggests that these programs are not as useful in the teaching of marketing. However, if more marketing programs integrate the growing topic of customer relationship management (CRM), with its emphasis on database mining, we may see an increased use of database management software in marketing classes. As this study was patterned after an earlier one (Cudd, Tanner, and Lipscomb, in press), the use of data mining was not explored in the present study. This is a topic that should be included in future investigations.

Some universities are dedicated to course offerings delivered exclusively through distance education (e.g., University of Phoenix). Virtually all universities provide distance education delivery for selected courses, and the trend appears to be toward increasing the percentage of curricula available online. Interestingly, nearly a third of the marketing faculty members responding indicated that they are involved or have been involved in using distance learning technology to teach at least one course while 71.6% have not done so. In addition to traditional correspondence courses and course lectures offered via the Public Broadcasting System, there are three newer technology-based methods of distance education course delivery. First, many universities sponsor local sites for course offerings managed by intranet software (e.g., BlackBoard or WebCT). This provides an online environment for each student to submit questions, obtain responses (from the instructor or other students), obtain course documents (such as course syllabi, presentation software files, spreadsheet files, data management files, special readings documents, etc.), hold chat sessions with other students, obtain course assignments, submit completed assignments, and check grade status. The accompanying whiteboard software also provides the ability for students and faculty to simultaneously write on the same electronic document. This type of online visual aid supports virtual class meetings held online. Whiteboard software only offers practical support of spontaneous student written replies (i.e., a Socratic environment) if each student is equipped with an electronic writing tablet.

Second, textbook publishers provide similar homepages for each specific textbook offering. These Internet sites provide the same services and offerings as intranet pages; except the publisher-provided homepages are national or international in scope, and students nationwide will not all be covering the same chapters at the same time. A third method of offering courses via distance education is through video conferencing (i.e., compressed video). Compressed video conferencing software (e.g., PictureTel, PolyCom, Net Meeting, etc.) enables students to attend a local physical classroom and receive and interact with an instructor at a remote location through two-way video and audio hardware and software. One deterrent to this mode of distance education is the relatively high cost of offering courses in this manner, which include the usage cost of the communications lines, remote classrooms, and compressed video equipment at all classroom sites.

A number of interesting patterns are apparent in the data as a function of demographic characteristics of the respondents. One of the most intriguing of these relates to gender differences in technology usage patterns. For example, female faculty members report making significantly greater use of computer presentation software as compared to their male counterparts. It is interesting that a previous investigation found the same pattern among Finance faculty members (Cudd, Tanner, and Lipscomb, in press). Women in the present sample also report significantly greater use of intranet software in teaching distance education classes. There were, however, no significant differences between male and female faculty members with respect to the various types of hardware employed. Although the specific reasons underlying gender-based differences in technology usage are unclear, it is noted that differences were also found as a function of both academic rank and years of teaching experience. In the present sample women tended to report fewer years total teaching experience and more junior academic rank as compared to men.

As mentioned, differences in technology usage patterns were also found as a function of academic rank. Specifically, it was found that junior faculty members (assistant professors and instructors) make significantly greater use of front oriented computer projection systems than do senior faculty member (professors and associate professors) whereas senior faculty make relatively greater use of rear-oriented projection equipment. In addition, senior faculty make relatively greater use of networked computer labs as compared to more junior faculty members with usage in neither case exceeding 40%.

Years of experience also found to be related to patterns of technology usage. Significant differences were found in comparing those with more than ten years of teaching experience with those with ten years or less experience. Those with relatively less experience reported both using front-oriented projection systems and computer presentation software more than did those with more experience. On the other hand, more experience faculty members reported using wall-mounted plasma projection and networked computer labs more than did less experienced faculty members but overall usage was rather low in both cases.

In order to better understand the present findings, the significant relationships among gender, rank, and years teaching, is worthy of discussion. Since women in the present sample tended to be

assistant professors and have spent less time in the college teaching profession, gender-based differences in technology utilization may be a function of more recent training. That is, more recent entrants into the “marketing academy” may have had greater exposure to and greater expertise with the use of technology for instructional purposes. The possibility that this is the case is worthy of further investigation in future studies.

Rogers’ views on the diffusion of innovation apply here: “A technological innovation usually has at least some degree of benefit for its potential adopters, but this advantage is not always clear cut to those intended adopters. They are seldom certain that an innovation represents a superior alternative to the previous practice that it would replace, at least when they learn about it” (Rogers 2003, p. 14). As marketing professors become better acquainted with the new technological innovations and as more universities acquire and make these available to faculty it is likely that we will see diminished use of some “old friends” like transparencies, overhead projectors, VCRs, and camcorders in favor of these newer innovations. Many of the newer technologies incorporate features of some of the older ones. For instance, Smart Boards allow the projection of videotapes through connecting VCRs. Wireless technologies may soon make even more radical changes in our classroom. As was noted above, more than $\frac{3}{4}$ of participating institutions have already established wireless LANS (Campus Computing Project, 2003)

There are several limitations of this study. These include self-selection bias, sample size, and the lack of sampling error measurement from the use of a web-based survey. All of these suggest that caution is in order in generalizing the present findings to marketing faculty as a whole. One participant commented in an e-mail message to one of the authors that the wording of our opening question is problematic. It would have been better to ask professors to focus on a particular semester, rather than on semester class time in general. Answers might vary greatly from semester to semester, depending on several factors. Thus, the question wording should be considered another limitation of this study. Never the less, the present exploratory study may have considerable value in serving as a benchmark against which future research can gauge trends in technology adoption and use for the purposes of instruction in marketing.

Just as professors become more comfortable with collecting data over the Internet rather than via the telephone or mail, we also become more comfortable using the technological innovations that come into our classrooms. One key question, though, that has not been addressed, and probably should be, is this: with all the new technology, are marketing departments (and deans) prepared to provide the financial support and technical training that will be required (mandated?) by all these technological pedagogical enhancements? Time will tell.

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