FACTORS RELATED TO TECHNOLOGY INTEGRATION IN INSTRUCTION BY MARKETING EDUCATION TEACHERS

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ABSTRACT

This study addressed how technology was being integrated in the teaching/ learning process in secondary marketing education programs for four distinct and independent phases: Exploration, Experimentation, Adoption, and Advanced Integration. The study was based on the Kotrlik/Redmann Technology Integration Model©. The phases in which marketing teachers are most active are exploration of the potential of using technology in the teaching/learning process, and adopting technology for regular use in instruction; they are functioning at a fairly strong level in both phases. They are not very active in the experimentation phase, but they are operating at a moderate level in the advanced integration phase. Teachers perceive that minor barriers exist that prevent them from integrating technology into the teaching/learning process and they perceive they are good teachers. Marketing teachers are not experiencing anxiety when attempting to integrate technology into the teaching/learning process. Teachers' technology anxiety, and their perceptions of their own teaching

INTRODUCTION

Advances in technology have had a tremendous impact on society. The Internet has changed how we communicate, learn, and conduct our business and personal affairs. Shinn (2001) noted that some Internet search engines can search 1.3 billion unique web addresses, search the equivalent of a 70-mile high stack of paper, or locate 14 million web pages about learning in less than one second.

In the educational community, the level of technology integration can deeply affect what teachers do and what their students experience. Within the last two decades, affordable technology has allowed schools to experience a growing investment in technology for the teaching/learning process. Because technology is changing so rapidly, it ". . . . is causing more and more confusion about the best way to use it in schools" (Bailey, 1997, p. 57). The ways that teachers incorporate technology into their teaching and classroom may deeply affect what they do and what their students experience (Sheingold & Hadley, 1990).

Because of technological advances, many of the old ways of doing things may be effective but not efficient. Learners need to acquire lifelong-learning skills and the ability to cope with

constantly changing workplaces. "Today's students need not only to know how to learn, but how to analyze and summarize data, make decisions, work in teams, plan solutions to complex problems and be capable of adapting to the unexpected" (Dwyer, 1999, p. 300). Dwyer noted that the traditional learning paradigm is still being used in which teachers lecture while students listen, take notes and demonstrate mastery on objective exams. This paradigm may not provide learners with all the necessary knowledge, skills, and attitudes (KSAs) for a rapidly changing global community. Dwyer stated that technology-based learning environments can help students acquire the type of KSAs needed for success, for example, cooperative team projects via e-mail and the Internet, electronic discussion, experiential learning activities via specialized software, simulation of real-life observation experiences, computerized movies with interactive check sheets, and practice activities for developing decision-making, problem-solving, and management skills.

"If the integration of technology in the classroom in the next ten years is to look any different from the last ten . . . ," the educational community " . . . must focus time, money, and resources in the areas that can have the greatest impact for our students, our teachers" (Fabry & Higgs, 1997, p. 393). To determine where technology can have the greatest impact in the classroom, research is needed. In fact, several of the top rated topics identified by Rader and Wilhelm (2001) are directly related to technology integration in the teaching/learning process. One topic asked, how does technology instruction with group support systems compare to traditional instruction? Another topic queried, are there differences in achievement with distance learning versus classroom learning?

Related Literature

Extent to Which Technology Has Been Integrated into the Teaching-Learning Process

The Office of Technology Assessment's 1995 report on teachers and technology indicated that schools have made significant progress in implementing technology to help teachers use basic technology tools but they still struggle with integrating technology into the curriculum. "Curriculum integration is central if technology is to become a truly effective educational resource, yet integration is a difficult, time consuming, and resource-intensive endeavor" (p. 1).

"Technology can play a vital role in helping students meet higher standards and perform at increased levels by promoting alternative, innovative approaches to teaching and learning" (George, 2000, p. 57). Glenn (1997) stated that public support for technology in schools is ". . . . strong and vocal, and there is an expectation that no school can prepare students for tomorrow's society if new technologies are not available for students" (p. 123). Glenn maintained that teacher training has focused on " . . . . word processing, test construction, automated transparency creation, and grading rather than creating a different learning environment" (p. 126). However, the National Center for Education Statistics (2000) studied the integration of various technologies in the teaching/learning process. The Center reported the following examples of how teachers had integrated technology: 44% reported using technology for classroom instruction, 42% reported using computer applications, 12% reported using practice drills, 41% reported requiring research using the Internet, 20% required students to use technology to solve problems and analyze data, 27% had students conduct research using CD-ROMs, 27% assigned students to produce multimedia reports/projects, 23%

assigned graphical presentations of materials, 21% assigned demonstrations/simulations, and 7% assigned students to correspond with others over the Internet.

Sandholtz, Ringstaff, and Dwyer (1997) described an evolutionary process that teachers go through as they continue to increase their use of technology. They described five phases: 1) Entry – teachers adapt to changes in physical environment created by technology; 2) Adoption - teachers use technology to support text-based instruction; 3) Adaptation – teachers integrate the use of word processing and databases into the teaching process; 4) Appropriation – teachers change their personal attitudes toward technology; and 5) Invention – teachers have mastered the technology and create novel learning environments. Sheingold and Hadley (1990) found that teachers needed five to six years of working with technology before they felt they had developed their expertise, and when they reached this level, they modified instructional strategies and dramatically changed the classroom environment.

BARRIERS TO THE IMPLEMENTATION OF TECHNOLOGY IN THE TEACHING-LEARNING PROCESS
Several authors have written about barriers to the implementation of technology. Kerr (1989) stated that " . . . . the teacher's world is substantially limited by powerful social and administrative pressures to teach in a particular way" (p. 7). In his 1997 article, Glenn supported Kerr by noting that the organizational structure of schools inhibits teachers' efforts to learn about new technologies and resists innovation, for example, the limited " . . . amount of time available to teachers to learn about new technology" (p. 127).

In a review of several meta-analyses by Fabry and Higgs (1997), it was found that the major issues in the implementation and integration of technology in the teaching/learning process were: resistance to change, teachers' attitudes, training, time, access, and cost. This research finding is supported by a study by Smerdon, Cronen, Lanahan, Anderson, Iannotti, and Angeles (2000) for the National Center for Education Statistics in which they found that the barriers to the use of the Internet and computers for instruction included lack of computers, lack of release time for teachers to learn how to use technology, and lack of time in the school schedule for student computer use. This research finding was also supported by George (2000) who indicated that the primary obstacle in incorporating technology in the teaching/ learning process is the lack of expertise, time, and funds.

Budin (1999) stated that, until recently, schools had their priorities backwards. They were more concerned with acquiring equipment and software rather than emphasizing staff development and planning for the integration of technology. Budin questioned what will happen to support for technology integration in the future if funding for technology integration results in test scores, student writing, and other measures that fail to live up to expectations. Budin indicated that curriculum, teacher training, and research have received minimal attention. He also indicated that the use of technology needs to be reconceptualized in areas such as students and teachers' roles in using technology, how technology fits into the curriculum, what teachers should know and how teachers will learn about technology, and how we should assess the impact of technology.

Bosch (1993) reported that teachers did not see computers as part of the normal classroom process and often used them for ancillary activities. He recommended that administrators look beyond the number of computers in schools and determine whether real integration across the curriculum had occurred. A Rand Corporation Study (Berman & McLaughlin,

1978) found that innovations tend to fail when they are implemented without considering the complex social nature of schools. The authors stressed it is not enough to simply make teachers better or more efficient–they must like new technology better than what they already had.

RELATIONSHIP OF TEACHING EFFECTIVENESS TO TECHNOLOGY INTEGRATION

A critical element in technology integration is its relationship to teaching effectiveness. Lu and Molstad (1999) defined instruction as ". . . . the process including all the activities purported to influence learners toward some predetermined goal" (169). Lu and Molstand (1999) cited ways technology can improve instructional effectiveness, including 1) multimedia packages that allow teachers to interact with large groups, lead discussions, individualize instruction, and direct student attention to key details in the presentation; 2) telecommunication tools that allow teachers to communicate with students and other teachers, encouraging articulation of ideas and collaboration; 3) technology enhances students' problem-solving ability; and 4) technology motivates students to learn. "Education technology has been found to have positive effects on student attitudes toward learning and on student self-concept. Students felt more successful in school, were more motivated to learn and have increased self-confidence and self-esteem when using computer-based instruction" (Institute for the Transfer of Technology to Education, 2002, ¶ 41).

Byron (1995) listed several shortcomings related to teacher effectiveness when using technology in instruction. These shortcomings included the lack of faculty training on the use in instructional technology, classrooms that were not designed to support the use of technology, teachers' doubts about whether technology would improve their performance, and teachers' concerns about whether technology enhances or detracts from teaching and learning.

Wardlow and Johnson (1999) addressed college faculty members' level of skill in educational technologies in their broader study of faculty teaching skills and interest in teaching improvement. More than 50% of teachers rated themselves much lower in the area of educational technology than on their self-ratings of teaching activities. The college faculty had a moderate level of interest in learning more about the 12 items in the education technologies scale. This study did not address the integration of technology in the teaching/learning process. In summary, it appears that teachers who use technology in their classrooms seem to change their instructional methods and attitudes (Jordan & Follman, 1993).

TECHNOLOGY ANXIETY

No research could be found that addressed teachers' anxiety relative to implementing technology in the teaching/learning process. Most of the research on technology related anxiety has been conducted in the area of computer anxiety and using computers as program or instructional management tools (word processors, grade books, databases, presentations, etc.) for teacher use.

In the area of computer anxiety, Fletcher and Deeds (1994) and Kotrlik and Smith (1989) found that no difference existed in the computer anxiety of agriculture teachers and the norm for other professionals reported by Oetting (1983); and it was reported in both studies that level of computer skills was a significant explanatory variable of computer anxiety. In addition, Kotrlik and Smith found that no differences existed in computer anxiety among teachers from various vocational fields, namely, agriculture, home economics (now called family and

consumer sciences), business, and industrial arts. They also found that four variables explained a substantial proportion of the variance in computer anxiety, namely, principals' support of computer use, computer availability at school, perceived mathematical ability, and whether the teacher had received formal computer training.

Budin (1999) stated that the placement of technology into classrooms without teacher preparation and curriculum considerations has produced high levels of anxiety among teachers. Russell (1995) identified six stages that naive users go through when learning to use technology: awareness, learning the process, understanding an application of the process, familiarity and competence, adaptation to other contexts, and creative application to new contexts. "Understanding the stages of learning to use the technology empowers the learner through the knowledge that the feelings of tension and frustration will be overcome" (p. 173). Teachers' understanding of these stages will assist them to reduce their anxiety level and pass through the stages more rapidly. Technology and psychological support are important because early successful encounters with technology will create enthusiasm and build teachers' confidence. These observations were supported by Hardy (1998) in her study of teacher attitudes toward and knowledge of computer technology.

NEED FOR THE STUDY

Numerous research studies have been conducted in an attempt to determine whether the use of technology in the teaching/learning process has resulted in improved student performance. There are many studies that document improvement (Khalili & Shashoani, 1994; Moore & Kearsley, 1996), and there are many studies that have not found any significant differences between technologically based and traditional instructional approaches (Moore & Kearsley, 1996). This debate continues, but one fact has been established. A number of organizational and political realities indicate that technology-based instruction is a viable alternative (Bower, 1998). Bower summarized the need for the integration of technology in the teaching/ learning process in the following way: "Is computer based instruction popular with students and educators? Yes. Does it improve student performance? Maybe. Is it worth the cost? Probably. Must we continue to explore this innovative pathway to education? Definitely" (p. 65). Even if there is a lack of indisputable proof that the use of technology in instruction improves student performance, marketing educators should model the use of technology since employers expect technology literate employees.

No research has been conducted to determine how marketing teachers are integrating technology in the teaching/learning process. This information is critical to ensure that technology integration achieves maximum effectiveness and impact. This study was designed to determine how technology is being implemented in marketing education programs.

THE KOTRLIK/REDMANN TECHNOLOGY INTEGRATION MODEL©

The four phases of the Kotrlik/Redmann Technology Integration Model were developed based on the literature and research cited above:

1) **Exploration - Thinking About Using Technology.** Teachers seek to learn about technology and how to use it.

2) **Experimentation - Beginning to Use Technology.** Physical changes start to occur in classrooms and laboratories. Instructors focus more on using technology in instruction by presenting information using presentation software and doing a <u>few</u> instructional exercises using spreadsheets, databases, word processors, games, simulations, the Internet, and/or other technology tools.

3) **Adoption - Using Technology Regularly.** Physical changes are very evident in the classroom and/or laboratory with technology becoming a focal point in the classroom and/ or laboratory organization. Instructors employ presentation software and technology-based instructional exercises using games, simulations, spreadsheets, databases, word processors, the Internet or other technology tools as a regular and normal feature of instructional activities. Student-shared responsibility for learning emerges as a major instructional theme.

4) **Advanced Integration - Using Technology Innovatively.** Instructors pursue innovative ways to use technology to improve learning. Students take on new challenges beyond traditional assignments and activities. Learners use technology to collaborate with others from various disciplines to gather and analyze information for student learning projects. The integration of technology into the teaching/learning process leads to a higher level of learning.

PURPOSE AND OBJECTIVES

This study was designed to determine what factors explain the degree of technology integration into the teaching-learning process in secondary marketing education programs. The objectives were to determine:

1. the extent to which technology has been integrated into the teaching-learning process;
2. the barriers that prevent marketing education teachers from implementing technology in the teaching-learning process;
3. marketing teachers' perceptions of their teaching performance and/or effectiveness;
4. technology anxiety of marketing teachers; and
5. if selected variables explain the variance in technology integration by marketing teachers. The variables used in this analysis were the teachers' perception of their instructional effectiveness, the teachers' perception of the barriers that prevented technology integration, gender, years teaching experience, and the teachers' perceived technology anxiety level.

The Association for Educational Communications and Technology (AECT) has adopted the following definition of Instructional Technology: "Instructional Technology is the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning" (Seels & Richey, 1994, p. 1). Funderstanding (2001) defined instructional technology as "Using computers, CD-ROMs, interactive media, modems, satellites, teleconferencing, and other technological means to support learning" (¶ 1). For the purposes of this study, technology has been defined as: Employing the Internet, computers, CD-ROMs, interactive media, satellites, teleconferencing, and other technological means in instruction to support, enhance, inspire and create learning.

METHOD

The population for this study was all secondary marketing educations teachers in Louisiana. All secondary marketing education teachers (*N*=107) listed in the 2001-2002 *Louisiana Marketing Education Teachers Directory* served as the frame for the study. Each mailing consisted of a questionnaire, cover letter, and stamped, addressed, return envelope. After two mailings and a phone follow-up, 56 teachers returned their surveys for a response rate of 52.2%.

To determine if the responses were representative of the population and to control for non-response error, inferential *t*-tests were used to compare the grand means of the technology integration, barriers, and teaching effectiveness scales of those questionnaires received during the phone follow-up (*n* = 10) to those received by mail (*n* = 46), as recommended by Gall, Gall, and Borg (2002). These scales are described in the instrumentation section below. The grand means of these scales were selected because they were primary variables of interest in the study. No statistically significant differences were found between the means by response mode for the primary scales in the instrument. In addition, none of the analyses revealed effect sizes that met the minimum value for a small effect size (*d* = .20) according to Cohen's (1988) standards for interpreting effect sizes. It was concluded that no differences existed by response mode and the data were representative of the population. The mail and phone follow-up responses were combined for further analyses. The results of these analyses may be found in Table 1.

INSTRUMENTATION

The instrument contained three scales: technology integration, barriers to integration, and perceived teaching effectiveness. The technology integration scale contained four subscales: exploration, experimentation, adoption and advanced integration. These scales and all demographic items used in the instrument were developed by the researchers after a review of the literature. The face and content validity of the instrument were evaluated by an expert panel of university faculty and teachers in doctoral programs. The instrument was pilot tested with 29 teachers of marketing, business, family and consumer sciences, and agriscience. These teachers were enrolled in a comprehensive graduate program in career and technical education. Changes indicated by the validation panel and pilot test were made. These changes occurred in the wording of items and in the instructions for completing the instrument. The standards for instrument reliability for Cronbach's alpha by Robinson, Shaver and Wrightsman (1991) were used to judge the quality of the three scales and four subscales in the instrument: .80 - 1.00 - exemplary reliability, .70 - .79-extensive reliability, .60 - .69 - moderate reliability, and <.60 - minimal reliability. Using these standards, all scales possessed exemplary reliability. Internal

consistency coefficients for the three scales and the four subscales (which were part of the technology integration scale) were as follows (Cronbach's *alpha*): Technology Integration Scale - .92; Exploration subscale - .83, Experimentation subscale - .96, Adoption subscale - .97, Advanced Integration subscale - .88, Barriers scale - .82, and Teaching Effectiveness scale - .89.

Table 1

Inferential t-tests of Differences Between Scale Means by Response Wave

Variable	Response Wave	*n*	*m*	*sd*	*se*	*t*	*Cohen's d*
Technology	1	46	3.05	1.21	0.18	0.38	<.01
Integration	2	10	2.90	0.88	0.28		
Barriers to	1	45	2.04	0.56	0.08	0.01	<.01
Integration	2	10	2.04	0.73	0.23		
Teaching	1	45	4.01	0.57	0.09	0.14	0.14
Effectiveness	2	10	3.99	0.52	0.16		

Note. N=56. Response waves: 1=responded after one of the first two mailings; 2=responded after phone follow-up. Levine's test for the equality of variances did not result in a significant *F* value, therefore, equality of variances was assumed.

DATA ANALYSIS

The data were analyzed using descriptive statistics for objectives 1-4. Multiple stepwise regression analysis was used to analyze the data for objective 5. The effect size for the multiple regression analysis was interpreted according to the standards for interpreting effect sizes for multiple regression analyses by Cohen (1988): $R^2 > .0196$ - small effect size, $R^2 > .13$ - moderate effect size, and $R^2 > .26$ - large effect size.

FINDINGS

Almost all (55 or 98.2%) of the marketing teachers had a home computer, while 52 (92.9%) had Internet access at home. Over three-fourths of the teachers (43 or 76.8%) reported they had an office at school and 39 or 69.6% had a computer in their office, while 30 (53.6%) reported having a computer with Internet connection in their office.

The teachers were asked to indicate the sources of their technology training. Five sources were listed, and the teachers were instructed to check all that applied to them. Over two-thirds of the teachers had participated in workshops or conferences (*n* = 51 or 91.1%) or were self-taught (*n* = 50 or 89.3%), while smaller numbers learned from colleagues (*n* = 36 or 64.3%) or had taken college courses (*n* = 27 or 48.2%). None reported that they had used other sources for their technology training. When asked about the technology that was available for their use in teaching, over one-half of the teachers had e-mail accounts (*n* = 33 or 58.9%), while smaller numbers had interactive CDs (*n* = 28 or 50.0%), laser disc players or stand alone

CD players (*n* = 13 or 23.2%), other types of technology available (*n* = 13 or 23.2%), or student e-mail accounts (*n* = 10 or 17.9%).

OBJECTIVE 1

The four subscales of the Technology Integration Scale (TIS) (©2002) were used to determine the extent to which technology had been integrated into the teaching/learning process in marketing education programs. The teachers responded to 33 items using the following Likert scale: 1 = Not Like Me At All, 2 = Very Little Like Me, 3 = Somewhat Like Me, 4 = Very Much Like Me, and 5 = Just Like Me. Examples of the items from the four subscales are presented in Table 2.

Analysis of the grand means for two constructs, Exploration - Thinking About Using Technology (*M* = 3.78, *SD* = .95), and Adoption - Using Technology Regularly (*M* = 3.92, *SD* = .94), revealed that teachers perceived the descriptions in these two subscales were "Very Much Like Me." Analysis of the grand mean for the construct, Experimentation - Beginning to Use Technology (*M* = 2.19, *SD* = 1.18), indicated that the teachers perceived the descriptions in the subscales were "Very Little Like Me." The data from the fourth construct (subscale), Advanced Integration - Innovative Use of Technology (*M* = 3.03, *SD* =1.15), revealed that the teachers perceived the descriptions in this subscale were "Somewhat Like Me." These analyses indicate that the marketing teachers in this study appear to be segmented into two groups. They are strongest in the exploration and adoption phases of the technology integration model. They are not displaying strength in the advanced technology integration phase.

OBJECTIVE 2

A researcher-developed scale was used to determine the magnitude of barriers that may prevent marketing teachers from integrating technology into the teaching/learning process. The teachers responded to 11 items using the following Likert scale: 1 = Not a Barrier, 2 = Minor Barrier, 3 = Moderate Barrier, and 4 = Major Barrier. The items included statements such as "Having enough time to develop lessons that use technology" and "My ability to integrate technology in the teaching/learning process." The grand mean revealed that marketing teachers perceive that minor barriers exist that prevent them from integrating technology into the teaching/learning process (*M* = 2.04, *SD* = .59). The statements in the scale are presented in Table 3.

Table 2

Examples of Items in the Four Subscales in the Technology Integration Scale©

Subscales and Statements	*M*	*SD*
Subscale: Exploration (5 statements in subscale) Grand Mean:	**3.78**	**.95**

2 I want to take a course to learn how to use technology in the teaching/learning process.
3. I talk with my principal or fellow teachers about using technology in my instruction.

Subscale: Experimentation (9 statements in subscale) Grand Mean:	**2.19**	**1.18**

9. I am just beginning to use instructional exercises that require students to use the
     Internet or other computer programs.

11. I am just beginning to experiment with ways to use technology in the classroom.

Subscale: Adoption (15 statements in subscale) Grand Mean:	**3.92**	**.94**

17. I emphasize the use of technology as a learning tool in my classroom or laboratory.
18. I assign students to use the computer to do content related activities on a regular basis.

Subscale:Advanced Integration (4 statements in subscale)Grand Mean: 3.03		**1.15**

26. I encourage students to design their own technology-based learning activities.
29. I expect students to use technology to such an extent that they develop projects that are
     of a higher quality level than would be possible without them using technology.

Note. *N* for the four subscales ranges from 55 to 56. Scale: 1 = Not Like Me at All, 2 =
     Very Little Like Me, 3 = Somewhat Like Me, 4 = Very Much Like Me, and 5 = Just
     Like Me. The Technology Integration Scale (TIS)© is based on the Kotrlik/
     Redmann Technology Integration Model (©2002).

All items from the four subscales are not included in this manuscript to protect the
copyrighted status of the instrument.

OBJECTIVE 3
A researcher-developed scale was used to determine the teachers' perceptions of their own
teaching effectiveness. The teachers responded to seven items using the following Likert scale:
1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, and 5 = Strongly Agree. All
items in this scale were worded in superlative language–strongly agreeing with the statements
in this scale indicated the teacher perceived they were excellent in their teaching effectiveness.
The items included statements such as "I am among the very best teachers at my school" and
"My students would rate me as one of the very best teachers they have ever had." The grand
mean of *M* = 4.01 (*SD* = .56) revealed that teachers agreed with the construct measured by this
scale, which indicates that they perceive they are effective teachers. The respondents' grand
means for this seven-item scale indicated that 21.8% of the teachers were undecided when

asked whether they agreed with statements that indicated teaching effectiveness, while only 16.4% of respondents' grand means indicated strong agreement, or that they had achieved teaching excellence as indicated by having a mean teaching effectiveness score in the "Strongly Agree" range, which is a grand mean of 4.50 and above. The statements in the scale are presented in Table 4.

Table 3

Statements Included in the Scale Measuring Barriers That May Prevent Marketing Teachers from Integrating Technology in the Teaching/Learning Process

Statements
1. Enough time to develop lessons that use technology.
2. Scheduling enough time for students to use the Internet, computers, or other technology in the teaching/learning process.
3. Availability of technology for the number of students in my classes.
4. Availability of technical support to effectively use instructional technology in the teaching/learning process.
5. Administrative support for integration of technology in the teaching/learning process.
6. My ability to integrate technology in the teaching/learning process.
7. My students' ability to use technology in the teaching/learning process.
8. Type of courses I teach.
9. Reliability of the Internet at my school.
10. Access to the Internet at my school.
11. Availability of effective instructional software for the courses I teach.

Note. N = 55. Scale Grand Mean = 2.04 (SD = .59). Scale: 1 = Not a Barrier, 2 = Minor Barrier, 3 = Moderate Barrier, and 4 = Major Barrier.

OBJECTIVE 4
A single item was used to assess the teachers' level of technology anxiety, "How much anxiety do you feel when you think about using technology in your instruction?" The teachers responded using the following scale: 1 = No Anxiety, 2 = Some Anxiety, 3 = Moderate Anxiety, and 4 = High Anxiety. The analysis of the data revealed that marketing teachers are not feeling anxious (M = 1.45, SD = .66) when they think about using technology in their instruction.

Table 4

Statements in the Teachers' Perceptions of Their Own Teaching Effectiveness Scale

Statements

1. I am among the very best teachers at my school.
2. I am highly effective in teaching the content in my courses.
3. My students would rate me as one of the very best teachers they have ever had.
4. The other teachers in my school would say that I am one of the best teachers at this school.
5. All of my students would evaluate my courses as excellent.
6. I am a role model for other teachers in my school.
7. My principal would say that I am one of the best teachers at this school.

Note. N = 55. Scale Grand Mean = 4.01 (*SD* = .56). Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, and 4 = Agree, and 5 = Strongly Agree.

OBJECTIVE 5

An analysis was conducted to determine if selected variables explained a substantial proportion of the variance in advanced technology integration scores. The grand mean of the advanced integration subscale was used as the dependent variable in this analysis.

Eight variables were used as potential explanatory variables: the grand mean of the barriers to the integration of technology scale, the grand mean of the teachers' perceptions of their own teaching effectiveness scale, the teachers' technology anxiety, gender (dummy coded as 1 = male, 2 = female), age, whether the computer in the teachers' office at school had Internet access, whether the teacher had a computer at home, and whether the teachers' home computer was connected to the Internet. The last four variables were dummy coded for use in the regression analysis (1 = yes and 2 = no).

The multicollinearity assessment revealed that multicollinearity did not exist in this regression analysis. Hair, Anderson, Tatham and Black (1998) indicated that "The presence of high correlations (generally, .90 and above) is the first indication of substantial collinearity" (p. 191). The highest correlation between any two independent variables was r=.47, which is substantially lower than the .90 criterion. Hair et al. (1998) also indicated that "Two of the more common measures for assessing both pairwise and multiple variable collinearity are (1) the tolerance value and (2) its inverse–the variance inflation factor (VIF). . . . Thus any variables with tolerance values below .19 (or above a VIF of 5.3) would have a correlation of more than .90" (p. 191, 193). For this study, the lowest tolerance value observed was .82 and the highest VIF value was 1.22.

Two variables explained 35% of the variance in the grand mean of the advanced technology integration scores, namely, the teachers' technology anxiety (R^2 = .24), and the grand mean of the Teachers' Perceptions of Their Own Teaching Effectiveness scale (additional R^2 = .11). According to Cohen (1988), a regression model that explains 35% of the variance represents a large effect size. The other variables did not explain a substantial proportion of the variance. The ANOVA table for the regression analysis is presented in Table 5 and the model summary is presented in Table 6.

Table 5

ANOVA Table for the Stepwise Multiple Regression Analysis of Advanced Technology Integration Subscale Scores

Source	SS	df	MS	F	P
Regression	22.77	2	11.38	13.50	<.001
Residual	42.17	50	0.84		
Total	64.94	52			

Table 6

Model Summary: Multiple Regression Analysis of Teacher Responses to the Technology Integration Subscale

Model	R	R2	Adjusted R2	R2Change	Std. Error of the Estimate
1a	0.49	0.24	0.23	0.24	0.98
2b	0.59	0.35	0.33	0.11	0.92

aExplanatory variables: Anxiety Level, dExplanatory variables: Model 1 plus Teachers Perception of Their Own Teaching Effectiveness.

CONCLUSIONS

The phases of the Kotrlik/Redmann Technology Integration Model in which marketing teachers are most active are exploration of the potential of using technology in the teaching/learning process, and adopting technology for regular use in instruction; they are functioning at a fairly strong level in both phases. They are not very active in the experimentation phase, but they are operating at a moderate level in the advanced integration phase. Some have not had access to the latest technology for use in their classrooms and labs; however, it appears marketing teachers have done an excellent job of using the available technology. Even though most marketing education teachers have computers and Internet access, they have not integrated

technology into their instruction at the highest level, often because they do not have access to this technology for student use in learning.

The marketing teachers are not experiencing barriers in their efforts to integrate technology in the teaching/learning process, although some experience minor or moderate technology integration barriers. This conclusion does not support the review of meta-analyses conducted by Fabry and Higgs (1997), and the national study conducted by the National Center for Education Statistics (Smerdon et al., 2000), in which they concluded that teachers were encountering barriers in their efforts to integrate technology in instruction. In general, marketing teachers are not experiencing technology anxiety at a level that prevents them from using technology in their instruction.

Marketing teachers perceive they are good teachers regardless of whether or not they demonstrated strength in the advanced technology integration level of the teaching/learning process, with a small proportion believing they are excellent teachers. The advanced integration of technology by marketing teachers is modest and may be reflective of many educational leaders such as Budin (2000) who voiced concerns about how technology fits into the curriculum, what teachers should know, and how the impact of technology should be assessed. This advanced integration of technology at a modest level does not seem to affect teachers' perceptions of their teaching effectiveness, since most consider themselves to be good teachers.

Teachers continue to use traditional sources for technology training such as workshops/conferences, college courses, colleagues, and self-directed learning. However, teachers are using workshops/conferences at a higher level than self-directed learning, which differs from the findings on marketing teachers' computer training reported by Kotrlik, Harrison, Redmann, and Handley (2000).

Teachers' technology anxiety and their perceptions of their own teaching effectiveness are strong explanatory variables for the extent to which marketing teachers integrate technology in the teaching/learning process. This conclusion indicates that little change has occurred since the Office of Technology Assessment's 1995 report on teachers and technology, in which it was concluded that schools have made significant progress in implementing technology and in helping teachers to use basic technology tools, but they still struggle with integrating technology into the curriculum.

The findings and conclusions in this study support and confirm the Kotrlik/Redmann Technology Integration Model© (Kotrlik & Redmann, 2002) because the instrument developed based on this model resulted in exemplary internal consistency coefficients for each subscale according to the reliability standards by Robinson et al. (1991). This model can be used as a basis for future research in marketing education.

RECOMMENDATIONS AND IMPLICATIONS

The conclusions revealed that more needs to be done to encourage and support marketing teachers in the integration of technology in the teaching/learning process. Certainly, university faculty and professional staff in state departments of education have a vital role and a definite

responsibility in this effort. In addition, the teachers must be encouraged to continue to embrace self-directed learning to support this effort.

Marketing education leaders must change the way we address technology integration. Just as our delivery of university courses continues to change to distance learning and other technology-based formats, leaders must develop new models that will result in faster and better integration of technology in the teaching/learning process at the secondary level. In addition to making teachers "better" users of technology, they must be convinced that technology will improve the quality of their instruction and ultimately, student learning. An excellent opportunity exists to design and implement change processes that will have a positive impact on technology integration. This process should involve stakeholders at all levels and must be aggressively pursued.

Additional research on factors related to technology integration in the teaching/learning process is warranted. This recommendation for further research certainly includes research to determine whether teachers are being adequately prepared by teacher education institutions to integrate technology in the teaching/learning process.

This study supports the review of several meta-analyses by Fabry and Higgs (1997) and the research by Smerdon, et al. (2000), in which they found that some of the major issues in integrating technology into instruction included training, access to technology, and various other barriers to the integration of technology. For both marketing teachers and their students, technology should be used as the basis of an instructional environment that enriches the teaching/learning experience. Technology has changed the nature and content of courses and allows teachers to complete menial tasks in a more efficient manner.

The instructional use of technology has changed from the occasional use of computer labs to conduct small computer-based projects to including multiple computers in classrooms so that technology can be integrated into the teaching/learning process (Oblinger, 1992). Marketing education teachers have demonstrated a strong movement from the low end to the adoption level of this continuum of technology integration; however, they must continue to pursue the highest degree of technology integration.

School systems that lack the latest computer technology and instant access to the Internet create a barrier for teachers desiring implementation of technology at the highest level. Additional research needs to address the impact of the age of the technology and the Internet connection speed on the integration of technology in the teaching/learning process.

If marketing education programs are going to provide the best education possible, they must integrate technology in the process. Marketing teachers create and maintain the instructional environment in their programs. If their approach to integration of technology is one that reflects doubt and consternation, the potential positive impact of technology integration may be neutralized. Technology integration must be emphasized by all stakeholders in the marketing education program.

REFERENCES

Bailey, G. D. (1997). What technology leaders need to know: The essential top 10 concepts for technology integration in the 21st century. *Learning and Leading With Technology, 25*(1), 57-62.

Berman, P., & McLaughlin, M. W. (1978). *Federal programs supporting educational change. Vol. VIII: Implementing and sustaining innovations*. Santa Monica, CA: Rand Corporation.

Bosch, K. A. (1993). Is there a computer crisis in the classroom? *Schools in the Middle, 2*(4), 7-9.

Bower, B. L. (1998). Instructional computer use in the community college: A discussion of the research and its implications. *Journal of Applied Research in the Community College, 6*(1), 59-66.

Budin, H. (1999). The computer enters the classroom. *Teachers College Record, 100*(3), 656-669.

Byron, S. (1995). *Computing and other instructional technologies: Faculty perceptions of current practices and views of future challenges*. (ERIC Document Reproduction Service No. ED390381).

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Dwyer, C. A. (1999). Using emerging technologies to construct effective learning environments. *Educational Media International, 36*(4), 300-309. (ERIC Document Reproduction Service No. EJ605260).

Fabry, D. L., & Higgs, J. R. (1997). Barriers to the effective use of technology in education: Current status. *Journal of Educational Computing Research, 17*(4), 385-395.

Fletcher, W. E., & Deeds, J. P. (1994). Computer anxiety and other factors preventing computer use among United States secondary agricultural educators. *Journal of Agricultural Education, 35*(2), 16-21.

Funderstanding. (2001). Instructional technology. Retrieved January 18, 2001 from http://www.funderstanding.com/instructional_technology.cfm.

Gall, M. D., Gall, J. P., & Borg, W. R. (2002). *Educational research: An introduction* (7th Ed.). Boston: Allyn and Bacon, Inc..

George, P. (2000). Breaking ranks. *Principal Leadership, 1*(4), 56-61.

Glenn, A. D. (1997). Technology and the continuing education of classroom teachers, *Peabody Journal of Education, 72*(1), 122-128.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th Ed.). Upper Saddle River, NJ: Prentice Hall.

Hardy, J. (1998). Teacher attitudes toward and knowledge of computer technology. *Computers in the School, 14*(3-4), 119-136.

Institute for the Transfer of Technology to Education, National School Boards Association. (2002). Education leadership toolkit: Change and technology in America's schools. Retrieved October 18, 2002 from http://www.nsba.org/sbot/toolkit/tiol.html.

Jordan, W. R., & Follman, J. M. (1993). *Using technology to improve teaching and learning. Hot topics: Usable research*. (ERIC Document Reproduction Service No. ED355930).

Kerr, S. P. (1989). Technology, teachers, and the search for school reform, *Educational Technology Research and Development, 37*(4), 5-17.

Khalili, A., & Shashoani, L. (1994). The effectiveness of computer applications: A meta-analysis. *Journal of Research on Computing in Education, 27*(1), 48-61.

Kotrlik, J. W., Harrison, B. C., Redmann, D. H., & Handley, C. H. (2000). Information technology related professional development needs of Louisiana agriscience teachers. *Journal of Agricultural Education, 41*(1), 18-29.

Kotrlik, J. W., & Redmann, D. H. (2002). *The Kotrlik/Redmann technology integration model.* Baton Rouge, LA: Louisiana State University.

Kotrlik, J. W., & Smith, M. N. (1989). Computer anxiety levels of vocational agriculture and other vocational teachers. *Proceedings, National Agricultural Education Research Meeting*, 1-9.

Lu, J., & Molstad, L.. (1999). Instructional effectiveness of computer technology in non computer-oriented courses as perceived by South Dakota high school business teachers, *The Delta Pi Epsilon Journal, 39*(3), 159-176.

Moore, M. G., & Kearsley, G. (1996). *Distance education: A systems view*. Belmont, CA: Wadsworth Publishing Company.

National Center for Education Statistics, U.S. Department of Education. (2000). *Stats in brief: Teacher use of computers and the Internet in public schools.* Washington, D.C.:Author.

Oblinger, D. (1992). *Learning with computers. An IAT technical primer.* (ERIC Document Reproduction Service No. ED358821).

Oetting, E. R. (1983). *Oetting's computer anxiety scale*. Rocky Mountain Behavioral Sciences Institute, Inc., Fort Collins, Colorado.

Office of Technology Assessment, U. S. Congress. (1995). *Teachers and technology: making the connection, OTA-EHR-616.* Washington, D.C.: U. S. Government Printing Office.

Rader, M. & Wilhelm, W. (2001). *Needed research in business education* (6th Ed.). Little Rock, AR: Delta Pi Epsilon.

Robinson, J. P., Shaver, P. R., & Wrightsman, L. S. (1991). Criteria for scale selection and evaluation. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.). *Measures of personality and social psychological attitudes* (pp. 1-16). New York: Academic Press.

Russell, A. (1995). Stages in learning new technology: Naive adult email users. *Computers and Technology, 25*(4), 173-178.

Sandholtz, J. H., Ringstaff, C., & Dwyer, D. C. (1997). *Teaching with technology: Creating student-centered classrooms.* New York: Teachers College Press.

Seels, B. B. & Richey, R. C. (1994). *Instructional technology: The definitions and domains of the field*. Washington, DC: Association for Educational Communications and Technology.

Sheingold, K. & Hadley, M. (1990). *Accomplished teachers: Integrating computers into classroom practice.* New York: Center for Technology in Education, Bank Street College of Education.

Shinn, G. (2001). Communicating technology for learning: New tools and proven strategies. *The Agricultural Education Magazine, 73*(4), 4.

Smerdon, B., Cronen, S., Lanahan, L., Anderson, J., Iannotti, N. & Angeles, J. (2000). *Teachers' tools for the 21st century: A report on teachers' use of technology*. Washington, D.C.:National Center for Education Statistics, U.S. Department of Education.

Wardlow, G., & Johnson, D. (1999). Level of teaching skills and interest in teaching improvement as perceived by faculty in a land-grant college of agriculture. *Journal of Agricultural Education, 40*(4), 47-56.