

## Association for Information Systems AIS Electronic Library (AISeL)

---

AMCIS 2005 Proceedings

Americas Conference on Information Systems  
(AMCIS)

---

2005

# IT User Satisfaction in Academia: A Comparison Across Three Student Types

Evelyn H. Thrasher

*Auburn University*, [thrash@auburn.edu](mailto:thrash@auburn.edu)

Daniel Gropper

*Auburn University*, [GROPPDM@AUBURN.EDU](mailto:GROPPDM@AUBURN.EDU)

John Corley

*Auburn University*, [corlej@auburn.edu](mailto:corlej@auburn.edu)

Follow this and additional works at: <http://aisel.aisnet.org/amcis2005>

---

### Recommended Citation

Thrasher, Evelyn H.; Gropper, Daniel; and Corley, John, "IT User Satisfaction in Academia: A Comparison Across Three Student Types" (2005). *AMCIS 2005 Proceedings*. 246.

<http://aisel.aisnet.org/amcis2005/246>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2005 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# IT User Satisfaction in Academia: A Comparison Across Three Student Types

**Evelyn H. Thrasher**  
Auburn University  
thrash@auburn.edu

**Daniel Gropper**  
Auburn University  
gropdm@auburn.edu

**John Corley**  
Auburn University  
corleij@auburn.edu

## ABSTRACT

This study utilized critical incidents and open-ended surveys to develop a focused information technology (IT) user satisfaction survey for use in academia. The resulting Likert-type scale survey was administered to 122 individuals enrolled in three different MBA programs – traditional, distance-learning, and executive – at a large university. Hypothesis testing employed ANOVA and SEM. The results suggest that IT user satisfaction differs among these student groups, and IT user satisfaction positively influences satisfaction with the academic program. Contributions of the study include an examination of IT user satisfaction in an academic setting and an investigation of the ways in which IT impacts the education process across different program types.

## Keywords

IT in Education, IT User Satisfaction, Critical Incidents, Survey Development

## INTRODUCTION

The measurement of IT user satisfaction has long been a primary behavioral research stream (Ives, Olson, & Baroudi, 1981; Melone, 1990; Simmers & Anandarajan, 2001). Although perceptual in nature, IT user satisfaction is measurable and has served as a surrogate for usefulness, effectiveness, and other constructs generally deemed immeasurable (Ives et al., 1983; Muylle, Moenaert, & Despontin, 2004). Further, IT user satisfaction gauges users' perceptions of the functionality of IT rather than simply measuring its technical quality (Ives et al., 1983; Muylle et al., 2004).

IT user satisfaction has been empirically examined most often through the lens of survey methodology (Hinkin, 1995; Roberts, 1999), with the most popular instruments being those developed by Bailey and Pearson (1983), Doll and Torkzadeh (1988), and Ives et al. (1983). These instruments have been tested extensively for validity and reliability, have been shown to be very adept at measuring overall levels of satisfaction, and have been relatively easy and inexpensive to administer (Melone, 1990). However, these instruments are largely general in nature, thereby obscuring much of the detail underlying the components of decision and task support provided by IT. Particularly when results varied among groups, these past models offered little insight into the reasons behind these differences (Au, Ngai, & Cheng, 2002). Some researchers have even suggested these general instruments be replaced or modified in studies where a focused instrument may have been better suited (Jones & Beatty, 2001; Zmud, Sampson, Reardon, Lenz, & Byrd, 1994). Additionally, these standardized instruments were developed for use in a mainframe IT environment. Thus, their continued usefulness has been challenged due to the momentous technological advances since the 1980's that have made the user-IT interaction more complex (Au et al., 1998; Muylle et al., 2004; Simmers & Anandarajan, 2001). For instance, Muylle et al. (2004) suggested the need for a reliable measure of user satisfaction with an organization's website, citing the need for more effective measures of satisfaction relative to IT support of complex, goal-directed behaviors. While the use of standardized instruments has served to inform and build theory around general IT user satisfaction, focused instruments may contribute to theory while also providing practitioners with a better diagnostic examination of the system, particularly when the intent is to assess the decision and task support of IT resources (Zmud et al., 1994).

The technological advances of the past two decades have also brought about increased use of IT in support of academia, making evaluation of IT user satisfaction an important issue for educators. Research has suggested that instruments used in an industrial setting may not be appropriate in an academic setting due to the different roles IT plays in academia (Wang, 2003). For instance, many of the traditional instruments include items to assess IT staff and services, user training, and user involvement in IT planning (Bailey & Pearson, 1983; Ives et al., 1983). In academic institutions, students have minimal input into the institution's IT planning process, little formal IT training, and limited interaction with IT support staff. Similarly, Doll and Torkzadeh (1988) included measures of top management and organizational support, other dimensions of IT user satisfaction more applicable to industry than academia. Thus, a call has been made for development of survey instruments better suited to an academic setting (Wang, 2003), measures that are tied to those tasks for which IT support is being provided, such as completion of and satisfaction with the academic program (Zmud et al., 1994). Such focused studies are lacking in the IT literature. Thus, we turn to studies from other industries to inform the present research.

The virtual team has been defined as a means to create temporary teams of remote workers across functional, geographical, and organizational boundaries for completion of a task (Lucas & Baroudi, 1994). Morris, Marshall, and Rainer (2002) defined the virtual organization as an organization formed through cooperative relationships across time and location and supported by IT to accomplish a goal. Distance-learning and executive MBA students are similar to participants in a virtual team or virtual organization. In their MBA programs, these students are required to participate in virtual teams for the purpose of completing an intensive online business simulation. In addition, online discussions, email, Internet, and DVDs facilitate the learning process and class participation. Thus, we define distance-learning students and executive students as members of virtual teams adapted for academia, dispersed functionally and geographically. Similarly, we liken traditional students to traditional workers, where completion of the academic program occurs in a local setting with classroom instruction and access to local resources.

In response to the call for more focused studies of IT user satisfaction in an academic setting, the present study demonstrates the critical incident technique (Flanagan, 1954) and open-ended questions for focused survey development. The critical incident technique encourages reflection on past occurrences and uses these reflections to identify user perceptions of a situation, IT, or other phenomenon of interest (Flanagan, 1954). Use of the critical incident technique has been rare in the MIS literature, although Bailey and Pearson (1983) used critical incidents to develop their widely used IT user satisfaction survey.

Using student responses from three MBA program types – traditional, distance-learning, and executive – we examine the dimensions of IT user satisfaction relevant to an academic setting and attempt to assess the influence of IT user satisfaction on satisfaction with the academic degree program. Critical incident and open-ended survey responses were analyzed and developed into survey items. The final survey instrument was administered, factor analyzed, and used to test three hypotheses.

## RESEARCH HYPOTHESES

IT user satisfaction has been defined as the perceived value that users receive from the information provided by one or more systems (Bailey & Pearson, 1983; Ives et al., 1983; Seddon, 1997). Linking satisfaction to attitude, Doll and Torkzadeh (1988) defined IT user satisfaction as a prevailing attitude about a computer application as perceived by someone interacting with the system. The present study expands these definitions, defining IT user satisfaction as the user's level of satisfaction with all aspects of the IT portfolio, including applications, communication, services, and the information provided by the applications.

Virtual team effectiveness has been a critical challenge for organizations (Staples, 2001). Because the nature of work for a virtual team member or remote worker differs from that of a traditional worker, IT is an essential resource for the remote workforce, enabling better communication among team members across geographical boundaries (Greengard, 1994; Lucas & Baroudi, 1994; Mowshowitz, 1994; Staples, 2001). Lack of face-to-face interaction has caused a heightened reliance on IT communication media for the remote worker, generally resulting in higher system usage by remote workers than by traditional workers (Wang, 2003). This increased experience and system use has been shown to lead to higher levels of IT user satisfaction (Simmers & Anandarajan, 2001). Along this same line of reasoning, the level of IT user satisfaction among

remote workers has been shown to differ from that of traditional workers (Staples, 2001). This discussion leads to the following hypotheses:

*Hypothesis 1:* The average level of overall IT user satisfaction will differ among students enrolled in distance-learning, executive, and traditional MBA programs.

*Hypothesis 2:* The average level of satisfaction with each dimension of IT user satisfaction will differ among students enrolled in distance-learning, executive, and traditional MBA programs.

Just as IT user satisfaction has been used as a surrogate for effectiveness, it has also been posited as an indicator of job satisfaction (e.g. Ang & Soh, 1997; Morris et al., 2002; Yoon & Guimaraes, 1995). Particularly in a virtual team setting where IT acts as a key enabler of team effectiveness, IT user satisfaction has been shown to positively influence job satisfaction (Morris et al., 2002). While perhaps not to the same degree as that of virtual teams, IT user satisfaction has also been shown to influence job satisfaction for the traditional worker. Researchers have demonstrated this positive link in a number of industrial settings (Ang & Soh, 1997; Morris et al., 2002; Staples, 2001; Yoon & Guimaraes, 1995). For traditional, distance-learning, and executive students alike, IT has become a necessary tool for completion of tasks and coursework (Wang, 2003). This increased reliance on IT for class participation, communication, and task completion, along with the discussion above, leads to hypothesis 3.

*Hypothesis 3.* IT user satisfaction will positively influence satisfaction with the academic program.

## **METHOD**

### **Participants**

The sample of interest was 122 students enrolled in an MBA program of a large university. This was a diverse group, with 46 traditional students on the main campus, 49 distance-learning students, and 27 executive students. The Executive MBA students are a hybrid group, participating primarily in a distance-learning environment but also spending one week in on-campus residency each semester. All participants were enrolled in an economic strategy course requiring extensive use of university IT resources such as word processing, spreadsheets, presentation applications, discussion forums, online access to course cases and handouts, and a computer-based business simulation. Distance-learning and executive students also received DVDs of the class lectures. Course registration and bill payment were completed online; and email was the university's official method of communication with students.

### **Measurement**

Data were collected in two phases using qualitative and quantitative methods (Hinkin, 1995). The data collection methods and procedures for each phase are described below.

#### *Phase 1: Open-ended Survey and Critical Incidents*

A group of randomly chosen 39 distance-learning and 36 traditional students were asked to complete an open-ended survey regarding their perceived strengths and weaknesses of the IT resources provided by the university for use in the academic program. Also, 10 distance-learning and 10 traditional participants were chosen at random and asked to complete a written critical incident questionnaire (Flanagan, 1954). 80 of the 95 questionnaires distributed in phase 1 were returned for an 83% return rate. Phase 1 instructions are given in Appendix A.

#### *Phase 2: Survey Instrument Development*

A customized survey instrument was developed from the phase 1 data. Item development for the survey instrument was done inductively using the results of the open-ended survey and the critical incidents (Butler, 1991; Hinkin, 1995, 1998). Eighty questionnaires were reviewed to establish themes and develop an initial list of survey items. Phase 2 was readily administered following the conclusion of phase 1 in order to reduce the possibility of bias resulting from learning effects. Thus, both phases were conducted near the end of the semester, spanning a brief 3-week period of time.

Using a Likert scale, considered to be most appropriate for use in factor analysis (Hinkin, 1998), the questionnaire was administered to the full group of 122 students, which also included the phase 1 participants. Each participant was asked to rate his or her level of satisfaction with each item on a scale of 1 (extremely dissatisfied) to 6 (extremely satisfied).

Additionally, each participant was asked to rate his or her overall level of satisfaction with the IT resources and the academic program using a single item for each. Several demographic items were included for comparison across groups. 103 surveys were returned for an 84% return rate. A series of chi square tests were conducted to compare the demographic variables of respondents and nonrespondents. No significance differences were noted.

## Data Analysis

### Survey Instrument Refinement

A pre-test was performed to refine the instrument (Hinkin, 1995), using a management professor, three graduate students from the sample of interest, and the MBA director. As a result, the scale was expanded to a 6-factor scale to allow for more variance among responses (Hinkin, 1995); and the wording of two items was changed to improve clarity.

### Factor Analysis

Exploratory factor analysis was used to identify factor structures and to refine the measurement items (Hinkin, 1995). All items were positively coded (Hinkin, 1995; Jackson, Wall, Martin, & Davids, 1993); only those items common to all three program types were included. A list of 22 items was analyzed for a response ratio of 5.5 participants to one item (Rummel, 1970).

Principle axis factoring with Varimax rotation was performed (Ford, MacCallum, & Tait, 1986; Hinkin, 1998; Rummel, 1970); and five IT user satisfaction factors were identified – Access to Electronic Records and Course Materials, University Web Navigation, General University Email Resources, Program-Specific Email Communication, and Program-Specific Web Navigation. Items with a factor loading greater than .40 were retained. Items loading heavily on two factors or items not loading on any factor were dropped (Hair et al., 1998), resulting in retention of 17 items (Table 1).

Item	Access to Electronic Records & Materials	University Web Navigation	General University Email Resources	Program-Specific Email Communication	Program-Specific Web Navigation
Ease of use WebCT(w/o email)	.67	.16	-.16	.07	.25
Value provided WebCT(w/o email)	.66	.12	-.19	.10	.12
Ease of use online student record system	.74	.01	.25	.08	.05
Value provided online student record system	.61	.20	.12	.05	.07
Hours of availability online student record system	.45	-.04	.14	-.06	.12
Ease of locating information on university web	.07	.73	.04	.13	.21
Accuracy and reliability of information on university website	.15	.79	.03	-.06	.39
Access to university email	.23	.15	.55	.10	.02
Ease of use regarding university email	.16	.04	.75	.13	.05
Ease of finding student email addresses	-.07	-.02	.07	.81	.12
Ease of finding faculty email addresses	-.01	.03	-.01	.79	.06
Ease of email communication with class members and team members	.15	.29	.03	.48	.18
Ease of locating information on MBA website	.27	.18	-.08	.18	.58
Accuracy and reliability of information on MBA website	.07	.09	-.09	.11	.76
Ease of locating information on College of Business website	.12	.09	.09	.06	.81
Accuracy and reliability of information on College of Business website	.05	.22	-.02	.14	.75
Ease of navigation across all university-related websites	.34	.27	.01	.09	.56

Table 1. Factor Loadings for Exploratory Factor Model of IT User Satisfaction

*Reliability and Predictive Validity*

Critical to a newly developed survey instrument are reliability among the items of each factor and the reliability of the resulting instrument to measure a single, complex construct. A coefficient alpha of at least .70 is indicative of strong covariance among the items and suggests a satisfactory sampling domain (Hair et al., 1998; Hinkin, 1998; Nunnally, 1978). All five scales and the overall instrument exhibited acceptable reliabilities based on Cronbach's alpha (Cortina, 1993). Predictive validity was assessed through the correlation of overall IT user satisfaction derived from the five factors against an overall IT user satisfaction rating collected in the demographic portion of the survey (Ives et al, 1983). The correlation between the two was .46, significant at  $\alpha = .01$ . Means, standard deviations, scale intercorrelations, and reliabilities are presented in Table 2.

Dimension	M <sup>ab</sup>	SD <sup>ab</sup>	1	2	3	4	5
Access to electronic records and course materials	4.51	.78	(.77)				
University web navigation	4.63	.80	.28**	(.83)			
University email resources	4.90	.92	.20**	.10	(.74)		
Program-specific email communication	4.44	.88	.13	.20*	.13	(.74)	
Program-specific web navigation	4.34	.74	.35**	.48**	.10	.28**	(.85)

Note. Numbers depicted in parentheses represent reliability for the scale.  
<sup>a</sup>N=103.  
<sup>b</sup>Likert scale of 1 (extremely dissatisfied) to 6 (extremely satisfied).  
 \*p<.05. \*\*p<.01.

**Table 2. Descriptive Statistics and Scale Correlations**

**RESULTS**

ANOVA was performed to test hypotheses 1 and 2 (Hair et al., 1998). Hypothesis 1, which stated that the average level of overall IT user satisfaction will differ among distance-learning, executive, and traditional students, was supported ( $F = 3.38$ ,  $p = .04$ ). More specifically, the overall level of IT user satisfaction for traditional and executive students did not differ, nor did that of traditional and distance-learning students. However, a significant difference was observed between distance-learning and executive students.

Hypothesis 2 stated that the average level of satisfaction with each dimension of IT user satisfaction will differ among distance-learning, executive, and traditional students. A difference was noted among the groups for three factors – General University Email Resources, Program-Specific Email Communication, and Program-Specific Web Navigation. Descriptive statistics and ANOVA results are presented in Tables 3 and 4, respectively.

Satisfaction Factor	Distance-Learning <sup>a</sup>		Executive <sup>b</sup>		Traditional <sup>c</sup>	
	M	SD	M	SD	M	SD
Access to electronic records and course materials	4.51	.95	4.44	.70	4.54	.68
University web navigation	4.40	.89	4.87	.80	4.70	.69
University email resources	4.88	1.06	4.38	1.02	5.16	.62
Program-specific email communication	3.96	.96	4.74	.52	4.67	.79
Program-specific web navigation	3.94	.81	4.71	.75	4.49	.52
Overall IT user satisfaction	4.06	.67	4.67	1.02	4.26	.91

<sup>a</sup>N=36.  
<sup>b</sup>N=21.  
<sup>c</sup>N=46.

**Table 3. IT User Satisfaction Ratings for Distance-Learning, Executive, and Traditional Students**

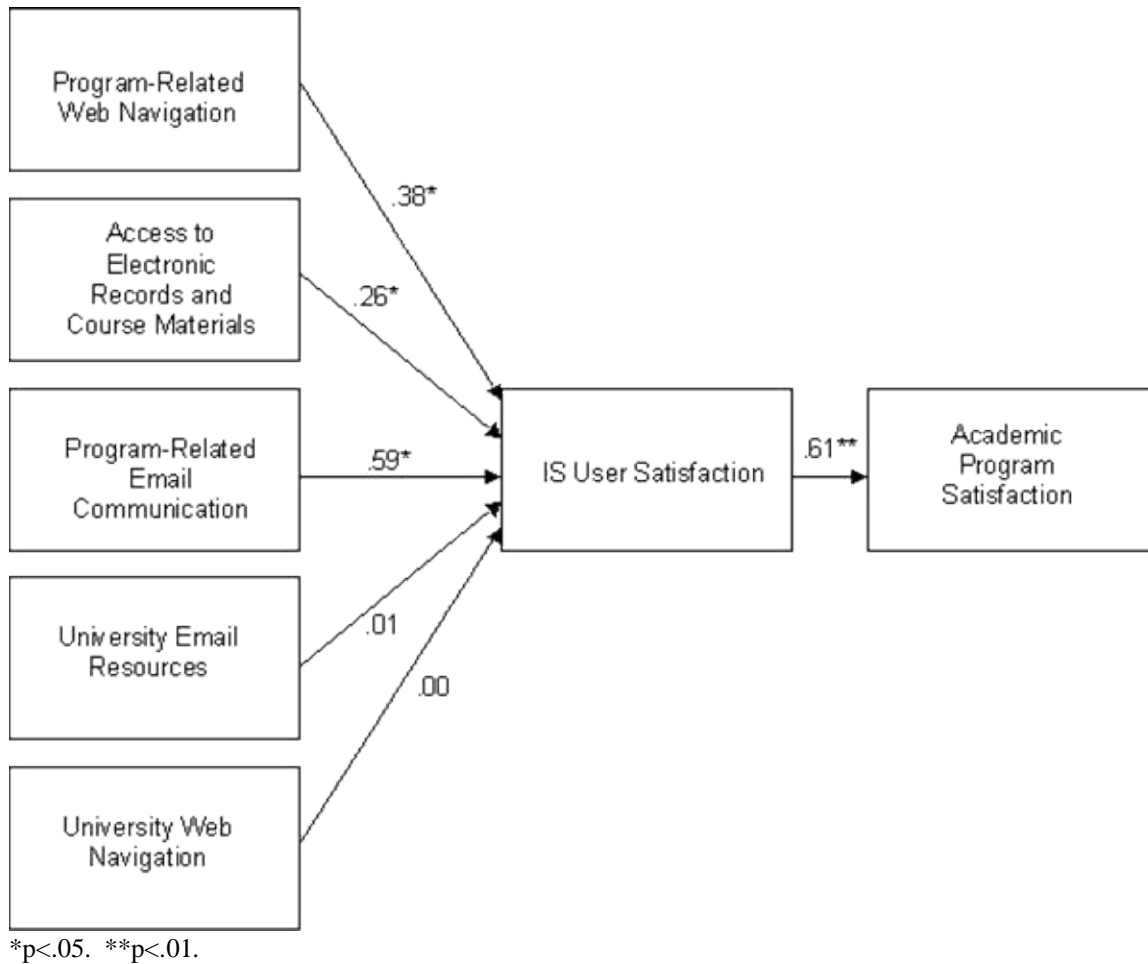
Source	Sum of squares	df	Mean Square	F	p
Access to electronic records and course materials					
Between groups	.17	2	.08	.14	.87
Within groups	62.01	100	.62		
Total	62.18	102			
University web navigation					
Between groups	3.41	2	1.71	2.75	.07
Within groups	61.90	100	.62		
Total	65.31	102			
University email resources					
Between groups	8.95	2	4.48	5.77**	.00
Within groups	77.56	100	.78		
Total	86.51	102			
Program-related email communication					
Between groups	12.47	2	6.23	9.45**	.00
Within groups	65.96	100	.66		
Total	78.43	102			
Program-related web navigation					
Between groups	9.70	2	4.85	10.37**	.00
Within groups	46.78	100	.47		
Total	56.48	102			
Overall IT user satisfaction					
Between groups	4.96	2	2.48	3.38*	.04
Within groups	73.43	100	.73		
Total	78.39	102			
*p<.05. **p<.01.					

**Table 4. ANOVA for IT User Satisfaction Among Distance-Learning, Executive, and Traditional Students**

Hypothesis 3 stated that within a single academic program, IT user satisfaction will positively influence academic program satisfaction. A path model of IT user satisfaction to academic program satisfaction was tested using SEM. Goodness of fit indicators suggested reasonable model fit (CMIN/DF = 1.708, GFI = .86, CFI = .91, PNFI = .67, and RMSEA = .08) (Hair et al, 1998). Access to Electronic Records and Course Materials, Program-Specific Email Communication, and Program-Specific Web Navigation demonstrated significant positive influences on overall IT User Satisfaction, which in turn demonstrated a significant positive influence on Academic Program Satisfaction, supporting Hypothesis 3 (b=.61, p=.00). The results are presented in Figure 1.

## DISCUSSION

The current study has examined IT user satisfaction in an academic setting through the inductive development of a survey instrument. Using critical incidents and open-ended surveys, MBA students in an economic strategy course at a large university were asked to describe their perceptions of the strengths and weaknesses of the IT resources used in the academic program. The results were used to develop a survey instrument, which was administered to distance-learning, executive, and traditional students, all of whom were taking the economic strategy course. Results were factor-analyzed, identifying five dimensions of IT user satisfaction in an academic setting – Access to Electronic Records and Course Materials, University Web Navigation, University Email Resources, Program-Specific Email Communication, and Program-Specific Web Navigation. These dimensions are similar to those identified in a previous study in which workers identified email, groupware, Internet, and communication as critical resources in a remote work environment (Staples, 2001). Three hypotheses were tested using ANOVA and SEM (Hair et al., 1998).



**Figure 1. Structural Equation Model of Relationship Between IT User Satisfaction and Academic Program Satisfaction**

Hypotheses 1 and 2 were supported, suggesting that IT user satisfaction differs among distance-learning, executive, and traditional students. These results are consistent with the findings of Staples (2001), who also suggested that IT satisfaction among remote workers differed from that of traditional workers. Interestingly, contrary to previous findings that suggested increased reliance and use of IT leads to higher levels of satisfaction with the IT (Simmers & Anandarajan, 2001) and to suggestions that remote workers use IT more frequently than traditional workers (Wang, 2003), the current study found that traditional students had a higher level of satisfaction on average than did distance-learning students. Further, executive MBA students, who participate in a hybrid program possessing elements of both on-campus and distance-learning, also reported higher levels of user satisfaction than distance-learning students on program-related dimensions of IT and on overall IT user satisfaction. In fact, executive MBA students reported the highest average levels of satisfaction with respect to four out of five factors and overall IT user satisfaction. Perhaps these findings are due to differences in an academic setting versus an industry setting (Alavi, Marakas, & Yoo, 2002; Wang, 2003) or are indicative of the hybrid characteristics of the executive program. These findings may also support the suggestions of Simmers and Anandarajan (2001) that the pervasiveness of the Internet and other technologies in today's society and the rapid rates of change in IT prohibit generalizability of past IT user satisfaction results to current studies. Further research regarding the differences among various program types may be necessary to build upon these findings.

The third hypothesis, which stated that IT user satisfaction will positively influence academic program satisfaction, was also supported. Similar to findings in an industry setting (Morris et al., 2002; Staples, 2001), this result suggests that the increased use of IT as a part of the academic program may, indeed, impact a student's overall perceptions of that program. As Wang (2003) suggests, IT has continued to evolve as a critical resource for students and faculty. With this increased reliance on technology for administration of courses, completion of tasks, and access to records and course materials,



satisfaction with an academic program may be increasingly influenced by the students' perceptions of the program's IT resources. Thus, as universities work to improve student satisfaction, improvements to the institution's IT resources should also be considered.

The findings and exploratory nature of the current study support the claims (Wang, 2003; Zmud, et al., 1994) that further research is needed regarding IT user satisfaction in academia. The advent of new technologies and increased use of IT in an academic setting suggest the need for focused studies of IT user satisfaction with less dependence on standardized survey instruments. The results of the current study and of similar focused studies may offer more insight into specific phenomena of interest for both researchers and practitioners (Zmud et al., 1994). For instance, while the final survey tests hypotheses for researchers and gives practitioners an overall picture of deficiencies within the IT portfolio, the data gathered using critical incidents and open-ended surveys may provide more insight into the survey responses, particularly for academic administrators and those working to improve the IT resources made available within the academic program. Thus, the current study proposes increased use of critical incidents and similar techniques in studies of IT user satisfaction to more aptly identify the issues behind participant responses. Furthermore, researchers have noted a need for additional studies of user satisfaction with the Internet (Simmers & Anandarajan, 2001) and a need for additional studies of distributed learning environments (Alavi et al., 2002). Particularly, Alavi et al. (2002) suggested that distributed learning environments, such as that experienced by the distance-learning and executive students in this study, may require increased student effort. Au et al. (2002) also suggested that although IT provides many features to satisfy users' needs, the amount of effort required to use IT may lead to dissatisfaction. Perhaps a measure of the students' perceived level of effort required for IT use should be considered in future studies.

## CONCLUSION

The current study makes two important contributions. First, we examine IT user satisfaction in an academic setting, an increasingly important setting in a knowledge-based economy, and one in which IT is playing a vital role, particularly within the rapidly expanding distance-learning area. As universities continue to expand their IT resources and depend more heavily on IT for learning support and interaction, evaluation of IT user satisfaction will become a critical measure of educational effectiveness and may be used as a lens to identify areas for improvement in the overall educational process. Any university that neglects IT as a key component of their educational infrastructure will ensure a decline in both the relative and absolute importance of their programs. Second, the study demonstrates the use of critical incidents and open-ended surveys in studies of IT user satisfaction, techniques infrequently documented in the IT literature. Concerns exist among researchers regarding overuse of general surveys in IT user satisfaction research; thus the current study promotes a focus on more comprehensive development of survey instruments to further the research on IT user satisfaction and to highlight contemporary IT issues that may not be readily apparent with the use of standardized survey instruments.

## REFERENCES

1. Alavi, M., Marakas, G. M. and Yoo, Y. (2002) A comparative study of distributed learning environments on learning outcomes, *Information Systems Research*, 13, 4, 404-415.
2. Ang, J. and Soh, P. H. (1997) User information satisfaction, job satisfaction and computer background: An exploratory study, *Information & Management*, 32, 255-266.
3. Au, N., Ngai, E. W. T. and Cheng, T. C. E. (2002) A critical review of end-user information system satisfaction research and a new research framework, *Omega*, 30, 451-478.
4. Bailey, J. E. and Pearson, S. W. (1983) Development of a tool for measuring and analyzing computer user satisfaction, *Management Science*, 29, 5, 530-545.
5. Butler, J. K. (1991) Toward understanding and measuring conditions of trust: Evolution of a conditions of trust inventory, *Journal of Management*, 17, 643-663.
6. Cortina, J. M. (1993) What is coefficient alpha? An examination of theory and applications, *Journal of Applied Psychology*, 78, 1, 98-104.
7. Doll, W. J. and Torkzadeh, G. (1988) The measurement of end-user computing satisfaction, *MIS Quarterly*, 12, 2, 259-274.
8. Flanagan, J. C. (1954) The critical incident technique, *Psychological Bulletin*, 51, 4, 327-358.

9. Ford, J. K., MacCallum, R. C. and Tait, M. (1986) The application of exploratory factor analysis in applied psychology: A critical review and analysis, *Personnel Psychology*, 39, 291-314.
10. Greengard, S. (1994, December) Making the virtual office reality, *Personnel Journal*, 66-79.
11. Hair, J. F., Jr., Anderson, R. E., Tatham, R. L. and Black, W. C. (1998) *Multivariate data analysis* (5th ed.), Prentice Hall, Upper Saddle River.
12. Hinkin, T. R. (1995) A review of scale development practices in the study of organizations, *Journal of Management*, 21, 5, 967-988.
13. Hinkin, T. R. (1998) A brief tutorial on the development of measures for use in survey questionnaires, *Organizational Research Methods*, 1, 1, 104-121.
14. Ives, B., Olson, M. H., & Baroudi, J. J. (1983) The measurement of user information satisfaction, *Communications of the ACM*, 26, 10, 785-793.
15. Jackson, P. R., Wall, T. D., Martin, R. and Davids, K. (1993) New measures of job control, cognitive demand, and production responsibility, *Journal of Applied Psychology*, 78, 753-762.
16. Jones, M. C. and Beatty, R. C. (2001) User satisfaction with EDI: An empirical investigation, *Information Resources Management Journal*, 14, 2, 17-26.
17. Lucas, H. C. and Baroudi, J. (1994) The role of information technology in organization design, *Journal of Management Information Systems*, 10, 4, 9-23.
18. Melone, N. P. (1990) A theoretical assessment of the user-satisfaction construct in information systems research. *Management Science*, 36, 1, 76-91.
19. Morris, S. A., Marshall, T. E. and Rainer, R. K., Jr. (2002) Impact of user satisfaction and trust on virtual team members, *Information Resources Management Journal*, 15, 2, 22-30.
20. Mowshowitz, A. (1994) Virtual organizations: A vision of management in the information age, *The Information Society*, 10, 4, 267-288.
21. Muylle, S., Moenaert, R. and Despontin, M. (2004) The conceptualization and empirical validation of web site user satisfaction, *Information & Management*, 41, 543-560.
22. Nunnally, J. C. (1978) *Psychometric Theory*, McGraw-Hill, New York.
23. Roberts, E. S. (1999) In defense of the survey method: An illustration from a study of user information satisfaction, *Accounting and Finance*, 39, 53-77.
24. Rummel, R. J. (1970) *Applied factor analysis*, Northwestern University Press, Evanston.
25. Seddon, P. B. (1997) A respecification and extension of the DeLone and McLean model of IT success, *Information Systems Research*, 8, 3, 240-253.
26. Simmers, C. A. and Anandarajan, M. (2001) User satisfaction in the internet-anchored workplace: An exploratory study, *Journal of Information Technology and Application*, 3, 5, 39-61.
27. Staples, D. S. (2001) A study of remote workers and their differences from non-remote workers, *Journal of End User Computing*, 13, 2, 3-14.
28. Wang, Y. (2003) Assessment of learner satisfaction with asynchronous electronic learning systems, *Information & Management*, 41, 75-86.
29. Woodroof, J. and Kasper, G. (1998) A conceptual development of process and outcome user satisfaction, *Information Resources Management Journal*, 11, 2, 37-43.
30. Yoon, Y. and Guimaraes, T. (1995) Assessing expert systems impact on users' jobs, *Journal of Management Information Systems*, 12, 1, 225-249.
31. Zmud, R. W., Sampson, J. P., Reardon, R. C., Lenz, J. G. and Byrd, T. A. (1994) Confounding effects of construct overlap: An example from IT user satisfaction theory, *Information Technology & People*, 7, 2, 29-45.

## **APPENDIX A: STRENGTHS-WEAKNESSES SURVEY AND CRITICAL INCIDENT SURVEY**

### Strengths-Weaknesses Open-Ended Survey Instructions

“Please list below any strengths and weaknesses you have observed with regard to all aspects of the information technology resources, applications, and services available to you as a student in this university’s MBA Program. Please feel free to use the back of the sheet if you need additional space.”

### Critical Incident Survey Instructions

“Thinking about all aspects of the information technology resources, applications, and services available to you as a student in this university’s MBA program, please describe below a recent critical incident, either positive or negative, which has impacted your ability to be successful in the MBA program. Please feel free to use the back of this sheet if you need additional space.”

32.