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ABSTRACT

Our data analysis suggests that the following factors contribute to the faculty adoption of and satisfaction with the online mode of instruction: improvement in traditional teaching ability through online teaching, higher quality of education that faculty believe online students receive, higher rating of the majority of students' technical sophistication, and higher number of online courses previously taught. On the other hand, the amount of time spent on grading and the time spent on technical adjustment impede willingness to adopt and satisfaction with the online mode of instruction. This paper offers an adoption model.

Keywords

Online instruction, faculty online teaching adoption and satisfaction

INTRODUCTION

To meet the educational needs of working individuals with limited available travel time, and for those who live in rural areas and away from campuses, many institutions of higher education are using technology innovations to expand on their online course and degree program development and delivery. Despite this expansion, some faculty members continue to resist developing and offering online courses. The focus of this paper is on factors that influence and impede faculty satisfaction with online course development and delivery. This paper reports findings based on an analysis of data collected from faculty who have and have not taught online courses. The data were collected over the spring and fall 2003 semesters from a campus of a major state university where there has been a high level of faculty involvement in online course development and delivery although the distribution of involvement has admittedly not been uniform across disciplines (Table 1).

We will first present a summary of the available literature in this area and then present a brief background about the institution at which this study took place. Next, we present our research method and the results of our data analysis and findings based on a survey instrument used for this study. In the last part of the paper we suggest an adoption model based on our survey results and discuss the implications of our findings.

LITERATURE REVIEW

Factors that are cited in the literature as reasons behind the significant growth of online course and degree program development and delivery include competition for students (Rahm and Reed, 1997; Tsichritzis, 1999), and life long learning

Colleges	Number of Online Courses	Enrollment	Credit Hours	Percentage
Business and Management	11	186	744	13.4%
Education and Human Services	26	259	850	15.3%
Liberal Arts and Sciences	65	890	3382	60.7%
Public Affairs and Administration	6	148	592	10.6%
Total	108	1483	5568	100%

Table 1. Fall 2003 – Distribution of Online Courses and Enrollment by College

and continuous professional education and growth (Confessore, 1999). One can also argue that developing online content and making it available to face-to-face as well as online students may facilitate improving the traditional face-to-face instruction.

Numerous studies (Chau and Tam, 1997; Damanpour, 1991; Flanagin, 2000; Teo, Tan and Buk, 1997; Thong, 1999; Tornatzky and Klein, 1982) have tried to identify factors that influence organizations' adoption of innovations in general and information technology in particular. Downs and Mohr (1976) classify factors that influence adoption of innovation as characteristics of organizations, the environment, or the perceived advantages of the innovation.

Many institutions of higher education are attempting to assess and ensure quality while coping with the significant growth in the demand for online programming. The Alfred P. Sloan Foundation's Sloan Consortium, known as Sloan-C, about 1997 recognized and publicized its Five Pillars (Mayadas, 1997) for high quality online education: learning effectiveness, student satisfaction, faculty satisfaction, cost effectiveness, and access.

A few studies have attempted to determine factors that contribute to faculty satisfaction with online course development and delivery. Thompson (2003) suggests institutional support, personal rewards and professional recognition as requirements for faculty satisfaction with developing and delivering online course and degree programs. Boschmann (2003) relates faculty satisfaction with online instruction to faculty training, involvement, support, and strong advocacy. Fetzner (2003) advocates faculty support in the areas of course development, technical, operational and administrative training.

Shea, Pelz, Frederickson, and Pickett (2002) link faculty satisfaction to the availability of technical support and training for online course development and delivery, better student performance, frequent interaction with students, scheduling flexibility, getting to know students better, better course design and assessment, and better ability to measure learning. Some concerns still cited (Shea et al., 2002) include the level and availability of the required technology on the learner side, the ability to verify authenticity of work done and submitted by the students, assurance of quality and learning, and an appropriate approach to guide students into face-to-face instruction when their learning style does not fit with the online mode of delivery.

Almeda and Rose (2000) reported the satisfaction of faculty in fourteen online freshman-level courses in composition and literature, business writing, and English as a second language. Based on a survey of faculty teaching those courses, they reported that these writing courses are suitable for the online mode of delivery and the faculty members are satisfied with the development and delivery of these courses using this mode of delivery.

Arvan, Ory, Bulock, Burnaska, and Hanson (1998) and Arvan and Musumeci (2000) studied faculty attitudes regarding online courses in the areas of Spanish, microbiology, economics, mathematics, chemistry, and physics. They reported faculty satisfaction with online course development and delivery in those areas. They further reported that online courses could result in some efficiency gains in some high enrollment courses without negatively affecting quality of instruction. Franklin (2001) advocates a mixed mode model as a point of synergy between online and face-to-face course development and delivery.

BACKGROUND

A major public higher education system, in the Fall of 1997, started its system-wide initiative to develop and deliver high-quality Internet-based courses, certificates, complete degree programs and Internet-based public service. The system consists of three campuses. The system currently offers 50 fully online degree programs, about 350 fully online courses, and enrolls more than 5000 online students.

The campus where this study was conducted has a high proportion (about 45 percent) of its faculty involved in Internet-based course development and delivery compared with about 10 percent on the other two campuses. Internet-based course offerings on this campus started in the Fall of 1998 with one course and an enrollment of 30 students. In the Fall of 2003, there were 1483 students enrolled in 108 fully Internet-based courses. Figure 1 shows the enrollment growth.
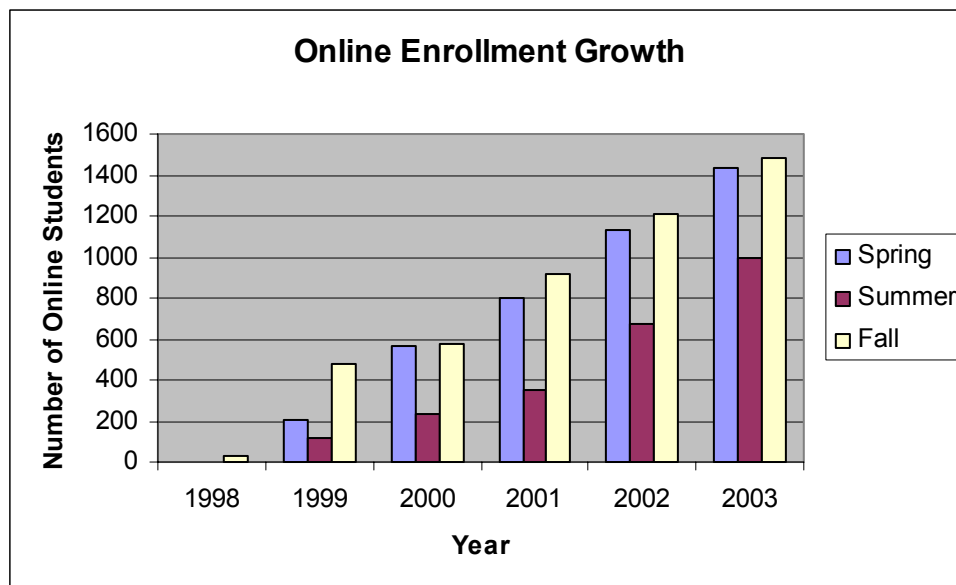

Figure 1. Online Enrollment Growth

This campus currently offers fully online a Master of Science in management information systems, Master of Arts in educational leadership with a concentration in master teaching and leadership, a graduate certificate in career specialist studies, and undergraduate degree completion programs in liberal studies, English, computer science, history, and philosophy, as well as many individual online courses in other disciplines.

The student body on this campus consists of the traditional full-time as well as part-time students who are employed full or part-time. Technical support and a help desk are available to students who are enrolled in the online or face-to-face courses. Online and face-to-face assistance using the teaching and collaborating tools such as course management systems employed in the online courses is available to students who are new to online learning. Other services such as online access to library resources and publications and a database of library collections as well as access to online course catalogues are available to students.

More than 90% of the online courses are developed and delivered by full-time faculty on this campus. In many cases, the same faculty member offers the online and face-to-face sections of a given course. The faculty members who teach the courses develop the majority of the online courses. Faculty who are new to online teaching and learning are usually encouraged to develop an online version of a course that they have taught face-to-face before as their first attempt to develop and deliver an online course. Various campus units with professional staff are available to provide any needed technical and instructional design assistance to faculty during the development and delivery of the courses on this campus. Enrollment in each online course is usually limited to 20-25 students. A well-organized and structured set of statewide online courses and a master online teacher certificate are also available for faculty who are new to online teaching to learn how to teach online. New faculty who plan to teach online courses also have access to a sample of live online courses so that they can better prepare themselves for online course development and delivery.

Course delivery on this campus is mainly via a Web browser but variation exists from course to course in the use of other tools and technologies. Some faculty distribute CDs with course content in addition to the Web while others make streaming audio of lectures as well as course related text and graphics available to students.

This campus operates on a semester basis and the duration and schedule of the online courses are identical to the traditional face-to-face courses. The online courses are delivered asynchronously but a significant amount of interaction exists between

faculty and students and among students via e-mail and conferencing tools. The majority of the courses have mandatory or optional synchronous components built into them.

METHODOLOGY

An instrument was designed to identify factors that influence and impede faculty satisfaction with online course development and delivery. The instrument used is a survey questionnaire consisting of thirty-two questions. The survey questions deal with issues such as faculty years of experience with online teaching, the subject matter they teach, teaching workload, time spent on development and delivery of courses, online teaching and learning activities, instructional materials they use, amount of faculty-student and student-student interactions, development of rapport with students, the ability to get to know students, advantages and disadvantages of online teaching, students' and faculty satisfaction with online teaching, major reasons behind adopting or not adopting the online mode of teaching, and faculty familiarity and level of comfort with using instructional technology.

The survey instrument consists of both open-ended and close-ended questions. A Likert scale is used to determine the level of agreement with the stated assertions for the close-ended questions. The responses to the open-ended questions are coded and grouped together for statistical analysis.

The subjects in the study were about 170 full-time faculty on this campus. About 45 percent of the faculty have developed, taught and/or are currently developing and/or teaching at least one online course. Sixty-four usable responses were received, which represents a 37.4% survey return. The usable sample size was not very large but it was statistically adequate for this exploratory study.

DATA ANALYSIS

Data from the survey questionnaire were analyzed to determine factors that affect faculty members' degree of willingness to participate in online courses and degree program development and delivery. Analyses of variance and regression analyses were used for this purpose. Factors that are hypothesized to affect faculty members' willingness to teach online courses are:

- A faculty member's background
- The faculty member's perception of students' ability and performance
- Time required of the faculty member
- Improvement of faculty member's teaching ability
- Perceived presence or absence in the course of a "human touch"
- Amount and quality of administrative and technical support

Willingness of faculty to teach online courses was treated as a dependent variable. For factors that are interval or ordinal measurements, correlation analysis was applied to determine whether a significant correlation exists between willingness and each factor. If a significant correlation exists, regression analysis was used to determine how the factor influences willingness. For factors that are nominal measurements, analysis of variance was applied to determine whether a significant difference exists in average willingness within a factor. Analysis of variance was also used to analyze faculty rankings of the advantages and disadvantages of teaching/taking online courses. When a significant difference in the average ranks exists, Duncan's new multiple range test was applied to group the advantages/disadvantages.

Willingness to Teach Online Courses and Faculty Member's Background

The following hypotheses were tested:

a) The gender of the faculty members does not affect willingness to teach online courses.

b) Years of teaching experience does not affect willingness to teach online courses.

c) The number of online courses previously taught does not affect willingness to teach online courses in the future.

d) Teaching discipline does not affect willingness to teach online courses.

e) Course level does not affect willingness to teach online courses.

Conclusion:

Gender (P-value=0.7745), years of teaching experience (P-value=0.2150), teaching discipline (P-value=0.3345), and course level taught (P-value=0.3744) do not affect faculty members' willingness to teach online courses in the future. However, the number of online courses previously taught has a positive correlation (P-value=0.0345) with faculty members' willingness to teach online courses in the future. The more online courses taught, the greater the member's willingness to teach online courses (Figure 2).

Willingness to Teach Online Courses and Faculty Member's Opinion about Students' Ability and Performance

The following hypotheses were tested:

a) Faculty members' ratings of students' technological sophistication is not related to willingness to teach online courses.

b) Faculty beliefs about whether students receive a better education online do not affect faculty willingness to teach online

   courses.

Conclusion:

The higher a faculty member's rating of the majority of students' technological sophistication, the greater the member's willingness to teach online courses (P-value=0.016) (Figure 3). The better the education that faculty believe online students receive, the greater a member's willingness to teach online courses (P-value=0.0008) (Figure 3).
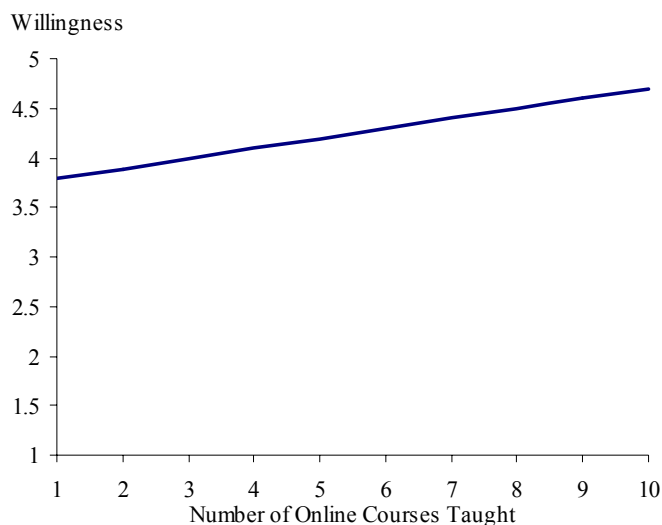

Figure 2. Relationship between Number of Online Courses Taught and Willingness to Teach Online in the Future

Willingness to Teach Online Courses and Time Required of Faculty Members

The following hypotheses were tested:

a) The amount of contact time is not correlated with faculty willingness to teach online courses.

b) The amount of grading time is not correlated with faculty willingness to teach online courses.

c) The amount of time spent on systematic instructional design is not correlated with faculty willingness to teach online

   courses.

d) The amount of preparation time is not correlated with faculty willingness to teach online courses.

e) The amount of time originally anticipated to write materials is not correlated with faculty willingness to teach online courses.

f) The amount of time originally anticipated in meeting with support staff is not correlated with faculty willingness to teach online courses.

g) The amount of time spent on technical adjustments for online delivery is not correlated with faculty willingness to teach online courses.

Conclusion:

The more time a faculty member spends on grading, the less the faculty member's willingness to teach online courses (P-value=0.0441) (Figure 3). The more time a faculty member spends on technical adjustments, the less the faculty member's willingness to teach online courses (P-value=0.0324) (Figure 3). Amount of contact time (P-value=0.8159), amount of time spent on systematic instructional design (P-value=0.9432), amount of preparation time (P-value=0.4702), amount of time required to write materials (P-value=0.2562), and amount of time required to meet with support staff (P-value=0.8372) do not affect willingness to teach online.

Willingness to Teach Online Courses and Improvement in Faculty Members' Teaching Ability

The following hypotheses were tested:

a) The amount of improvement in online teaching ability is not correlated with faculty willingness to teach online courses.

b) The amount of improvement in traditional teaching ability as a result of the online teaching experience is not correlated with faculty willingness to teach online courses.

Conclusion:

The more faculty members believe online teaching improves their traditional teaching ability, the greater the faculty member's willingness to teach online courses (P-value=0.0055) (Figure 3). However, faculty members' beliefs about improvements in their online teaching abilities do not affect the faculty member's willingness to teach online courses in the future (P-value=0.0997).

Willingness to Teach Online Courses and the "Human Touch" in Online Courses

The following hypotheses were tested:

a) Faculty members' opinions about their getting to know students better in online courses do not affect faculty willingness to teach online courses.

b) Faculty members' opinions about whether students get to know faculty better in online courses does not affect faculty willingness to teach online courses.

Conclusion:

Neither faculty beliefs about whether or not they get to know students better (P-value=0.4963) nor whether students get to know them better (P-value=0.7806) affects faculty willingness to teach online courses in the future.

Willingness to Teach Online Courses and Satisfaction with Support for Online Courses

The following hypotheses were tested:

a) Level of satisfaction with technical help does not affect faculty willingness to teach online courses.

b) Level of satisfaction with administrative support does not affect faculty willingness to teach online courses.
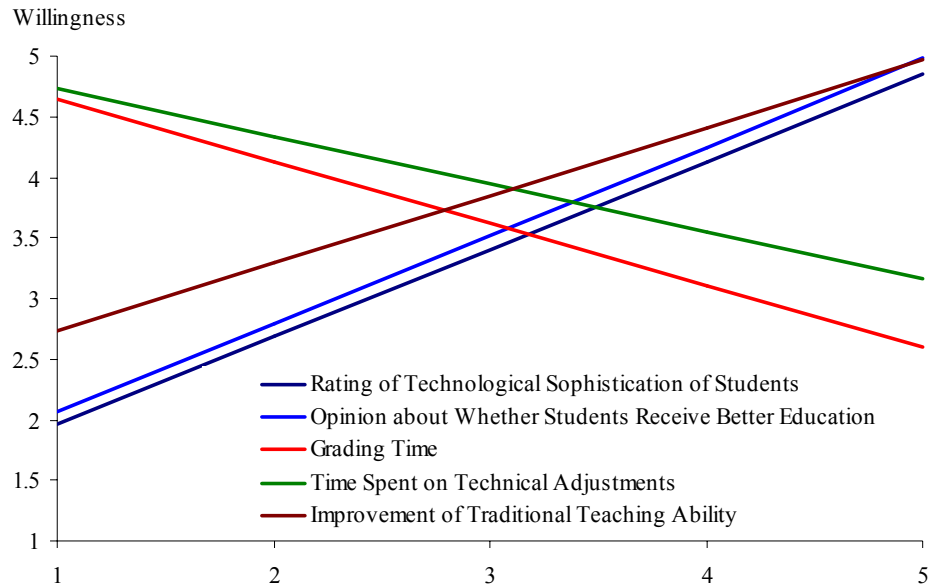
Figure 3. Relationship between Willingness to Teach Online and Technological Sophistication of Students, Perceived Quality of Education Students Receive, Time Spent on Grading, Time Spent on Technological Adjustment, and Improvement in Traditional Teaching

Conclusion:

Neither level of satisfaction with technical help (P-value=0.4055) nor level of satisfaction with administrative support (P-value=0.4987) affects faculty willingness to teach online courses. This result is probably related to the high levels of satisfaction with technical help and administrative support reported by survey respondents (Technical Help average = 4.22; Administrative Support average = 3.64 on a scale of 1 to 5, with 5 being very satisfied).

Faculty Views of the Advantages and Disadvantages of Teaching/Taking Online Courses

The advantages and disadvantages of teaching online courses from the faculty points of view as well as what faculty members believe are advantages and disadvantages for students who take online courses are considered next.

Advantages of Teaching Online Courses

Hypothesis: There is no significant difference in faculty opinions about the advantages of teaching online courses.

Conclusion:

Faculty opinions about the advantages of teaching online courses do not differ significantly (P-value = 0.5675). In other words, faculty believe that the following factors have similar advantages: the ability to give students feedback at any time, the ability to perform class duties without having to come to campus every class day, the individual attention faculty can give students, and the privacy of communication between students and between each student and the instructor.

Disadvantages of Teaching Online Courses

Hypothesis: There is no significant difference in faculty opinions about the disadvantages of teaching online courses.

Conclusion:

Faculty opinions about the disadvantages of teaching online courses are significantly different (P-value=0.0001). On average, faculty believe the amount of time required to teach online courses is the greatest disadvantage and faculty lack of familiarity with hardware/software is the least disadvantageous issue (Table 2).

Item	Average Disadvantage	Grouping *
The amount of time required to teach online courses	3.7241	
Lack of the "human touch"	2.7931	
The limitations of the hardware and/or software	2.6897	
Lack of group meetings and the resulting immediate crosstalk and exchange	2.4483	
Students' lack of familiarity with the hardware and/or software	2.4138	
Faculty lack of familiarity with the hardware and/or software	1.6207	

* Items covered by the same line are not significantly different at the 0.05 level of significance.

Table 2. Factors Faculty Consider a Disadvantage when Teaching Online Courses

Faculty Views of the Advantages for Students of Online Courses

Hypothesis: Faculty views about what they believe students may consider advantages of online courses do not differ significantly.

Item	Average Advantage	Grouping*
Not having to come to campus every class day	4.6552	
The ability to perform the class work at other than set times	4.5862	
The ability to get feedback from the teacher at any time	3.7931	
Individual attention from the teacher	3.4828	
The privacy of communication between students and between each student and the instructor	3.2759	

* Items covered by the same line are not significantly different at the 0.05 level of significance.

Table 3. Factors Faculty Consider an Advantage for Students Taking Online Courses

Conclusion:

Faculty beliefs about these advantages for students of taking online courses differ significantly (P-value=0.0001). On average, faculty believe that students' not having to come to campus every class day and their ability to perform the class work at other than set times are the most advantageous issues for students (Table 3).

Faculty Views of the Disadvantages for Students of Online Courses

Hypothesis: Faculty views about what they believe students may consider disadvantages of online courses do not differ significantly.

Conclusion:

 Faculty beliefs about the disadvantages for students of taking online courses do not differ significantly (P-value=0.5902). In other words, faculty believe that students consider the following factors: lack of familiarity with the hardware and/or software, lack of the "human touch," lack of group meetings and the resulting immediate cross talk and exchange, the

limitations of the hardware and/or software, the difficulty of learning the software, and the amount of time required to take an online course have similar disadvantages.

Reasons that Faculty Have Not Yet Offered an Online Course

A number of factors were considered to identify the reasons that faculty have not yet offered an online course (Table 4).

Reason	Average Ranking	Grouping*
My other duties require so much time that I simply haven't had the time to adapt my materials or develop a course.	4.1176	
I believe my courses are not appropriate for online delivery.	2.2294	
I need to learn more first about the technology involved.	1.4706	
I'm relatively new on this campus so I haven't had the opportunity yet	1.4118	
Others	0.8058	
I believe the benefits of an online course are outweighed by the disadvantages.	0.7000	
I've tried but the technical and/or pedagogical help was inadequate.	0.3529	
I am too far along in my career now to change.	0.3176	
I have applied for one of the grants to put a course online, but my application wasn't approved.	0.2647	
I don't believe my students or I would gain anything by putting any of my courses online because they work just fine as they are.	0.1882	
I don't trust the technology.	0.1412	
I think the whole online push is merely a fad.	0.0000	

* Items covered by the same line are not significantly different at the 0.05 level of significance.

Table 4. Ranking of Reasons Faculty Have Not Yet Offered an Online Course

Hypothesis: There are no significant differences in average ranking among the reasons that faculty have not yet offered an online course.

Conclusion:

Average rankings for reasons that faculty have not yet offered an online course are significantly different (P-value=0.0001).

The most significant reason for not yet offering an online course is "My other duties require so much time that I simply haven't had the time to adapt my materials or develop a course."

A Framework for Faculty Adoption of Internet based Course Development and Delivery

Downs and Mohr (1976) classify factors that influence adoption of innovation as characteristics of organizations, the environment, or the perceived advantages of the innovation. We propose a similar framework with the addition of the perceived disadvantages of the innovation as an impediment to adoption. From the institutional and managerial viewpoint, our adoption model identifies factors that faculty consider critical in adopting online course development and delivery. It

also identifies factors that impede such adoption. Figure 4 depicts our adoption model. It should help faculty and institutions in their adoption decisions.
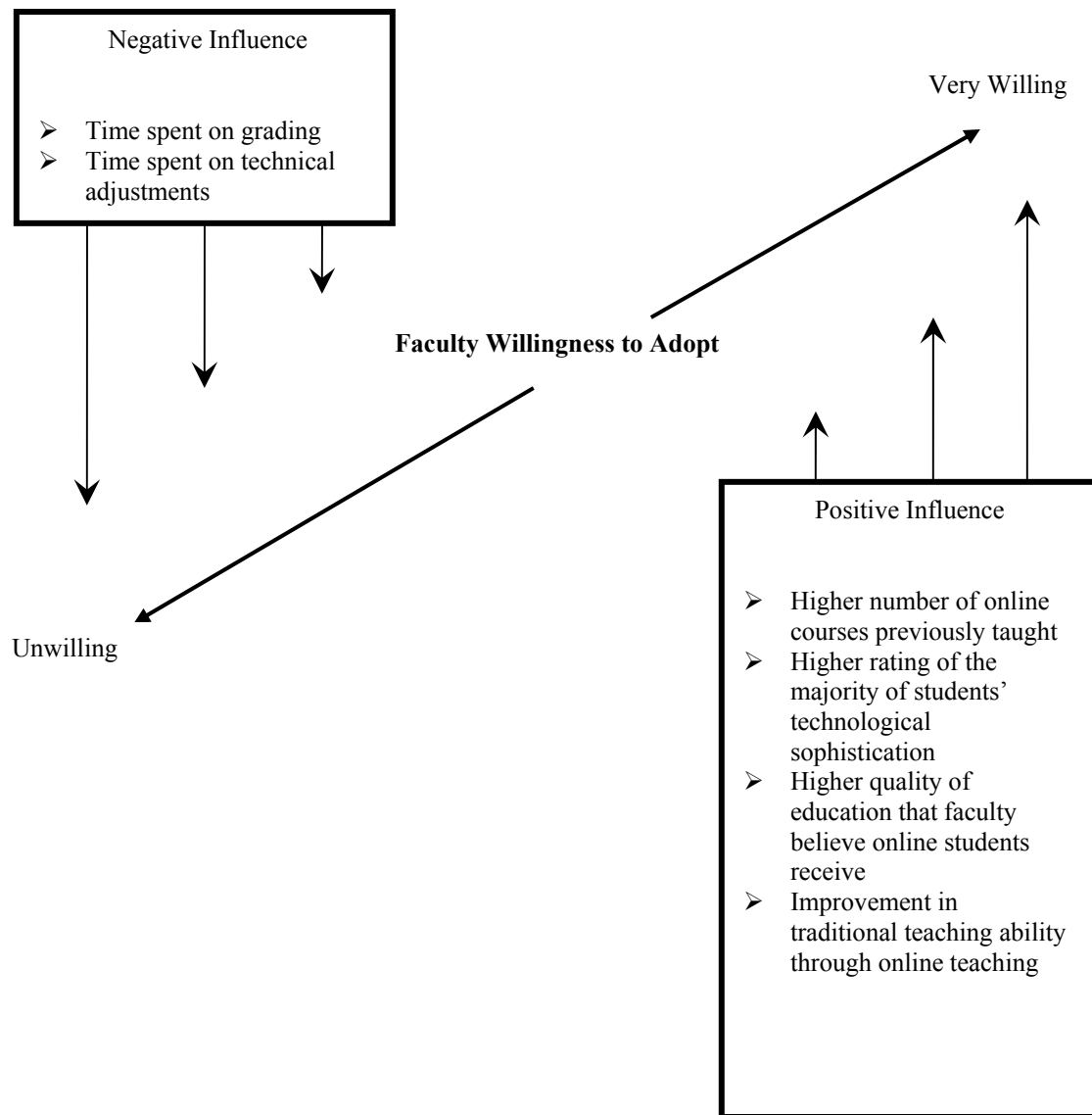

Figure 4. A Framework for Faculty Adoption of Internet–based Course Development and Delivery

SUMMARY AND CONCLUSIONS

Faculty members are among the major stakeholders in online course development and delivery, and adoption of this mode of course delivery may depend on various factors. The entire faculty at a campus of a major state university was surveyed to identify factors that influence their decision whether to adopt online course development and delivery. The data were analyzed to determine if these influential factors depend on faculty characteristics such as gender, field of study, course subject, quality perception, and time requirements.

Gender, years of teaching experience, teaching discipline, and course level did not influence faculty decisions to develop or deliver courses online. Perceptions of quality and the time required of faculty to develop and deliver the courses did influence the choice of whether to adopt the online mode or not. More specifically, higher number of online courses previously taught, higher rating of the majority of students' technical sophistication, higher quality of education that faculty believe online students receive, and improvement in traditional teaching ability through online teaching contribute to the faculty adoption of and satisfaction with online mode of instruction. These findings are consistent with better student performance and the level and availability of the required technology on the learner side as factors for faculty adoption of and satisfaction with online instruction indicated by Shea, et al. (2002). On the other hand, our analysis shows that the amount of time spent on grading and the time spent on technical adjustment impede the adoption of and satisfaction with the online mode of instruction.

The above tendencies suggest an adoption model similar to what is proposed in this paper that encompasses both the advantages and disadvantages that faculty perceive when considering adopting the online mode of course development and delivery.

ACKNOWLEDGEMENTS

REFERENCES

1. Almeda, M. B. and Rose, K. (2000). Instructor satisfaction in University of California Extension's online writing curriculum. *Journal of Asynchronous Learning Networks*, 4, 3, 180-195.
2. Arvan, L. and Musumeci, D. (2000). Instructor attitudes within the SCALE efficiency projects. *Journal of Asynchronous Learning Networks*, 4, 3, 196-215.
3. Arvan, L., Ory, J. C., Bullock, C. D., Burnaska, K. K., and Hanson, M. (1998). The SCALE efficiency projects. *Journal of Asynchronous Learning Networks*, 2, 2, 33-60.
4. Boschmann, E. (2003). The IUPUI story of change. In J. Bourne & J.C. Moore (Eds.), Elements of Quality Online Education: Practice and Direction, 4 (213-228). Needham: Sloan Center for Online Education.
5. Chau, P. Y. K. and Tam, K. Y. (1997). Factors affecting the adoption of open systems: An exploratory study. *MIS Quarterly*, 21, 1, 1-24.
6. Confessore, N. (1999, Oct. 4). The virtual university. *The New Republic*, 26-28.
7. Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal*, 34, 3, 555-590.
8. Downs, G. W. and Mohr, L. B. (1976). Conceptual issues in the study of innovation. *Administrative Science Quarterly*, 21, 4, 700-714.
9. Flanagin, A. J. (2000). Social pressures on organizational Web site adoption. *Human Communication Research*, 26, 4, 618-646.
10. Fetzner, M. J. (2003). Institutional support for online faculty: Expanding the model. In J. Bourne & J.C. Moore (Eds.), *Elements of Quality Online Education: Practice and Direction,* 4 (229-241). Needham: Sloan Center for Online Education.
11. Franklin, C. L., II. (2001). Distance versus live education: Points of compromise, points of synergy. *Academy of Educational Leadership Journal* 5, 2, 97-102.
12. Mayadas, A. F. (1997). An interview with Gary E. Miller. *The American Journal of Distance Education*, 11, 3.
13. Rahm, D. and Reed, B. J. (1997). Going remote: The use of distance learning, the World Wide Web, and the Internet in graduate programs of public affairs and administration. *Public Productivity and Management Review* 20, 459-473.
14. Shea, P. J., Pelz, W., Frederickson, E. E., and Pickett, A. M. (2002). Online teaching as a catalyst for classroom-based instructional transformation. In J. Bourne & J.C. Moore (Eds.), *Elements of Quality Online Education*: *Practice and Direction* 3, 103-123. Needham: Sloan Center for Online Education.
15. Teo, T. S. H., Tan, M. and Buk, K. W. (1997). A contingency model of Internet adoption in Singapore. *International Journal of Electronic Commerce* 2, 2, 57-69.
16. Thompson, M. M. (2003). Faculty satisfaction in the online teaching-learning environment. In J. Bourne & J.C. Moore (Eds.), *Elements of Quality Online Education: Practice and Direction* 4, 189-212. Needham: Sloan Center for Online Education.
17. Thong, J. Y. L. (1999). An integrated model of information systems adoption in small business. *Journal of Management Information Systems* 15, 4, 187-214.
18. Tornatsky, L. G. and Klein, K. J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management* 29, 1, 28-45.
19. Tsichritzis, D. (1999). Reengineering the University. *Communications of the ACM* 42, 93-100.