IMPLEMENTATION OF INTERNET BASED COURSES
IN COMPUTER INFORMATION SYSTEMS AT
MILWAUKEE AREA TECHNICAL COLLEGE:

by

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ABSTRACT

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INFORMATION SYSTEMS AT MILWAUKEE AREA TECHNICAL COLLEGE

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Students in the Computer Information Systems (CIS) program at Milwaukee Area Technical

College were studied to determine whether there was interest in expanding the offerings of that

department to include distance education courses, specifically offered via the Internet. Students

were chosen from several advanced courses in the CIS curriculum and to give their opinions on

their past experience with distance education via the Internet, as well as preferences for other

courses they would like to see offered in that venue. Results of the study showed demand for

more online courses, but that any online courses, as well as instructor-led courses, needed

updating to include state-of-the-art technologies and other refinements.

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Chapter 1

Introduction

For almost 150 years, it has been the mission of American educators to give students in remote areas the same access to learning as their urban and suburban counterparts. This mission has remained constant through some of the most dramatic technological changes in American history, including the Industrial Revolution and the Space Age. Now that American society is well into what we call the "Information Age," education has adjusted itself to use available technology to offer its' services to a wider range of potential students over a wider geographical area.

One aspect of this new age of technology involves educational institutions offering distance education courses. Willis (1995) defined distance education as that which takes place when the instructor and learner(s) are separated by physical distance, and technology such as video, computer, and print materials is used to bridge the instructional gap. Distance education programs can reach potential students who could not or would not otherwise attend traditional classes due to time constraints, physical limitations or travel difficulties. A variety of reasons have been given why students might fall into these categories, among them:

- High school students can take online courses their schools do not offer for either high school credit or Advanced College Standing (Owston, 1997)

- Adults can finish GED programs online while working their regular jobs (Owston, 1997)

- Students can complete programs without sacrificing family or careercommitments (Schuemer, 1993)

- Students can take courses to broaden their education, even if not interested in completing a degree (Schuemer, 1993)

- Students with a physical limitation that may hamper their performance in a traditional classroom (Willis, 1995)

- Students who live in a remote location and cannot attend classes on a campus   (Schuemer, 1993)

History of Distance Education

According to Moore and Kearsley (1996), correspondence study became a legitimate form of education in both Europe and the United States as postal services came into being in the last half of the 19th century. Correspondence teachers sent readings, textbooks, study guides and other print materials by mail to students who gained credit for successfully completing specified assignments and mailing them back to the instructor for evaluation. This correspondence model evolved into the first generations of distance education.

Broadcast and recorded technology were the defining methods of the 2nd generation of distance education. In the late 1960 educators experimented with radio and television broadcasts, tape recordings and telephones. These technologies were combined with study guides held over from the first generation and other local library resources to provide education to students who were separated from traditional classes by long physical distances.

As broadcast and computer technologies have advanced, so did distance education, now in its' third generation. Educators delivered instruction to students in remote locations via interactive television, electronic networks and computer based multimedia systems. The most critical advance of the third generation over the second is that third generation distance education allows educators and students to communicate in a truly interactive, two-way manner, rather than the one-way communication of television broadcasts and tapes.

Distance education now sits at the dawn of a fourth generation, which uses network based delivery systems (Hirumi, 1997) to provide users with training on an as-needed basis, information and support through audio, video, text and/or graphic communications provided by live instructors or facilitators or by a computer. One such network structure is the Internet, specifically the World Wide Web (WWW or Web) portion of it.

Why use the WWW for distance learning? Willis (1995) believed the World Wide Web and browser software such as Netscape Navigator and Internet Explorer have made the Internet a more user friendly environment for educators than other forms of distance education. The Web can be used by the distance educator to build a classroom home page that can be customized for each class to include the syllabus, exercises, literature references, and sample files or study guides. The class can also provide links to information on the school, program or instructor as well as other links that would be useful to the class, such as access to library catalogs or research databases. In addition, the home page can link students to a discussion list or listserv set up for student communication or individual student home pages.

Advanced features of newer versions of these browser, such as the web page design tools, called page composers, that are built into them, allow even inexperienced users to integrate graphics, text, video and sound into a web site with relative ease. These advances have also simplified the use of

software to create forms that students can fill out online and submit to the instructor as an e-mail message, which makes it easier for students to submit assignments and provide feedback.

Milwaukee Area Technical College (MATC) has offered distance education courses for over 30 years, starting with the College of the Air program of televised courses on public TV in the mid-1960's. As technology has advanced, so has MATC, which now offers over 30 courses via the Internet, primarily in Liberal Arts (MATC, 1998). The Computer Information Systems (CIS) department, however, has not followed suit. In the fall of 1997, CIS offered one course, Visual Basic Programming via the Internet as an experiment. One year later, CIS department administration permitted an additional section, but chose not to sanction additional CIS courses for Internet delivery.

Statement of the Problem

The CIS Department at MATC offers one Internet based programming course, Introduction to Visual Basic Programming, on an experimental basis. The department is considering offering additional courses, but demand for additional courses and satisfaction with the current course offering have not been determined.

Purpose of the Study

The purpose of this study was to determine if students are satisfied with MATC's current online CIS course offering and to assess the need for more online offerings.

Objectives of the Study

The objectives of this study were to:

1. Determine student satisfaction levels toward CIS courses offered through distance education at MATC.

2.   Identify factors that contribute to success within MATC's CIS distance education

        courses

3.   Assess demand for Internet based CIS classes at MATC

4.   Determine whether special prerequisites should be placed on Internet-based courses.

Importance of the Study

Technical colleges such as MATC face a changing student population that does not conform to the traditional student model of full time day scheduling. One way to serve these non-traditional students is to offer courses via the Internet.

Many public and private educational institutions are using the Internet as a method of delivering education and training in the Information Technology field. So many institutions have adopted the Internet that public perception is changing to the point that institutions now must provide Internet-based courses in order to stay competitive in their fight to maintain student enrollments.

Data from this study can be used by MATC instructors to determine whether their courses could be offered via the Internet and to improve their present course offerings by more effective use of the Internet.

Scope of the Study

The study covered students enrolled in the CIS program at MATC at that time, regardless of whether they were taking or had taken Internet based courses.

Limitations of the Study

1.   MATC currently offers only one Internet-based CIS course, Visual Basic Programming.

        Any findings regarding achievement can not necessarily be applied to other courses,

        particularly those which are not related to programming.

2.	The study involved students enrolled in the CIS program at MATC who had completed at least 6 credits of CIS courses and attended class during the period of the study. The results may not reflect the attitudes of the general student population at MATC and may not be applicable to other institutions.

3.	The instrument was distributed by several different instructors at MATC. Even though instructions were printed on the form, there may be discrepancies in how individual instructors interpreted the instructions.

4.	MATC has many part time students in the CIS program who may not take CIS courses in any given semester, whether for personal, professional or academic reasons, such as taking required general education or support courses. The results may not include these students if they were not enrolled in a CIS course in the particular semester.

Definition of Terms

1.	Owston (1997) defined The World Wide Web (WWW) as "a unique way of linking text, images, sound, and video resources on computers connected to the Internet." (p. 29) Web information is viewed on the user's screen as pages of formatted text that may include graphics and/or sound. By clicking the mouse on underlined text or a graphic, the user can link to another page or access an image, sound, or video clip on a computer literally anywhere else in the world.

2.	Web Address or URL: According to Owston (1997), "Every Web page has a unique Internet address that identifies it, just as your own name, street, city, state, and ZIP code uniquely identifies where you live". (p. 27) These addresses, known as Uniform Resource Locators (URLs), are prefixed with the code, http://..., which stands for HyperText Transfer Protocol.

3   Owston's (1997) definition of a home page is "the first page of a collection of related Web pages, much like a combination of the cover and table of contents of a book." (p. 28)

4.   The PC Webopaedia (1998) refers to a listserv as a computer program that works in this manner: E-mail addressed to a LISTSERV is transmitted as e-mail to individuals on the list, and only individuals who are authorized to access that list. If an entire class is on a LISTSERV mailing list, anyone may send a note to the LISTSERV, which distributes that message to the entire group, saving each individual the time and effort needed to maintain their own copy of that list.

Chapter II

Review of Literature

Why Does Distance Education Work?

Distance education works for many reasons, including, but not limited to:

Access to learning - Owston (1997) provided this perspective:

(M)ost will agree that it means making education more attainable by more people.

That is, providing educational opportunities in the workplace, community, or

home, for those unable to attend school or college because of cultural, economic,

or social barriers. (p. 31)

Taken from that point of view, Distance Education provides education for those who otherwise

might not have access.

Appeal to younger learners - Papert (1993) called the computer a children's machine, because

so many of our young people have never experienced learning without a computer.   The younger

generation has grown up with computers in the home and the classroom, relating to it in much the

same way that their parents do with television. To these learners, the computer serves as both tool

and toy, which allows them to more readily achieve a comfort level with computers than their

parents. As these young people mature into adults, their educators must continue to use the

computer as a learning tool in order to continue to stimulate their interest in learning.

Flexibility - As discussed earlier, Web-based education is a viable option for students who

cannot attend classes on campus. However, online courses are now becoming an option for

traditional students as well.   Indiana University, for example, offers hundreds of degree credit

courses through its' Continuing Education program. If an Indiana student is unable to take a

required course because of a time conflict, the student may have the option of enrolling in a Distance Education section of one course and completing the work via correspondence, videotape or perhaps even the Internet, depending on the course. This allows students greater flexibility in scheduling course work, which can assist them in graduating faster since they can focus on getting into specialized courses which may have limited section offerings.

Studies on the Effectiveness of DE

Much research has been undertaken to gauge the effectiveness of Distance Education and has documented its' effectiveness, a summary presented by Kelly (1993) stated; "Well designed distance education programs are equally effective in terms of learner outcomes with resident instruction, in general, and produce superior learning outcomes in specific applications". (p. 76)

A study done by Schuette (1996), supported that statement. It compared the performances of students in a Social Statistics class at California State University - Northridge. Schuette hypothesized no discernable difference between the traditional class and the virtual class, but instead found that the virtual class scored roughly 20% higher than the traditional class on both tests. In addition, his post-test results indicate the virtual class had significantly higher perceived peer contact and time spent on class work than the traditional class. Finally, Schuette's online students demonstrated a perception of more flexibility, understanding of the material and greater affect toward math, at semester end, than did the traditional class.

Why would this happen? Schuette found that online students formed study groups to compensate for the lack of face-to-face interaction with an instructor. There was no "live" instructor with whom the students could interact, therefore the students bonded with each other. It was this peer interaction that was found to be the key to achievement, as the highest levels of peer interaction were reported by the highest achievers in both groups.

Other studies are not so overwhelmingly in favor of Web-based distance education. There is considerable debate whether any media has unique attributes that universally enhance learning (Clark, 1983, 1994; Kozma, 1991, 1994). This debate stems from over 50 years of observation and research on instructional media, which has shown no consistent significant effects on learning via any specific medium. In the case of Educational Television, hopes were high that it would have specific characteristics that would improve learning, but none were found. However, there also exists an argument that no effect can possibly be demonstrated, because any improvement in learning results from the instructional design, whether in addition or despite the delivery medium (Clark, 1994).

<u>Online Distance Education Offerings</u>

Hundreds of institutions of higher education around the world now use online distance education for many of the reasons discussed earlier. Many institutions now treat online courses as a regular part of the curriculum, not differentiating them at all from traditional courses, and colleges and universities like Indiana University and UCLA, have separate divisions that handle online courses. The popularity and acceptance of such course work has led to the birth of online colleges, such as the University of Phoenix, which offer their entire programs online and which do not have a physical campus.

Even though online courses are popular, many scholars, administrators and faculty question whether our institutions are truly ready for this type of delivery system. Boettcher (1998) raised the question whether distance education is right for all institutions in all cases. She described a series of stages of progression of institutions to determine their readiness for implementing "flexible learning" (p. 23), her term for distance education. These stages range from Waiting, Watching, Wondering and Wishing (WWWW), which is the initial information gathering stage, through two

implementation stages, finally reaching the "New Paradigm" (p. 25), or Foundational Instructional Technology phase, where the primary site of organized instruction is a web site and where the physical classroom is merely a secondary gathering place. This phase is highlighted by a total commitment to information technology resources, including a policy of full student, faculty and staff access to computing resources 24 hours a day, 7 days a week. Along with this access must come resources such as technical support, infrastructure and the determination to deal with a given amount of problems in the initial stages of this kind of program. Not every institution is willing to provide these resources. Boettcher (1998) estimated that 60-70 institutions nationwide meet this criteria.

In addition to resources, there are other concerns regarding the widespread offering of online courses. One of the strongest is the question of how existing faculty, especially veterans, will develop the skills necessary to teach in an online environment. Epstein (1998) asked the question "Most faculty members do not write college textbooks. Why should we expect that they would create and maintain interactive course comprehensive Web sites?" (p.56)

There are a variety of resources available for faculty who have lack the time or training to develop these interactive sites. Textbook publishers such as Prentice Hall and Course Technology have already developed web sites that supplement many of their textbooks. Services such as College NewsLink provide news stories from leading reporting agencies, supplement them with subject-specific Web links and categorize them into over 200 college courses.

There are also software publishing tools available for the instructor who wishes to dive into the new technologies or who teaches a specialized course for which there are limited textbook resources. Gray (1998) talked about a varieties of these tools, ranging from simple web page

templates to more complicated course management software packages that include collaboration tools for chat and threaded discussion groups.

One resource that is available for institutions to use is the interactive SERF system developed by Dr. Fred Hofstetter at the University of Delaware and distributed through the Internet via the Public Broadcasting System (PBS) Network Web site. SERF integrates a customized textbook and course development tools such as a day by day scheduler for course work and assignments with better known Web-based technologies such as LISTSERVs, text links that refer to companion sites all over the Internet, chat and e-mail. SERF's textbook integration enables the instructor to develop a daily pace for each course that allows each student to have some idea of how quickly to pace themselves in this type of course. Slower students may allow more time, while more adept ones may tackle several days of material at once. This integration and pace setting answers a primary criticism of Internet-based education: that it caters primarily to courses of a self-paced nature.

Beyond the issue of pace, additional criticism of distance education relates to the notion that the information age will bring with it a different type of student, with different skills and expectations from the traditional student. Can educational institutions adjust to meet these newly-developed needs? Geoffery Moore (1991) offered a model for change called the Technology Adoption Life Cycle. He refers to a chasm that inhibits the transition from early, limited use of a new idea to long-term acceptance and use by the general population.

Fulkerth (1998) suggested that the application of Moore's model to distance education may be foreshadowing a plateau in distance education programs. He speculated that "Our early successes may simply be fueled by early adopters," (p. 29) and that these students represent a very small portion of the general population. Fulkerth goes on to suggest that educators view students as businesses do clients and target their offerings to the needs of these educational consumers.

Interestingly enough, many technical colleges such as MATC are already taking that route, stressing aspects of education that relate more to customer demand for flexibility in scheduling, direct relation to workplace skills and advancement, and accelerated programs that lead to fast graduation. This can also apply to distance education programs, which are marketed in the same manner.

In the spring semester of 1999, MATC offered 39 different courses via the Internet, only one of which, Visual Basic Programming, is part of the CIS curriculum. However, MATC does offer 12 other computer software courses not related to the CIS program that are offered online.

While MATC does not use SERF for any online course, it does use some of the techniques of SERF. The textbook was selected primarily for its' flexibility and possibilities as a self-study tool. The instructor, Fred Bates (1998), has posted a schedule web page that lists dates and textbook tutorials to be covered, plus links to explanations of selected pieces of the material. He communicates with students via e-mail and a mailing list, though not a formal LISTSERV. While not as sophisticated as SERF, these methods have shown achievement rates and drop rates consistent with, and in some cases better than, instructor-led courses.

Chapter III

Research Methods

This chapter contains an overview of the instrument and methodologies used in conducting the study, the purpose of which was to determine if students are satisfied with MATC's current online CIS course offering and to assess the need for more online offerings. The methods and processes used in the study are explained in this chapter under the heading of Research Design, Population and Sample, Instrumentation, Procedures Followed and Method of Analysis.

Research Design

This was a descriptive study used to gather information from MATC students enrolled in CIS courses regarding their attitudes toward and experiences in Internet-based courses.

Data was collected using a structured questionnaire. While quantitative, Likert-style instruments provide measurements of satisfaction and fulfillment of expectations, qualitative data collected from open ended questions added in-depth insights.

The instrument was distributed in March, 2000, in fifteen different sections of advanced CIS courses across all four MATC campuses. The courses covered are Systems Analysis and Design, Computer User Support, Systems Applications, Integrated Systems, Business Internship, Visual Basic Programming 2 and Data Base Management Systems. These courses were chosen because they have prerequisites to ensure respondents have previously taken at least nine CIS credits.

Population and Sample

The population was comprised of students currently enrolled in CIS courses at MATC. This population was chosen because it is most directly affected by the course offerings of the CIS program.

The sample was taken from those members of the population who attended advanced course sections in the period during which the instrument was administered. Students enrolled in more than one of these selected course sections were asked not to submit multiple responses.

The students were in the second year of the CIS program, the equivalent of college sophomore standing. The sample was a cluster sample taken from all students attending the selected course sections at their scheduled times in a given week. Due to the possibility of students taking multiple courses, instructions were given for the student to only submit one copy of the completed instrument.

The sample numbered 220, an average of just under 15 students per section, allowing for absences and students attending multiple sections of classes participating in the study. This allows for a sampling error of 5%, an accepted research standard in this type of study.

The course sections to be sampled were chosen in March of 2000, based on criteria described above, once official course enrollments were available for the Spring 2000 semester.

Instrumentation

Variables needed for the study included student rankings of several criteria, among them:

- Overall satisfaction with the CIS program

- Self-perception of computer experience coming into the program

- Level of interest in taking Internet-based courses

- Whether the student had taken an Internet-based course previously

  -- and their satisfaction with the course

- Satisfaction with course materials such as textbooks

- Availability of instructor

- Turnaround time for instructor feedback

- Student perception of quality of instruction

Respondents who had previously taken online courses, whether at MATC or elsewhere were asked to provide additional feedback as to their likes and dislikes about the course and any suggestions they might offer to improve the course.

Procedures Followed

Given the purpose of the study, research objectives to be addressed and the close physical proximity of the population, a hand-distributed questionnaire seemed to be the most appropriate technique for collecting information. The instrument was distributed to the students who attended class during the survey period. Each respondent was asked to fill out a survey and return it to the instructor of that particular class, who then sent them to the researcher. Students were asked not to complete duplicate surveys.

The instrument consisted of an 8.5 x 11 inch sheet of paper printed on both sides, and divided into four sections (See Appendix 1).   In the first section, respondents were asked about their previous experiences with online courses, whether at MATC or other institutions. If they had previously taken an online course, they were asked what course they took and where, then to give some feedback about that online course.

The second section asks the respondent to choose which of 17 of MATC's CIS courses they would take if offered in an online format. Courses such as Computer User Support and Network Environment Implementation were not included because they require extensive laboratory work that the department believes would not translate well to online delivery. At the

end of this section, the respondents are asked to name factors that might affect their decision to take a course online.

The third section asks respondents for a self-evaluation of their own computer and Internet skills. These questions were included to determine whether a link exists between the respondent's desire to take an online course and their perceived level of computer-related expertise. The section then asks for general demographic data, such as age, gender, years of work experience, hours worked per week and time proximity to MATC.

The fourth section asks open-ended questions about the respondent's likes and dislikes about the CIS program at MATC and solicits suggestions for improvement.

Method of Analysis

The data was entered and tabulated during the week of April 10 - 15, 2000, using the statistical analysis program, Flo-Stat. In each section of the survey, each item was analyzed in terms of frequency of each response, and overall percentages for each option were provided.

Respondents were asked about their previous experience with and success in online courses. This was used to determine how much exposure the respondents had with online education. They were also asked whether they had a computer at home, and to assess their own internet and computer skills. This was done in order to discern the perception of computer experience among the sample.

Open ended questions were used to solicit feedback from the respondents regarding their previous experience. This method was chosen to encourage the respondents to consider all aspects of their online education experience, rather than focusing on specific issues.

This information provides a background upon which the study can better analyze the overall experience of the respondents and the reasoning behind their views on distance education.

Chapter IV

Data Analysis and Discussion

The purpose of this study was to determine if students are satisfied with MATC's current

online CIS course offering and to assess the need for more online offerings.

Demographic Characteristics of Respondents

All 220 respondents are students currently enrolled in advanced CIS courses at MATC. The

respondents are grouped by age as follows: 25 and under (44.5%),   26-40 (43.6%) and over

40 (11.8%), with a nearly even split between men (52.3%) and women (47.7%).

The vast majority of the respondents in the survey work part-time, with a combined total of

75.9% working less than 30 hours per week. The level of work experience among the

respondents was evenly distributed, with equal amounts of respondents (32.7% each) having

worked up to five years and ten or more years.

Nearly three-fourths (72.3%) of the respondents live within a 30-minute commute to the

campus at which they took the survey.

Table 1
Credits Taken in
Current Semester

N=220

Value	Value	Percent
< 6	82	37.3
6 - 11	85	38.6
> 11	53	24.1

Less than one of four respondents in the survey (24.1%) was considered a full-time student,

a designation earned by enrolling in 12 credits for the semester (see Table 1).

Table 2
Respondent Grades
in Previous Online Courses

N = 65

Grade	Number
A	20
A-	5
B+	6
B	11
B-	1
C+	1
C	3
C-	1
In Progress	4
Drop/Withdraw	5
Not for credit	8

Table 3
Online Courses Taken
by Respondents

N = 81

Course Title	Number
Microsoft Office	19
Internet Skills	16
Professional Certification	12
Web Design	10
Intro to Visual Basic	8
Microsoft Word	4
HTML	3
Access	2
Accounting	2
Java	2
Business Writing	1
Quicken	1
C Programming	1

Satisfaction with Internet-based Courses

 The first research objective of this study was to determine the satisfaction of MATC

students with Internet based courses. Of the 61 respondents who have taken an online course,

42 received a grade of B or higher, six received a grade lower than B, five dropped the course

before completion and four were currently taking a course and were yet to receive a grade (see

Table 2). The numbers do not match the total number of respondents because some took more

than one course, and others took non-credit courses. The respondents had taken a total of 13

different online courses, most of which were computer-related (see Table 3), such as Microsoft

Office or any of its' components, courses related to using the internet or MATC's online

Introduction to Visual Basic course.

Table 4			Table 5	
Positive Factors of Online Courses			**Negative Factors of Online Courses**	
N = 49			N = 44	
<u>Factor</u>	<u>#</u>		<u>Factor</u>	<u>#</u>
Flexible Scheduling	16		Instructor not available	15
Study at Own Pace	19		Slow turnaround for questions	9
Work Alone	7		Can't understand textbook	8
Take Class at Home or Office	5		Projects not graded promptly	5
No Formal Class Sessions	2		No individual assistance	5
			Poor books/materials	2

Comments received regarding the online courses were generally positive (see Table 4). Respondents most often mentioned flexibility and ability to work at their own pace as the most positive factors. Negatives were primarily instruction-related issues, including poor texts and supplemental materials, slow response times to requests for more information or additional help and lack of feedback regarding course performance.

Respondents raised technology issues in their criticisms of online courses as well. Slow, unresponsive web sites were identified as a primary concern, as were incompatibilities between server or web page design software and the browser software employed by the home user.

<u>Factors for Success</u>

The second objective of the study was to identify some factors that contribute to the success of students taking online courses.

Table 6
Respondents Who Have
a Computer at Home

N=220

Value	Value	Percent
Yes	152	69.1
No	68	30.9

Table 6 shows that slightly more than two-thirds (69.1%) of the respondents have a computer in their home. 68.7% consider themselves moderate or advanced computer users, while 63.2% consider themselves to have moderate or advanced levels of internet skills (see Table 7).

Table 7
Self-perception of Skill Level

Computer Skills:

Value	Value	Percent
Novice	69	31.4
Moderate	117	53..2
Advanced	34	15.5

Internet Skills:

Value	Value	Percent
Novice	81	36.8
Moderate	108	49.1
Advanced	31	14.1

Respondents who had done well in online courses mentioned the following positive aspects of the experience: the ability to work at their own pace and around their professional and personal schedules; the depth and detail of the materials distributed to them for use in the courses; good communication with their online instructor or facilitator; their own comfort level with self-paced learning, and their level of computer skills.

A common complaint in the open-ended response section of the instrument expressed a lack of information and technical support for home computer users. One respondent who had not done well in online courses commented that his home computer wasn't powerful enough for the course requirements, but that the course documentation never mentioned system requirements, nor was his instructor able to offer technical support. Respondents who identified themselves in their comments as AOL, Netscape, Macintosh and UNIX users criticized MATC and other institutions that offered online courses exclusively to students who ran Microsoft-based computers and browsers. They also stated that no system requirements or technical support were made available to them throughout the course because they were told by MATC's Help Desk that "I didn't have an 'MATC standard computer', whatever that means."

Table 8
Interest in Online Courses

N=220

	Ever Taken		Have taken from MATC		Would take from MATC	
Yes	79	35.9%	61	27.7%	125	56.8%
No	141	64.1%	159	72.3%	95	43.2%

Course Demand

The third stated objective of the study was to assess the demand for online courses at

MATC. Table 8 shows that just over one-third (35.9%) of respondents have taken an online

course before, most of those (27.7%) having taken an online course from MATC. The question

did not specify whether that online course was a CIS class. However, over half (54.5%) said

they would at least try an online course.

Table 9 Interest in Specific MATC CIS courses		
N = 220		
Course Title	Number	Percent
CIS Fundamentals	103	46.8
Data Communications	100	45.5
Database Systems w/ SQL	85	38.6
Intro to UNIX	84	38.2
Adv Programming/ C++	80	36.4
Operating Systems	79	35.9
Intro to NT	79	35.9
Visual Basic 1	70	31.8
Web Page Creation	69	31.4
C Programming	59	26.8
Integrated Systems	56	25.5
Systems Analysis	56	25.5
Intro to Java	50	22.7
Systems Applications	41	18.6
Visual Basic 2	40	18.2
COBOL Programming	37	16.8
Advanced COBOL	28	12.7

The respondents were asked whether they would take any of seventeen CIS courses in an

online format. The responses are shown in Table 9. Internet-related courses were overall the

most in demand for online classes, specifically Windows NT (40.9%), Operating Systems

(35.9%), Data Communications (38.6%), Database Management Systems (56.4%) and

Introduction to Unix (37.7%). Programming courses such as COBOL Programming (16.8%),

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Advanced COBOL (12.7%), and Systems Applications (18.6%) had the lowest positive response rates.

<u>Special Prerequisites</u>

The final objective of the study asked whether Internet based courses should have special prerequisites that did not necessarily apply to classroom based courses. As in the section on factors for success, we can look to responses of those who were unaware that their home computers were not compatible with the course requirements. Computer and internet users whose operating system and software platforms were something other than purely Microsoft based also mentioned their being at a disadvantage.

Two respondents noted that they felt they the instructor took their level of internet skills for granted, speaking in terms they weren't familiar with. These respondents said they had to extend themselves to learn the internet as well as the course work, leaving them with a negative impression of online courses.

<u>Discussion</u>

Open-ended questions at the end of the survey asked for feedback from the respondent regarding MATC's CIS program and their reasons for enrolling in it. Many respondents stated they entered the program because of the booming technology job market and their overall feeling that MATC could prepare them for a position in that market.

When asked about their overall likes of the CIS program at MATC, respondents most often noted the short amount of time needed to complete a degree, followed by the relatively low cost of courses. There were also comments about the quality and amount of one-on-one assistance available, particularly at South Campus.

Criticisms of MATC's CIS program included the non-transferability of MATC degree credits to four-year institutions, and some resistance by technical managers and human resource people to accepting an Associate Degree as a proper technical credential. The programs came under fire as not having the kind of depth necessary for a proper introduction into the computer field, and requiring far too many unnecessary courses. The programs were also criticized as being "behind the times" and "technologically outdated."

Faculty and administration were both praised and criticized for their knowledge, teaching skill and concern for the students. In general, instructors were praised for allowing students to practice their skills and criticized for being, as one respondent phrased it, "overly academic. I came here to learn to be a programmer, not write term papers in every computer class".

Respondent recommendations included more online courses, more courses related to emerging technologies and the internet, more certification preparatory courses and more course work directed at the types of work they would be doing in the field. It was also suggested that MATC work to reduce its' class sizes in computer courses. One respondent observed that in the five years he had been taking computer classes in the evening, the average class size had grown from about 15 to 25, a figure the respondent considered too high for the kind of individualized learning needed to truly learn the material.

<u>Summary</u>

In summary, MATC's CIS population displays a diverse set of demographics, background and educational experience. Over one-third have already taken some kind of online training, mostly computer-related. Most of who had taken an online course for a grade earned grades of B or better. Whether or not they had previously taken an online course, more than half of the respondents would at least try one online CIS course.

The respondents indicated that time and flexibility are their primary reasons for taking online courses. Their biggest concerns are with quality of instruction, materials and supplemental assistance.

Overall, the respondents viewed CIS program at MATC positively, but in need of upgrading and refinement. Respondents want more hands-on courses in emerging technologies and certifications and less traditional academic course work.

Chapter V

Conclusions and Recommendations

Restatement of the Problem

The CIS Department at MATC offers one Internet based programming course, Introduction to Visual Basic Programming, on an experimental basis. The department is considering offering additional courses, but demand for additional courses and satisfaction with the current course offering have not been determined.

Purpose of the Study

The purpose of this study was to determine if students are satisfied with MATC's current online CIS course offering and to assess the need for more online offerings.

Methods and Procedures

A questionnaire was developed and distributed to 220 students in fifteen different sections of MATC's 2nd year CIS courses. The instrument was developed to assess their overall satisfaction with the CIS program, self-perception of computer and internet experience, level of interest in taking Internet-based courses, previous experience with online education, and perception of instructional quality. The instrument also gathered demographic data and solicits feedback regarding CIS department course offerings.

Major Findings

There exists a strong demand for MATC's current CIS courses, particularly those involving operating system and internet-related technologies. Over half of the respondents would at least try a CIS course from MATC over the internet.

Respondents like the idea of self-paced courses, as long as the instructor provides quality text and supplemental material, timely feedback and additional assistance where required.

Conclusions and Recommendations

Research Objective 1 sought to determine student satisfaction levels toward CIS courses offered through distance education at MATC. The data showed that most of the respondents enrolled in online courses achieved grades of B or better and were generally satisfied with their online course experiences, but that the courses can be improved. It can be concluded from the data that MATC is on the right track with their current online course offerings, but needs to work to ensure that the online courses are taught by qualified, technology-savvy instructors, and that these courses use materials and resources developed with online delivery in mind.

Based on these findings, it can be recommended that online courses be taught by instructors with experience and interest in the online environment, or at the very least, experience with the tools of an online environment. Online faculty should be comfortable with developing web pages, using e-mail, chat, threaded discussion software and any other tools that can enhance their courses. They should also allocate time on daily basis to respond to questions and concerns from online students as well as to provide feedback on assignments promptly after their due dates. Institutions and departments offering online courses should also develop supplemental instruction methods, which may include online, phone or in-person tutoring, FAQ files, web pages that further explain the material, links to reference sites that can supplement instruction and/or self-paced instructional modules. These may be provided by textbook or software publishers, or by the faculty themselves if no publisher meets the specific needs of the course material.

The second research objective sought to identify factors that contribute to student success in online courses. The data shows that students with at least modest experience and skills using the internet and computers in general will be more successful in these courses. Another

important factor is the student having the use of a computer in the home. The respondents identified factors such as supplemental materials, technical support and one-on-one assistance as very helpful in achieving success in these courses. It can be concluded from the responses that MATC needs to improve its' support services for online students in order to increase their chances of success in online courses.

Based on that conclusion, it can be recommended that MATC publish system requirements for each of its' courses and make those requirements known to students before they enroll in an online course. MATC can also work to either make its' web sites more compatible with users of non-Microsoft platforms, or provide additional technical support to help those students who use other products.

Additionally, MATC's online instructors can choose textbooks and other course materials that are designed to be used with online instruction. They can also develop Frequently Asked Question (FAQ) pages or other supplemental material to help students who might need to have common questions answered or clarified.

It is important to overcome barriers in communications and supplemental instruction that could hinder student progress in an online course. One way this might be accomplished would be through a partnership with Academic Support, allowing for tutoring via e-mail, phone or internet chat. Instructors can also schedule online chats, or have set phone contact hours. It is imperative that the instructor also provide prompt responses to e-mail questions and feedback on course projects.

The third research objective assessed the demand for online courses at MATC. The data supports the conclusion that there is a demand for online sections, particularly in introductory courses and those which relate to internet technologies. Courses such as Database Management

Systems, Windows NT, Web Page Creation, Java have the highest demand, but a market exists for online courses in many, if not all CIS courses.

From the findings of this study, it can be recommended that MATC offer more of its' CIS courses online as soon as feasible, as long as they maintain course quality and integrity within technological and budgetary constraints.

The fourth and final research objective asked whether special prerequisites should be placed on online courses. The data showed that students who are better equipped for online courses are more satisfied and achieve better grades. It can be concluded from these findings that special prerequisites are in order.

Based on these findings, it can be recommended that great care be taken to accurately assess whether a student is properly equipped for taking an online course. In that regard, an institution offering online computer courses should consider imposing special prerequisites on these courses such as documented computer experience, access to a relatively modern computer at home or work, a passing score on a hands-on technology aptitude test, or any combination of these. These institutions also need to ensure that their scheduling systems do not accidentally place novice students in these courses.

Recommendations for Further Study

This study was designed to assist MATC's CIS department in their assessment of whether to offer more online courses. It can also be used by other technology-related departments, such as Computer Software, or E-Commerce, or any other program that markets to a similar audience.

This study focuses on general student interest in online courses and the achievement levels of students currently enrolled in MATC's existing online CIS course.

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A future study could be undertaken to assess the specific demand for a completely internet-based program offered through MATC. This study could also determine whether this program would be an existing degree program or one developed specifically for online delivery. Additional study is needed to determine exactly which of MATC's individual CIS courses could be offered via the Internet, or in some combination of classroom and internet-based course work. This study could also determine whether some current lab-intensive CIS courses, such as Computer User Support and Network Environment Implementation could be offered online as well.

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