RECRUITING AND RETAINING WOMEN INTO THE MANAGEMENT INFORMATION SYSTEMS AND COMPUTER SCIENCE MAJORS AT THE UNIVERSITY OF WISCONSIN-EAU CLAIRE

by

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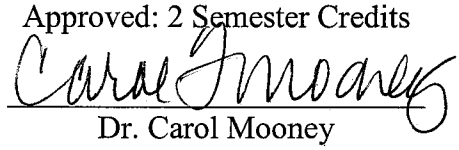

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ABSTRACT

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Information technology has been the backbone of many businesses in corporate America and educational institutions for years, and it is growing at an alarmingly fast rate. This profession has been male dominated for all of those years and to this day the number of women is still significantly low.

Not only is corporate America to blame for the lower number of women compared to men in information technology professions, but educational institutions are also part of the problem.

Women have been underrepresented and underpaid compared to men in information technology professions since the start of technology. Educational institutions need to find ways to increase and retain the number of women in their information technology programs.

The purpose of this study was to determine why women decide to enter the information technology programs at the University of Wisconsin – Eau Claire and the reasons why they stay. The results of this study will generate ideas and strategies that educational institutions can use to recruit and retain women into information technology programs. The women were current students of the MIS and CS majors at the University of Wisconsin-Eau Claire were surveyed. These surveys were distributed through electronic mail due to the ease of reaching the individuals in the sample group. This study was conducted during the month of April 2004.

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CHAPTER ONE

Introduction

Information technology has been the backbone of many businesses in corporate America and educational institutions for years, and it is growing at an alarmingly fast rate. This profession has been male dominated for all of those years and to this day the number of women is still significantly low. The history of technology had women portrayed as being "consumers" rather than "producers" of technology, which consisted of telephones and typewriters at the time (*Women and a brief history of computers*, n.d.). It was not until WWII that women were allowed to become more involved with technology, and this was only because of the shortage of men due to the war. These women were actually given menial tasks to accomplish their jobs and were considered to be at the lowest end of the status chain (*Women and a brief history of computers*, n.d.). It was not until the 1950's and 1960's that women were given more status in the information technology professions because of their involvement with technology during WWII Once the war ended, women returned to the domestic domain and the men again dominated the technology field (*Women and a brief history of computers*, n.d.).

The Information Technology Association of America (ITAA) conducted a study on the number of women in information technology professions. ITAA found that "the percentage of women in the overall Information Technology (IT) workforce fell from 41 percent to 34.9 percent between 1996 and 2002" (Burton, 2003, ¶2). Also, once women join the information technology professions, there was a tendency for them to not stay. Women have two points in their lives where they drop out of their careers in corporate America, one is in their thirties and the other is in their forties and fifties. The reasons for their choice to drop out of their careers at these ages are due to having children and getting older. This article also stated the best way to

find out why these women in information technology professions are leaving their careers was to conduct exit interviews and to use the information obtained in them to help retain women in the future (Higginbottom, 2003).

One of the reasons women do not stay in information technology professions is the wage discrepancy between men and women. Women are still making less than men in information technology (IT) professions and the gap is not getting any better. Women in IT are making about $7,000 less than men in information technology in total compensation, and this wage gap is actually going up instead of going down (Goodridge, 2002).

Not only is corporate America to blame for the lower number of women compared to men in information technology professions, but educational institutions are also part of the problem. It is necessary to go back and take a look at the education these women received when they were attending school starting with elementary and ending with high school. These girls were just not as interested in taking computer science classes as the boys. In retrospect this showed how underrepresented in high-technology learning environments girls are, and this caused girls to not want to pursue careers in information technology professions (Crombie, Abarbanel, & Anderson, 2001).

A study conducted by Growth and Retention of Women (GROW) found that the top choice for both college majors and career choices were in computer science and engineering, not for girls, but for boys (Melymuka, 2001). Also, at the high school level, girls still looked at technology and just did not get it. They do not understand what was involved with working in information technology professions. This implies that schools and businesses were not doing their job of promoting this information. The results were that girls did not think information technology professions would give them what they want in life (Melymuka, 2001). Another look

at high school age girls and how they related to computers and information technology had shown that only 17 percent of these high school girls were taking the advanced placement computer science exams (How to diversify the geek pool, 2000).

Young girls, who looked at their futures and decided what to complete their undergraduate degrees in, were not even looking at the information technology professions. Of the women who had decided to pursue degrees in information technology, only 22 percent of them completed computer science and engineering undergraduate degrees in 2000 (Burton, 2003). It looked like our educational system, along with corporate America, had a great deal to do with the problem of women not going into the information technology professions.

The city of Eau Claire or as some called it back then "The Bridge City" started out in the logging industry in 1845, but once the forest/white pines had become depleted, many people moved on to farming, making shoes, or making tires. Interestingly enough, Eau Claire became known as the "Horse Radish Capital of the World" thanks to Ellis Huntisinger. Today Eau Claire is known for its technology, because of Hutchinson Technology and Cray Research. This is the reason why many "people refer to the area as the Silicon Valley of the Midwest" (Borofka, 2000, p. 2). The population of Eau Claire has grown to 56,856 (*Eau Claire Wisconsin resources guide,* 2002), and includes such industries as Menards, McDonough Mfg., and health care facilities such as Marshfield Clinic, Midelfort/Mayo, and retail (Borofka, 2000). Eau Claire is also the home of the University of Wisconsin – Eau Claire.

The University of Wisconsin – Eau Claire (UWEC) is one of thirteen campuses in the University of Wisconsin System and was founded in 1916. The enrollment as of fall 2002 was 10,636 and consisted of the following three colleges: Arts & Science, School of Business, and Professional Studies (School of Education, School of Human Sciences and Services, and School

of Nursing) (*The University of Wisconsin - Eau Claire: General information*, 2003). The Management Information Systems major is located within the college of the School of Business at the University Wisconsin–Eau Claire, and is for students who are interested in pursuing careers in programming, network administrators, information systems consultants, application developers, marketing, finance, and project managers (*The University of Wisconsin – Eau Claire: Undergraduate fact sheet for management information systems,* n.d.). The Computer Science major is located within the College of Arts and Science at the University Wisconsin–Eau Claire, and is for students who are interested in pursuing careers in programming, system analysis, web development, system engineers, software development, and new language development *(The University of Wisconsin – Eau Claire: Undergraduate fact sheet for computer science,* n.d.).

Women have been underrepresented and underpaid compared to men in information technology professions since the start of technology. Educational institutions need to find ways to increase and retain the number of women in their information technology programs.

Statement of the problem

Fewer women than men choose careers in the IT field. This is apparent within the Management Information Systems (MIS) and the Computer Science (CS) majors at UWEC. The following statistics stated that in the fall semester of the 2003/2004 school year at the University of Wisconsin – Eau Claire there were 188 males compared to 37 females in the MIS major. The CS major only had 16 females compared to 186 males (K. Magadance, personal communication, December 16, 2003). Based on the researcher's experience and perception, there has been a limited amount of research, if any, done at the University of Wisconsin – Eau Claire relating to this problem. The University of Wisconsin – Eau Claire, the MIS, and the CS departments need

to determine why fewer women than men enter these related majors for the purpose of attracting and retaining females in these majors.

Purpose of the study

The purpose of this study was to determine why women decide to enter the information technology programs at the University of Wisconsin – Eau Claire and the reasons why they stay. The results of this study will generate ideas and strategies that educational institutions can use to recruit and retain women into information technology programs. The women were current students of the MIS and CS majors at the University of Wisconsin-Eau Claire were surveyed. These surveys were distributed through electronic mail due to the ease of reaching the individuals in the sample group. This study was conducted during the month of April 2004.

Research objectives

The objectives of this research will be to address the following:

1. Identify the factors that influence women to enter the information technology (IT) programs at the University of Wisconsin - Eau Claire.
2. Identify the factors that will keep women enrolled in the information technology (IT) programs at the University of Wisconsin – Eau Claire.

Significance of the study

This study was important due to the limited number of women in the information technology professions.

1. Data from this research may help girls develop an interest in information technology professions at a younger age.
2. Data from this research may also help to develop coursework at the elementary, middle, and high school level to increase the interest of girls in information technology.

3. Data from this research may be used to recruit women into obtaining their Management Information System (MIS) and Computer Science (CS) degrees at the college level.

4. Data from this research may be used to recruit more women into information technology professions who are skilled and knowledgeable.

5. Data from this research may be used to recruit and retain women in information technology programs at other universities.

Limitations of the study

The following are limitations that are relevant to this study:

1. The study involved women who were current students at the University of Wisconsin Eau Claire who were majoring in the MIS and CS programs.

2. The questionnaire was designed by the researcher, whose own bias can be factored into the resulting instrument.

3. The limited size of the sample consisted of only the women in the MIS and CS programs at the University of Wisconsin Eau Claire, and therefore limits the generalizability of the results.

4. The responses to the questionnaire may be based on the individual's bias and interpretations of the instructions.

5. Results may not be generalizable to other universities.

Assumptions of the study

The following assumptions are being made:

1. This study assumes there are a limited number of women in information technology professions.

2. This study assumes that the women in the information technology programs answered all questions on the questionnaire truthfully.

3. This study assumes that there are problems in recruiting and retaining women into the IT programs.

4. This study assumes that there are not recruiting and retaining strategies for women in the information technology programs.

Definition of terms

The following terms need to be defined for clarification of understanding.

1. Computer Science (CS) – a major which involves all aspects of computing, from applications to development. It also, involves the use of mathematics, engineering and science skills (*The University of Wisconsin – Eau Claire: Undergraduate fact sheet for computer science,* n.d.).

2. Information Technology (IT) – is a term businesses use to relate to their computer systems, which include the hardware, software, networking, and telecommunications (*Information technology,* 2003).

3. Management Information Systems (MIS) – a major which not only involves computing, but all of the functions of a business. Students learn about programming, telecommunications, marketing, and accounting (*The University of Wisconsin – Eau Claire: Undergraduate fact sheet for management information systems,* n.d.).

CHAPTER TWO

Literature Review

Introduction

The number of women in information technology professions has been significantly lower than the number of men in these professions. Why were women underrepresented in the information technology profession? This literature review looked at the current involvement of women in information technology professions, which include the reasons why women enter and stay, the reasons why they leave, and the reasons why they are not even interested in these professions. Also, this review looked at the impact educational institutions have on women and their decision to or not to enter information technology professions, which are the K-12 level and the post-secondary level.

Current involvement of women in information technology

Information technology is considered to be one of the fastest growing professions, and will continue to increase into the year 2010. This rapid growth is attributed to organizations embracing and integrating more advanced and intricate technology. Furthermore, this rapid growth has caused an increase in many job openings, but there are not enough qualified professionals to fill all of the open positions. The U.S. Department of Labor stated that "System analyst, computer scientists, and database administrators held about 887,000 jobs in 2000, including about 71,000 who were self-employed" (U.S. Department of Labor Bureau of Labor Statistics Occupational Outlook Handbook, 2002-2003).

Men are continuing on to post-secondary educational institutions to become qualified to fill these open positions, but women are not going on to school and are not even entering these professions. The women who become qualified and enter into the information technology

profession are not staying very long; actually they are leaving faster than ever. According to a study conducted by Women in IT Champions in 2002, 36 percent of the new hires were women, but 46 percent of the people leaving were women (Higginbottom, 2003).

Reasons why women enter and stay in information technology professions

According to Teague (2000), women decide to enter information technology professions for two different reasons. The first reason has to do with some type of event or someone who influenced them. The second reason has to do with "attributes of the women themselves or of computing careers" (Teague, 2000, p. 69). Teague also stated that these influences came about while these women were in high school, college, working at another career, and from friends and family.

The women who made the decision to enter IT while in high school or college did so because of the positive influence they received from their programming classes and their teachers. Some of them did not start out majoring in computers, but discovered they liked the computer classes they had taken more than the required classes for their current major. One woman, while in college, just took a computer class because her friend was and discovered she actually liked programming (Teague, 2000).

Some women made the decision to switch to IT from another career because they were not happy with what they were doing. The jobs they were not happy at involved some type of computer work which was the only part of the job they liked. These women had never thought about going into IT while in college because they did not have enough knowledge of computing (Teague, 2000).

A majority of women enter IT because of the influence from a family member or a friend. Women who grow up in a household where the parents were involved in some type of math,

science, or computer career tend to themselves go into one of these careers. According to Teague (2000), men have positively influenced some women to pursue careers in computers.

The second reason women enter IT was that they like the work they do because of the attributes of the work.

Some of these attributes include:

- The work being straightforward
- challenging
- the amount of money they were making
- the work always being different
- being able to solve problems
- new software needing to be tested,
- creating new software
- creating web pages
- critically thinking through problems
- travel
- the diversity
- technology always changing

(Teague, 2000).

Reasons why women leave information technology professions

Women are leaving information technology professions faster than corporations can hire them. Women have two points in their lives where they drop out of their careers in corporate America; one is in their thirties and the other is in their forties and fifties. The main reasons for women choosing to drop out of their careers at these ages were due to having children. The other reason for them to drop out was getting older because when women are in their forties and fifties they do not want to travel or work the long hours that go a long with working in IT professions (Higginbottom, 2003).

The long hours and inflexible work schedules IT professionals are required to work goes hand-in-hand with women leaving to have children. Women who have families or small children

would like to be able to work a nine-to-five schedule compared to the sixteen to twenty hour days (Hilton, 2001). Also, women would like to work a more flexible schedule where they could go to work after they get their children off to school in the morning or be able to be at home when their children get home from school. Another schedule would be one of working at home and telecommuting. Corporations just need to come up with more flexible ways of the work day scheduling for these women and then they would not end up losing so many of them once they start families.

Another reason women leave is due to the salary difference between women and men. The wage gap in total compensation is almost $7000 less for women than men, and this gap is still growing (Goodridge, 2002). Informationweek Research conducted a study of 10,109 IT professionals in the spring of 2002 and found that "at the staff level, men received a $2000 increase in median base pay, and women received a $1000 increase" (Goodridge, 2002, p. 1).

Finally, women decide to leave the IT profession because they are unable to move up into management. The women who were actually in entry-level management say they had to work twice as hard as a man and still get passed over for promotions. These women feel like they were up against a glass ceiling because they were being told they are not qualified or they had to prove their technical skills to become promoted, whereas the men did not have to do either one (DeBare, n.d.). Some of these women would just rather just leave than fight for what is rightfully theirs, because they know they cannot win against a bad company (Goodridge, 2002).

Reasons why women are not even interested in information technology professions

Women were not interested in information technology professions due to the following three reasons: the stereotypes or perceptions, the lack of female role models, and the design of computer games.

The first reason why women were not interested in information technology professions had to do with the stereotypes and perceptions that have developed. The information technology profession has had a bad reputation for many years, but it is slowly changing. The problem is that the stereotypes and perceptions are still causing a number of women to become disillusioned with information technology and therefore not entering the profession. At a young age, girls are told they need to learn how to cook and to play with their dolls, whereas the boys get to play with the building blocks and play on the computer. The computers are kept in the boy's room and the girls are told to stay away (Furger, 1998). Another stereotype about women and men is that they are different, which is true, but educators and the work industry are still catering to the men. Boys are considered to be more aggressive in the classroom and push girls away from the computers. Men are given the impression that they can do any type of work on the job and given many opportunities to advance by their employers, but women are not given the same impressions and opportunities (Radcliff, 1999). Young girls were asked what they think about information technology and to them it is geeky, un-cool, they work in cubes, lead very solitary lives, are anti social, and dream about code (Margolis & Fisher, 2003).

The second reason women were not interested in information technology professions has to do with the lack of female role models. Young women who are looking to their futures and what careers they may be interested in pursuing are looking at the women who are teachers, nurses, sales people, doctors, lawyers, and small business owners by seeing them on TV, from friends, and family members who are currently in these professions. These same young women are not looking at careers in information technology professions due to not seeing women on TV, not having friends, and not having family members who are currently in the IT profession. The

reason for these young women not looking at IT as a career choice is the not knowing what IT is about due to the lack of role models (Furger, 1998).

Finally, the third reason why women are not interested in information technology professions is the design of computer games. The computer games that are written by men are designed for boys to play (Wright, 1997). Girls and boys view computer games differently; girls typically want computer games that have a story line, some sort of social interaction, realistic characters, and goals. Boys typically want computer games that are action-filled, fast moving, adventuristic, and violent. Young girls find that most of the computer games designed today have mostly men in them, there is very little color, they are full of violence, and some of them are even degrading to women. These computer games are designed typically to attract boys and leave the girls out in the cold. This has caused girls to lose future interest in computers. Girls will keep using computers, but only as tools to do homework or create cards. They are no longer interested in designing or playing more computer games (Furger, 1998).

Educational institutions

K – 12

At the early elementary level of school, both girls and boys are already looking at computers in a different way. Boys are more likely to use the computer during free time to play games, whereas the girls use the computer for writing stories (Margolis, & Fisher, 2003). Boys at this age also have a more positive attitude towards computers, they are more aggressive in the classroom, use the computer more at home, and have a tendency to master the computer more than the girls (Butler, 2000).

At the middle school level the little bit of self-motivation and positive attitude the elementary girl did have towards computers diminishes. At this age girls also start to have

problems with their self confidence, where as the boys level of confidence stays the same or grows when it comes to computers. Girls also developed strong reservations about using computers and thought of computers as a waste of time (Dobosenski, 2001). Also at this age level, girls are more likely to help other girls with their projects than spend time on the computer during technology classes. These same girls stated that "they did not use them because the boys did and because the boys always get there first and it was always the same boys" (Margolis, & Fisher, 2003, p. 34). Many middle schools and high schools have not been able to diminish the gap between the girls and boys, because boys are still more acquainted, knowledgeable, and more at ease with computers (Margolis, & Fisher, 2003).

Girls at the high school level are still lacking the confidence and still doubt their abilities when in comes to using computers. Many of the girls who do have the confidence and abilities to work successfully with computers downplay or hide their accomplishments from their female friends. They want to be known as normal and not as a computer geek (Furger, 1998). Friends have a big influence on what classes students will take at the high school level and most girls think math, science, and computer classes are for the nerds and the smart people. A girl who likes computers, math, and science will not take the classes because their friends will not. The number of girls in math and science classes has been slowly increasing due to the importance of getting into college, but they still lack the confidence (Margolis, & Fisher, 2003).

Post-secondary (two-year and four-year college)

The issue of women and their use or lack of use of computers follows through into the post-secondary level of education. A study conducted by the University of California-Los Angeles (UCLA) department of Higher Education Research found that "first-year-undergraduate women were only half as likely as first-year-undergraduate men to assess their computer-use

skills as 'above average' or within the top 10 percent." The study also found that only 23.2 percent of women had high regard for their computer skills compared to 46.4 percent of the men" (First-year female college students found to have less confidence about computer skills than male counterparts, 2001). Along with the number of women having less confidence in their computer knowledge than men is the number of degrees obtained by women in Computer Science. The number has been on a decline since 1984, where as the number had been as high as 37 percent, but now is down to 28 percent (*Tech-savvy: Educating girls in the new computer age* 2000).

The desire to study computer science is different between women and men. Women tend to study computer science due to the technical aspect which they find interesting and the enjoyment they gain from computing. They will also study computer science because of the versatility of computing, how it relates to other fields like math and science. They consider computing careers to be exciting, safe, and secure. Finally they decide to study computer science because of the encouragement from family, friends, and teachers. Men will study computer science because they consider it to be an "extension of their hobby and lifelong passion for computers", and the enjoyment they receive from working with computers. They worked on and with computers from the time they were small boys and never thought of doing anything else as a career (Margolis, & Fisher, 2003).

Summary

The literature review reiterates that women are immeasurably underrepresented in the information technology professions. Women were influenced by many factors when it come to deciding upon using computers and pursuing a career in information technology, which the literature review shows. Finally, the business world and educational institutions still have a ways

to go if more women are going to help fill the number of jobs available in information technology.

CHAPTER THREE

Methodology

Introduction

This chapter includes information about how the sample was selected, a description of the sample, and the instrument used. In addition, data collection and data analysis procedures were given. Finally, the limitations were listed.

Subject Selection and Description

The subjects of this study were women who were current students majoring in the Management Information Systems and Computer Science programs at the University of Wisconsin – Eau Claire during 2004. A current list of these students was generated by the UWEC Registrar's office.

Instrumentation

The instrument used in this study was designed by the researcher. The survey was developed to maintain the subject's confidentiality. The survey instrument consisted of a cover letter (see Appendix A) and the two page questionnaire (see Appendix B). There were twenty-one questions of which the first eleven were designed to gather data pertaining to the respondent's age, year in college, major, and why they decided upon this major. The last ten questions were designed to gather data as to how they were treated being female students in these majors by using a five point Likert scale. Finally the survey questions were developed based on the literature review, the subject's demographic information, and the research objectives, which included:

1. Identify the factors that influence women to enter the information technology (IT) programs at the University of Wisconsin - Eau Claire.

2. Identify the factors that will keep women enrolled in the information technology (IT) programs at the University of Wisconsin – Eau Claire.

Data Collection

A current list of all of the female students majoring in the Management Information Systems and Computer Science programs was generated by the University of Wisconsin – Eau Claire Registrar's office. Next, a distribution list with these student's e-mail addresses was developed. The consent letter, along with the attached survey, was distributed through electronic mail to these students. This study was conducted during the month of April, 2004.

Data Analysis

The completed surveys where taken to the University of Wisconsin-Stout Research Support Services where they were tabulated using SPSS-11. The research specialist used the SPSS-11 software to generate reports to show the frequencies and percentages for each question.

Limitations

The survey was designed by the researcher, resulting in unmeasured validity or reliability of the instrument. Also, the sample size was limited to only the women who were current students at the University of Wisconsin – Eau Claire who were majoring in the MIS and CS programs. Finally, the responses to the survey may be based on the individual's bias and interpretations of the instructions.

CHAPTER FOUR

Results

Introduction

This chapter includes the results of this study. The demographic information and the item analysis are discussed first in this chapter and will conclude with the following research objectives that were under investigation:

1. Identify the factors that influence women to enter the information technology (IT) programs at the University of Wisconsin - Eau Claire.
2. Identify the factors that will keep women enrolled in the information technology (IT) programs at the University of Wisconsin – Eau Claire.

Demographic Information

There were a total of 173 students enrolled in the Management Information Systems program at the University of Wisconsin – Eau Claire of which thirty-seven are women. The Computer Science program at UWEC has a total of 207 students of which nine are women. A total of forty-six surveys were sent out with a response rate of thirty-one or 67 percent.

Item Analysis

All of the percentages in the following results and tables were based on the total number of responses to the survey.

Question number one asked for each respondent's age. Five respondents or 16.1 percent were nineteen years of age, one respondent or 3.2 percent were twenty years of age, eight respondents or 25.8 percent were twenty-one years of age, three respondents or 9.7 percent were twenty-two years of age, five respondents or 16.1 percent were twenty-three years of age, two respondents or 6.5 percent were twenty-four years of age, one respondent or 16.1 percent were

twenty-five years of age, two respondents or 6.5 were twenty-six years of age, one respondent or 16.1 percent were twenty-nine years of age, one respondent or 16.1 percent were thirty-one years of age, and one respondent or 16.1 percent were thirty-five years of age.

Table 1

Age of Respondent

	Respondents	Percentages
19 years old	5	16.1
20 years old	1	3.2
21	8	25.8
22	3	9.7
23	5	16.1
24	2	6.5
25 years old	1	3.2
26	2	6.5
29	1	3.2
32	1	3.2
35 years old	1	3.2
39 years old	1	3.2

Question number two asked each respondent's year in college. Four respondents or 12.9 percent were first year students, four respondents or 12.9 percent were second years students, nine respondents or 29 percent were third year students, eight respondents or 25.8 percent were fourth year students and six respondents or 19.4 percent were fifth year or longer students.

Table 2

Year in College

	Respondents	Percentages
1st year	4	12.9
2nd year	4	12.9
3rd year	9	29.0
4th year	8	25.8
5th year or longer	6	19.4

Question number three asked each respondent what was their major. Twenty-two respondents or 71 percent were Management Information System students and nine respondents or 29 percent were Computer Science students.

Table 3

Respondent's Major

	Respondents	Percentages
Mgmt Info Systems	22	71.0
Computer Science	9	29.0

Question number four asked each respondent when they decided upon their current major. Twenty-two respondents or 71 percent decided before attending UWEC, two respondents or 6.5 percent decided the fall term of their freshman year, three respondents or 9.7 percent decided the spring term of their freshman year, three respondents or 9.7 percent decided after their freshman year, and one respondent or 3.2 percent decided during their sophomore year.

Table 4

Decided Upon Current Major

	Respondents	Percentages
before attend UWEC	22	71.0
fall term fresh year	2	6.5
sprg term fresh year	3	9.7
after freshman year	3	9.7
during soph year	1	3.2

Question number five asked each respondent if they had taken any computer classes before attending UWEC. Twenty respondents or 64.5 percent stated no to taking any computer classes before attending UWEC and eleven respondents or 35.5 percent stated yes to taking computer classes before attending UWEC.

Table 5

Were any Computer Classes Taken Before Entering UWEC?

	Respondents	Percentages
no	20	64.5
yes	11	35.5

Computer classes that respondents had taken:

- C++
- Visual Studio
- Advanced computer skills
- Programming classes
- A+ Certification classes
- Basic computer skills
- Pascal
- Web development
- Visual Basic
- Front Page
- Java

Question number six asked each respondent if they had spent much time playing computer games during high school. Twenty-six respondents or 83.9 percent stated no to playing computer games during high school, and five respondents or 16.1 percent stated yes to playing computer games during high school..

Table 6

Played Computer Games During High School

	Respondents	Percentages
no	26	83.9
yes	5	16.1

Table 7

Computer games respondents had played:

Story Lined Based Computer Games	Goal Based Computer Games	Social Interaction Computer Games	Other Computer Games
Myst	Rollercoaster Tycoon	The SIMS	Word Games
King' Quest	Ski Resort Tycoon		Online Pool
	The SIMS		Solitaire
	Myst		Minesweeper
			Action
			RPG

Question number seven asked each respondent who or what had influenced their decision to major in MIS or CS. The respondents were asked to choose from the following list if someone or something had influenced their decision: mother, father, sister, brother, friend, teacher, high school counselor, work experience, high school class (math, science, or computer class), self study/interest, or other. Three respondents or 9.7 percent stated yes to being influenced by their mother and twenty-eight respondents or 90.3 percent stated no to being influenced by their mother. Four respondents or 12.9 percent stated yes to being influenced by their father and twenty-seven respondents or 87.1 percent stated no to being influenced by their father. Two respondents or 6.5 percent stated yes to being influenced by their sister and twenty-nine or 93.5 percent stated no to being influenced by their sister. Two respondents or 6.5 percent stated yes to being influenced by their brother and twenty-nine or 93.5 percent stated no to being influenced by their brother. Five respondents or 16.1 percent stated yes to being influenced by a friend and

twenty-six respondents or 83.9 percent stated no to being influenced by a friend. Nine respondents or 29 percent stated yes to being influenced by a teacher and twenty-two respondents or 71 percent stated no to being influenced by a teacher. Two respondents or 6.5 percent stated yes to being influenced by their high school counselor and twenty-nine or 93.5 percent stated no to being influenced by their high school counselor. Six respondents or 19.4 percent stated yes to being influenced by work experience and twenty-five respondents or 80.6 percent stated no to being influenced by work experience. Seven respondents or 22.16 percent stated yes to being influenced by a high school class they had taken and twenty-four respondents or 77.4 percent stated no to being influenced by a high school class they had taken. Fourteen respondents or 45.2 percent stated yes to being influenced by self study/interest and seventeen respondents or 54.8 percent stated no to being influenced by self study/interest. Finally, two respondents or 6.5 percent stated yes to being influenced by others and twenty-nine or 93.5 percent stated no to being influenced by others. The two others were an aunt and other family members.

Table 8

Who or What Influenced your Decision to Major in MIS or CS

	yes/checked		no/not checked	
	Respondents	Percentages	Respondents	Percentages
WHO/WHAT INFLUENCED DECISION: (STEP) MOTHER	3	9.7	28	90.3
WHO/WHAT INFLUENCED DECISION: (STEP) FATHER	4	12.9	27	87.1
WHO/WHAT INFLUENCED DECISION: SISTER	2	6.5	29	93.5
WHO/WHAT INFLUENCED DECISION: BROTHER	2	6.5	29	93.5
WHO/WHAT INFLUENCED DECISION: FRIEND	5	16.1	26	83.9
WHO/WHAT INFLUENCED DECISION: TEACHER	9	29.0	22	71.0
WHO/WHAT INFLUENCED DECISION: SCHOOL COUNSELOR	2	6.5	29	93.5
WHO/WHAT INFLUENCED DECISION: WORK EXPERIENCE	6	19.4	25	80.6
WHO/WHAT INFLUENCED DECISION: HIGH SCHOOL CLASS	7	22.6	24	77.4
WHO/WHAT INFLUENCED DECISION: SELF STUDY/INTEREST	14	45.2	17	54.8
WHO/WHAT INFLUENCED DECISION: OTHER (SPECIFY)	2	6.5	29	93.5

Question number eight asked each respondent what was their most important reason for choosing the MIS or CS degree at UWEC. The thirty-one respondents stated the following reasons for choosing the MIS or CS degree:

1. The Multicultural Office is what made me choose to come to UWEC. I had already chosen my major

2. I enjoyed working on the computer and my teacher said that it would be a good choice for me
3. It is a field that is very interesting and exciting for me because it is constantly changing and there are many different aspects to it
4. The versatility of computers, marketing, and management.
5. The diversity of the program
6. I knew I wanted to be in MIS because I like technology and I also like the business aspect. The education at UWEC is well balanced between the two, the class sizes are small, and the professors really know their stuff
7. It is a challenging fast moving career
8. Enhance computer skills and it works nicely with my second major, and later with my PhD of linguistics
9. It is a subject that I really love and I have had the opportunity to work in the field so I know I will enjoy it
10. Making a good salary
11. I like working with computers
12. I wanted a mix between computers and business
13. I wanted to enter a field involving computers, but I did not want to just be involved in coding
14. I was only a marketing major at first, but added the computer side to make my self more marketable
15. Interest, aptitude in field

16. At the time I decided on a MIS major the job market was really good and that was one of my main reasons for choosing it. Now, I have stayed with the MIS major because I really enjoy it
17. Computers and good money
18. I think UWEC has a great MIS program and I know I will receive a good education that will prepare me for my future career
19. I can do many things with my MIS degree
20. I am interested in computers
21. I could use my computer skills and my like of marketing
22. I like working with computers
23. The program sounded fun and challenging
24. I can not see myself doing anything else. Working with computers (specifically programming) is something I really enjoy
25. I needed a major that would challenge me and allow for employment after graduation
26. Interested in the field and the program is good
27. Jobs pay well
28. It is challenging and fun. It deals with math and science, my two top areas
29. UWEC has a very good computer science program
30. I found the CS website and the description it gave sounded exactly like me. I decided to try it out and see what happened
31. UWEC has one of the best CS programs in the state

Question number nine asked each respondent if someone had told them not to go into the MIS or CS major. The respondents were asked to choose from the following list if someone had told them not to go into the MIS or CS major: mother, father, sister, brother, friend, teacher, or high school counselor. One respondent or 3.2 percent were discouraged from pursuing a major in MIS or CS by their mother and thirty respondents or 96.8 percent were encouraged by their mother. One respondent or 3.2 percent were discouraged from pursuing a major in MIS or CS by their father and thirty respondents or 96.8 percent were encouraged by their father. Thirty-one respondents or 100 percent were not encouraged by their sisters to pursue a major in MIS or CS. Thirty-one respondents or 100 percent were not encouraged by their brothers to pursue a major in MIS or CS. Two respondents or 6.5 percent were discouraged from pursuing a major in MIS or CS by their friends and twenty-nine respondents or 93.5 percent were encouraged by their friends. One respondent or 3.2 percent were discouraged from pursuing a major in MIS or CS by their teachers and thirty respondents or 96.8 percent were encouraged by their teachers. One respondent or 3.2 percent were discouraged from pursuing a major in MIS or CS by their high school counselors and thirty respondents or 96.8 percent were encouraged by their high school counselors.

Table 9

Discouraged from Pursuing a Major in MIS/CS

	yes/checked		no/not checked	
	Respondents	Percentages	Respondents	Percentages
WHO DISCOURAGED DECISION: (STEP) MOTHER	1	3.2	30	96.8
WHO DISCOURAGED DECISION: (STEP) FATHER	1	3.2	30	96.8
WHO DISCOURAGED DECISION: SISTER			31	100.0
WHO DISCOURAGED DECISION: BROTHER			31	100.0
WHO DISCOURAGED DECISION: FRIEND	2	6.5	29	93.5
WHO DISCOURAGED DECISION: TEACHER	1	3.2	30	96.8
WHO DISCOURAGED DECISION: SCHOOL COUNSELOR	1	3.2	30	96.8

Question number ten asked each respondent if they had considered other majors at UWEC before deciding on MIS or CS. Ten respondents or 32.3 percent stated yes to having considered other majors and twenty-one respondents or 67.7 percent stated no to having considered other majors.

Table 10

Considered Other Majors at UWEC Before Deciding upon MIS/CS

	Respondents	Percentages
yes	10	32.3
no	21	67.7

Other majors that were considered:

1. Chemical Engineer
2. Economics
3. American Indian Studies
4. Pre-Law

5. Kinesiology
6. Pre-Pharmacy
7. Athletic Training
8. Nursing
9. Psychology
10. Math

Question number eleven asked each respondent if they planed on completing their degree in MIS or CS at UWEC. Thirty-one respondents or 100 percent stated they would complete their MIS/CS degree from UWEC.

Table 11

Plans on Completing the MIS/CS Degree at UWEC

	Respondents	Percentages
yes	31	100.0

The following questions were answered using a Likert Scale with 1 being strongly disagree, 2 being disagree, 3 being undecided, 4 being agree, and 5 being strongly agree.

Question number twelve stated some instructors say men are more likely than women to succeed academically. Eleven respondents or 35.5 percent strongly disagreed or disagreed with this statement. Where as, four respondents or 12.9 percent agreed and five respondents or 16.1 percents were undecided about this statement.

Table 12

Men More Likely Than Women to Succeed Academically

	Respondents	Percentages
strongly disagree	11	35.5
disagree	11	35.5
undecided	5	16.1
agree	4	12.9

Question number thirteen stated faculty make insulting or disparaging remarks about women. Eleven respondents or 35.5 percent strongly disagreed and fifteen respondents or 48.4 percent disagreed with this statement. Where as, four respondents or 12.9 percent agreed and one respondent or 3.2 percent were undecided about this statement.

Table 13

Faculty Make Insulting or Disparaging Remarks about Women

	Respondents	Percentages
strongly disagree	11	35.5
disagree	15	48.4
undecided	1	3.2
agree	4	12.9

Question number fourteen stated the climate in the classroom is less supportive of women than men. Eight respondents or 25.8 percent strongly disagreed with this statement and eleven respondents or 35.5 percent disagreed with this statement. Where as, ten respondents or 32.3 percent agreed with this statement and two respondents or 6.5 percent were undecided about this statement.

Table 14

The Climate in the Classroom is Less Supportive of Women than Men

	Respondents	Percentages
strongly disagree	8	25.8
disagree	11	35.5
undecided	2	6.5
agree	10	32.3

Question number fifteen stated I have often felt like an outsider in my classes. Seven respondent or 22.6 percent strongly disagreed with this statement and three respondents or 9.7 disagreed with this statement. Where as, fifteen respondents or 48.4 percent agreed with this statement, two respondents or 6.5 percent strongly agreed with this statement and four respondents or 12.9 percent were undecided about this statement.

Table 15

I Have Often Felt Like an Outsider in my Class

	Respondents	Percentages
strongly disagree	7	22.6
disagree	3	9.7
undecided	4	12.9
agree	15	48.4
strongly agree	2	6.5

Question number sixteen stated some instructors have created an inhospitable atmosphere for me in class. Thirteen respondents or 41.9 percent strongly disagreed with this statement, sixteen respondents or 51.6 percent disagreed with this statement and two respondents or 6.5 were undecided about this statement.

Table 16

Some Instructors have Created an Inhospitable Atmosphere for Me in Class

	Respondents	Percentages
strongly disagree	13	41.9
disagree	16	51.6
undecided	2	6.5

Question number seventeen stated academic expectations for female students are lower than for male students. Fifteen respondents or 48.4 percent strongly disagreed with this statement and three respondents or 9.7 percent disagreed with this statement. Where as, seven respondents or 22.6 percent agreed with this statement and six respondents or 19.4 percent were undecided.

Table 17

Academic Expectations for Female Students are Lower Than for Male Students

	Respondents	Percentages
strongly disagree	15	48.4
disagree	3	9.7
undecided	6	19.4
agree	7	22.6

Question number eighteen stated in class, ideas male students present are valued more highly than ideas female students present. Fourteen respondents or 45.2 percent strongly disagreed with this statement and five respondents or 16.1 percent disagreed. Where as, seven respondents or 22.6 percent agreed with this statement and five respondents or 16.1 percent were undecided.

Table 18

In Class, Ideas Male Students Present are Valued More Highly Than Ideas Female Students Present.

	Respondents	Percentages
strongly disagree	14	45.2
disagree	5	16.1
undecided	5	16.1
agree	7	22.6

Question number nineteen stated female students are seen as less qualified than male students. Eleven respondents or 35.5 percent strongly disagreed with this statement and five respondents or 16.1 percent disagreed. Where as, ten respondents or 32.3 percent agreed with this statement and five respondents or 16.1 percent were undecided.

Table 19

Female Students are Seen as Less Qualified Than Male Students

	Respondents	Percentages
strongly disagree	11	35.5
disagree	5	16.1
undecided	5	16.1
agree	10	32.3

Question number twenty stated generally instructors treat female students with respect. Fourteen respondents or 45.2 percent agreed and strongly agreed with this statement and three respondents or 9.7 percent were undecided.

Table 20

Generally Instructors Treat Female Students With Respect

	Respondents	Percentages
undecided	3	9.7
agree	14	45.2
strongly agree	14	45.2

Question number twenty-one stated in class male students generally speak more than female students. Three respondents or 9.7 percent strongly disagreed with this statement and two respondents or 6.5 percent disagreed. Where as, seventeen respondents or 54.8 percent agreed with this statement, five respondents or 16.1 percent strongly agreed and four respondents or 12.9 were undecided.

Table 21

In Class Male Students Generally Speak More Than Female Students

	Respondents	Percentages
strongly disagree	3	9.7
disagree	2	6.5
undecided	4	12.9
agree	17	54.8
strongly agree	5	16.1

Research Objectives Analysis

Research objective number one: Identify the factors that influence women to enter the information technology (IT) programs at the University of Wisconsin - Eau Claire. The following survey questions dealt with this research objective: numbers five, six, seven, and eight.

Research objective number two, Identify the factors that will keep women enrolled in the information technology (IT) programs at the University of Wisconsin – Eau Claire. The following survey questions dealt with this research objective: numbers eight, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, twenty, and twenty-one.

CHAPTER FIVE

Discussions, Conclusions and Recommendations

Introduction

This chapter provided a summary of the study, the conclusions drawn from the research and surveys of this study, and finally the recommendations of the study.

Summary

The purpose of this study was to determine why women decide to enter the information technology programs at the University of Wisconsin – Eau Claire and the reasons why they stay. The following two research objectives were also addressed as part of this study:

1. Identify the factors that influence women to enter the information technology (IT) programs at the University of Wisconsin - Eau Claire.
2. Identify the factors that will keep women enrolled in the information technology (IT) programs at the University of Wisconsin – Eau Claire.

A survey containing twenty-one questions eleven of which were used to obtain data pertaining to the respondent's age, year in college, major, did any one influence their decision to enter this major, did any one try to dissuade them from entering this major, and why they decided upon this major. The last ten questions were designed to gather data as to how they were treated being female students in these majors by using a five point Likert scale. This survey was sent to all thirty-seven female students in the MIS program and all nine female students in the CS program at UWEC. Of the forty-six female students who received this survey, thirty-one responded. The over all perception of the female students in the MIS and CS programs at UWEC was positive.

Conclusions

Based the study the demographics of the respondents were an average age of the twenty-one, 29 percent of them were third year students, 71 percent of them were MIS students, 71 percent had decided before attending UWEC to enroll in the MIS or CS program at UWEC, and all thirty-one of the respondents plan on graduating with a MIS or CS degree from UWEC. The ten respondents who had considered other majors before deciding upon the MIS or CS program there was only one who had considered a female dominated career and that career was nursing.

The respondents were asked in question number six if they had played computer games in high school. 83.9 percent stated that they were not interested in playing games in high school. The games that the other 16.1 percent did play in high school were games that involved social interaction, that were realistic, and goal based. The literature review also stated that most girls in

computers. The results of the survey did also indicate that teachers and friends influenced these women, with 29 percent being influenced by teachers, and 16.1 percent being influenced by friends. The literature review also indicated that women were influenced by family, friends, and teachers, but it stated that the majority of women were influenced by family, friends, and teachers. Whereas, the survey indicated the majority were influenced by self study and self interest in computers.

One of the other important questions was number nine where the respondents were asked if anyone had discouraged them from not pursuing a degree in MIS or CS. Only six of the thirty-one respondents stated they had been discouraged from pursuing a degree in MIS or CS and this was by a friend. This is encouraging to the future of the recruitment of women into these programs.

Questions eleven through twenty-one asked for information pertaining to the attitudes and atmosphere in the classroom towards female students.

Respondents were asked in question number twelve if they thought instructors said men were more likely to succeed academically than women and 71 percent strongly disagreed or just disagreed. Next, the respondents were asked in question number thirteen if they thought faculty made insulting or disparaging remarks toward them and 83.9 percent strongly disagreed or just disagreed. The respondents were also asked in question number fourteen if they thought the classroom climate was less supportive of women than men, and 61.3 percent strongly disagreed. Along with the climate of the classroom, the respondents were asked in question number sixteen if they thought some instructors had created an inhospitable atmosphere for them in the classroom and 93.5 percent strongly disagreed or just disagreed. The respondents were also asked in question seventeen if they thought the expectations for female students was lower than

male students and 58.1 percent strongly disagreed or just disagreed. Next, the respondents were asked in question number eighteen if the male students present in the classroom were more highly valued than the female students and 61.3 percent strongly disagreed or just disagreed. Next, the respondents were asked in question number nineteen if female students were seen as less qualified than male students, and 51.6 percent strongly disagreed or just disagreed. Respondents were asked in question number twenty if they thought instructors treated females students with respect and 90.4 percent agreed or strongly agreed. Finally, respondents were asked in question number twenty-one if the male students generally spoke out more in class than the female students and 70.9 percent agreed or strongly agreed. The conclusions drawn from this information stated that the majority of female students in the MIS or CS programs at the University of Wisconsin – Eau Claire are being treated with respect, supported academically in their chosen program, are comfortable in the classroom, and are treated as knowledgeable students by their instructors.

There was one negative result from the ten questions and it was in question number fifteen, which asked the respondents if they felt like outsiders in their class. 54.9 percent agreed or strongly agreed with this question, 32.3 percent strongly disagreed or disagreed and 12.9 percent were undecided. This may imply that women feel intimated by males when it comes to speaking up in their classes. This also implies that there is still some work that can be done to improve or getting more women to speak out in the classroom.

Recommendations

Based on the research, the following recommendations are made to encourage and retain more female students into the Management Information Systems and the Computer Science programs at the University of Wisconsin - Eau Claire.

1. The Management Information Systems and Computer Science departments at the University of Wisconsin – Eau Claire needs to attract more female instructors into these programs to help recruit and retain more female students into these programs.
2. The Management Information Systems and Computer Science departments at the University of Wisconsin – Eau Claire needs to employ more female mentors to help guide the female students involved in the MIS and CS programs.
3. Inquire with the Guidance Counselors, Technology, Business, Math, and Science instructors at the local elementary, middle, and high schools about developing a relationship with them to meet with the girls who maybe or are interested in pursuing careers in the IT programs at UWEC.
4. The MIS and CS programs at UWEC need to develop a web site that is specifically geared towards recruiting prospective female students. The site should point out the importance of IT programs and careers for female students. Maybe even add a few quotes from previous female students on how they felt about the programs from a their perspective.
5. Develop a summer program that allows middle and high school age girls who are interested in technology to come to UWEC and explore the IT programs and careers that are available to them. This should allow them to have a hands-on experience with IT projects. A good starting point would be contacting the University of Wisconsin – Stout. They have a program called the Summer Technology and Engineering Preview at UW-Stout for Girls (STEPS). There STEPS program runs during the summer and gives girls hands-on experience with different types of technology.
6. This study should be replicated in five years within the MIS and CS programs at UWEC.

7. The MIS and CS departments at the University of Wisconsin – Eau Claire should take a look at different universities in Wisconsin that have successful IT programs. The best practices of the successful universities than need to be looked at by the MIS and CS departments at UWEC to determine if these best practices can help them recruit and retain more female students into their programs.

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APPENDIX A

SURVEY LETTER

Dear Survey Recipient:

My name is Michelle Johnson and I work in Computing and Networking Services here at UWEC. I am currently working on my master's degree from the University of Wisconsin-Stout. The degree requirements include conducting a research study. The data from the attached questionnaire will be used in a University of Wisconsin-Stout graduate research study designed to recruit and retain women into the MIS and CS majors at UWEC.

By returning this questionnaire, you are giving your informed consent as a participating volunteer in this study. You are implying that you understand the basic nature of the study and agree that any potential risks are exceedingly small. You are also implying that you understand the potential benefits that might be realized from the successful completion of this study and that the information is being sought in a manner that guarantees confidentiality. You have the right to refuse to participate and your right to withdraw from participation at any time during the study will be respected with no coercion or prejudice. The University of Wisconsin-Stout Institutional Review Board for the Protection of Human Subjects has approved this survey.

Questions or concerns regarding this research study may be directed to Michelle Johnson (researcher), at 715-379-4512, or Carol Mooney (research advisor), at 715-232-1444. Questions about the rights of research subjects can be addressed to Sue Foxwell, Human Protections Administrator, UW-Stout Institutional Review Board for the Protection of Human Subjects in Research, at 715-232-1126. Please complete the questionnaire and return it to me by

April 20, 2004

Thank you for taking the time to complete this questionnaire.

Sincerely,

Michelle M. Johnson
715-379-4512

APPENDIX B

Recruiting and Retaining Women into the MIS and CS Majors at UWEC Survey

1. Current Age: _____ years old

2. What year are you in college? (check one)
   _____ First _____ Second _____ Third _____ Fourth _____ Fifth or more

3. What is your major? (check one)
   _____ Management Information Systems _____ Computer Science

4. When did you decide upon your current major? (check one)
   _____ Before attending UWEC
   _____ Fall term of freshman year
   _____ Spring term of freshman year
   _____ After freshman year
   _____ During sophomore year
   _____ After sophomore year

5. Did you take any computer classes before entering UWEC?
   _____ No
   _____ Yes – If yes, where? _
   What type of classes? _

6. Did you spend much time playing computer games during high school years?
   _____ No
   _____ Yes – If yes, what types of computer games did you play?
   (Be specific. Example: action, role playing, sports, SIMS, etc.)

7. Who or what influenced your decision to major in MIS or CS? (check all that apply)
   _____ mother
   _____ father
   _____ sister
   _____ brother
   _____ friend
   _____ teacher
   _____ school counselor
   _____ work experience
   _____ high school class (math, science, or computer class)
   _____ self study/interest
   _____ other (please explain) _

8. What is your most important reason for choosing the MIS or CS degree at UWEC?

9. Did someone say you should **not** go into the MIS or CS major? (check all that apply)
   _____ mother
   _____ father
   _____ sister
   _____ brother
   _____ friend
   _____ teacher
   _____ school counselor
   _____ other (who?) _
   Why did they think this? _

10. Did you consider other majors at UWEC before deciding on MIS or CS?
    If yes, which one(s)? _

11. Do you plan to complete your degree in MIS or CS from UWEC?
    _____ yes
    _____ no – If no, why not? _

Please define your level of agreement or disagreement with the following statements.

	Strongly Disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly Agree 5
12. Some instructors say men are more likely than women to succeed academically					
13. Faculty make insulting or disparaging remarks about women					
14. The climate in the classroom is less supportive of women than men					
15. I have often felt like an outsider in my classes					
16. Some instructors have created an inhospitable atmosphere for me in class					
17. Academic expectations for female students are lower than for male students					
18. In class, ideas male students present are valued more highly than ideas female students present					
19. Female students are seen as less qualified than male students					
20. Generally instructors treat female students with respect					
21. In class male students generally speak more than female students					