Computer Competencies for Visual Communications Students At Nicolet High School in Glendale, Wisconsin

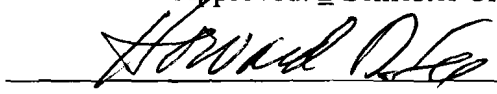
by

Aleta M. Gretenhardt

A Research Paper
Submitted in Partial Fulfillment of the
Requirements for the
Master of Science Degree
in

Industrial Technology Education

Approved: 2 Semester Credits



Dr. Howard Lee, Research Advisor

The Graduate School

University of Wisconsin-Stout

August, 2006

The Graduate School
University of Wisconsin-Stout
Menomonie, WI

Author: **Gretenhardt, Aleta M.**

Title: ***Computer Competencies for Visual Communications Students at Nicolet High School in Glendale, Wisconsin***

Graduate Degree/Major: MS Industrial Technology Education

Research Advisor: **Dr. Howard Lee**

Month/Year: **April, 2006**

Number of Pages: **96**

Style Manual Used: **American Psychological Association, 5th edition**

ABSTRACT

This research attempts to identify the basic entry-level computer skills required of incoming freshman whom have chosen to study visual communication at Southeastern Wisconsin postsecondary schools. Consequently, the results of this study may ultimately be integrated into the visual communications curriculum at Nicolet High School, Glendale, Wisconsin.

The purpose of the study is to identify visual communications competencies for Nicolet High Schools visual communication program that will meet the needs of high school seniors planning on attending Wisconsin area technical colleges.

This review of literature begins with a brief examination of visual communications as a discipline. Next, it presents an overview of postsecondary visual communication programs in

Southeastern Wisconsin. It will touch on the transition into visual communication-related careers and the application of basic computer mechanics skills — as well as the skills unique to visual communications. Finally, previous postsecondary competency studies will be examined in conjunction with a review of past postsecondary instructor surveys.

TABLE OF CONTENTS

List of Tables

List of Figures

Chapter I: Introduction

Background and Significance to the Statement of the Problem

The State of Wisconsin's Public School System is comprised of 426 public school districts in 72 counties within the perimeters of the state of Wisconsin. Each district has one or more high schools within their districts. Of those schools, not all high schools offer technology education courses within the content of their course offerings.

Milwaukee County is home to the Nicolet unified school district. According to the most recent United States census (2004), Milwaukee County was home to some 933,221 people. Figures show that Milwaukee County's population had grown by nearly 20,000 people from 1985 to 1990, but new estimates indicate that from 1990 to 2000 it had diminished by -2.0 percent residents while in contrast the state of Wisconsin has grown by 9.6 percent (United States Department of Census, 2004).

Nicolet High School is located just north of Milwaukee, Wisconsin and serves the communities of Glendale, Fox Point, Bayside and River Hills. As a part of the Nicolet Unified High School district Nicolet High School's student population is composed of students from the three feeder school districts (Nicolet High School Web Site, 2004).

- Fox Point - Bayside School District
- Glendale - River Hills School District
- Mapledale - Indian Hills School District

Nicolet High School is currently a 9-12 grade school serving over 1,440 students. Of the 1,440 students attending Nicolet High School the ethnicity consists of 18 percent African American, less than 1 percent American Indian, 5 percent Asian, 3 percent Hispanic, and 74 percent White. Nicolet currently maintains a 15.8 student per teacher ratio that is according to the

National Center for Educational Statistics (NCES). Nicolet has a publicly elected School Board that provides direction and oversight, with a Superintendent heading the organization's administration (City of Glendale, 2004) According to Nicolet's website's mission statement the goal of Nicolet is, "To continually better educate and prepare our students to become productive citizens who excel at the universities, colleges and careers of their choice."

Although the administration at Nicolet has emphasized its role as a college prep school they strongly support its specialized technology education department. Nicolet has a very unique technology education department that focuses on pre-engineering and visual communication skills. The two full-time instructors are expected to prepare the students for postsecondary training in engineering and visual communication. Both of the programs generally require a four-year degree at an accredited public or private college. Occasionally some students may start a visual communications program at a two-year technical school and then transfer to a four-year bachelors program.

All students entering Nicolet High School may elect to take course work from one or both of the technology programs. Some of the technology education courses offered at Nicolet High School are: interactive graphics I & II, video production, television broadcast, multimedia, architectural drawing and design, and computer assisted drafting. The visual communications and pre-engineering content require a high level of computer skills, in particular the uses of sophisticated software. Occasionally students will elect to take classes from both content areas. Nicolet students that take technology education courses display a vast array of computer competency skills. This may be due to the fact that the visual communications programs are open to all students regardless of computer expertise.

Nicolet High School's pre-existing communication technology program was designed to address the skills and competencies needed for the print trade, with some focus on web design. In the past, the visual communications content was a small facet of the curriculum. There was no formal visual communication curriculum in place. In 2002, the administration at Nicolet High School made a decision to focus the program on visual communications. It was this decision that influenced the school board to invest money in the construction of a state of the art digital design and broadcast lab. There has never been any study to support the curriculum that has been implemented.

Visual Communications is an essential element in the technology-based classroom The scope of this field is vast, crossing over into many areas of study. According to *The Journal of Visual Literacy,* (Journal of Visual Literacy, 1997), "The study of visual communication theory is a multi-disciplinary, multi-dimensional effort. People who write on this topic come from mass communication, film and cinema studies, education, art, anthropology, psychology, philosophy, linguistics, semiotics, and architecture and archaeology, among other fields" (p. 2). For the purpose of this study the research will be limited to visual communications technology.

Currently the term technology is used to describe many fields of study; because of this, it is important to define technology. To find a clear definition of technology the International Technology Education Association states, "Broadly speaking, technology is how people modify the natural world to suit their own purposes. From the Greek word techne, meaning art or artifice or craft, technology literally means the act of making or crafting, but more generally it refers to the diverse collection of processes and knowledge that people use to extend human abilities and to satisfy human needs and wants" (Standards for Technological Literacy, 2000).

In the science of technology, visual communications examines the way our society processes visual information. According to *The Journal of Visual Communication and Image Representation,* "The field of visual communications and image representation is considered in its broadest sense, and covers both digital and analog aspects as well as processing and communications in biological visual systems" (2005). In this study the areas will be limited to:

1. Image scanning, capturing, and sampling
2. Digital image processing
3. Digital design, construction, and implementation
4. Image encoding and decoding
5. Visual data reduction and compression
6. Pre-production planning and post-production analysis.

Simply knowing the terminology involved will not lead to an understanding of the field. The end products are as varied as the scope of study.

Some of the finished products of visual communications include both informative and instructional videos, game design, web design, CD roms, computer graphics, photographic digital imaging, and computer animation. The units can include both passive and interactive formats. Visual Communication products are present in every aspect of life, from the way our society chooses to inform, educate and entertain. It would be impossible for anyone to communicate today with out the use of one or more products from visual communications. Because of this, careers and the classes that teach media are in high demand.

This interest in media may be better illustrated by the report from *The Occupational Outlook Quarterly*, published by the Bureau of Labor Statistics released in Fall of 2002. Within that report it stated,

> Eight (8) of the 10 fastest growing occupations between 2000 and 2010 will be computer related. For this reason future jobseekers need to know about the variety of ways to prepare for a career in information technology. Over the next 10 years, the Bureau of Labor Statistics (BLS) projects that an additional 2 million workers will be needed to fill these jobs. Companies already report difficulties in filling these positions today. (Successful Telecommuting Programs, 1997, pp. 3-5)

What is developing is a fast paced, highly evolving vocation, that may require training at a technical school or university. It is the intention of this research to categorize and prioritize the Wisconsin Academic Standards for Technology Education. By doing this, the established standards can be tailored for the study of visual communications.

A technologically literate person will need to have some computer competencies established during their high school education to assist in their assimilation into a postsecondary career or college training. Educators have begun developing curricula to teach general and specific computer knowledge, skills and attitudes (Pelgrum & Plomp, 1993). Knowledge, skills and attitudes are being integrated into existing subjects as well as being developed as separate units of instruction, courses, and programs throughout elementary and secondary school systems under the guise of "computer literacy" (Becker, 1993; Hadley & Sheingold, 1993; Heywood- Everett, 1991; Pelgrum & Plomp, 1993). To consider one competent in visual communications The International Board of Standards for Training, Performance and Instruction has a web site for instructional designers and developers, where they state "a competency is defined here as a knowledge, skill, or attitude that enables one to effectively perform the activities of a given occupation or function to the standards expected in employment. Competencies are comprised of observable performances" (International Board of

Standards for Training Performance and Instruction, 1999). These recommended computer competences will allow for a smooth transition into a postsecondary education. This will help students in the transition to upon entering college, where students are expected to be technology literate and capable of using technology tools.

Statement of the Problem

The visual communication curriculum has never been validated at Nicolet High School. Without a competency study the visual communications portion of the curriculum may not be meeting the needs of the students requiring future employment or placement into a post secondary program. The expertise within the technical and bachelor college has never been taped as to their opinions and perceptions of a high school visual communications course.

This research study will identify computer competency needs for visual communication students at Nicolet High School, in Glendale, Wisconsin. The perspective of the technical and bachelor college instructors will be surveyed to determine; if the current students computer competencies provide for a smooth transition into postsecondary training; therefore, leading to a successful career in the field of visual communication, and what changes must be made to help visual communication obtain the skills expected of them for the present and future?

Research Objectives

This descriptive research was developed and designed to provide information that will:

1. Identify the technological demands in the first year of higher education for entry-level visual communication students.
2. Document a computer competency list specifically designed for visual communication students at Nicolet High School.

3. Identify post-secondary visual communication computer competency needs from both two and four year programs in southeastern Wisconsin
4. Determine response differences on selected demographics of instructors.

A review of the literature indicates there is a relationship between computer competencies and a successful post secondary experience. The literature also indicates that therefore the hypothesis for this study is that it is beneficial to the technical college instructors.

Purpose of This Study

The main purpose of this descriptive study was to identify the computer competencies that the postsecondary instructors want of visual communications graduates from Nicolet High School's technology education program. A survey instrument was developed and designed to establish computer competencies associated with successful entry level visual communication skills for high school seniors planning on attending Wisconsin area technical and four-year colleges. The data was then used to create and update Nicolet High School's computer competency list for the visual communication program.

The research data will provide a format for the design and implementation of skill levels to properly prepare the graduates from Nicolet High School in the areas of visual communications. The data will assist the high school instructor in their abilities to align content with the computer competencies needed at the technical and four-year college. A system for updating computer competencies would be an asset.

Significance of the Study

The study was conducted to create curriculum and computer competencies of the visual communication program at Nicolet High School in Glendale, Wisconsin. The past curriculum addressed the print and web area. This research was used to open up communication between the

high school instructor and the technical college instructors. The survey instruments were designed to seek knowledge from the instructors who would be directly affected by the competency changes. The research was designed exclusively for Nicolet High School; however, the results may be of interest to other high school technology instructors starting programs in visual communications.

Limitations of the Study

1. This study is restricted to the visual communication instructors from southeastern Wisconsin technical and four year public and private college programs visual communication instructors from Wisconsin's independent private technical schools will not be a part of this research.
2. The rather small population of instructors surveyed limits the data.
3. The obstacle to this research is obtaining the participation of the technical and four-year college instructors.
4. This analysis is restricted to the instructors of visual communication that specialize in electronic forms of media. It will not include analysis of specialized fields such as graphic arts or photography.
5. The application of this research will be limited to influence only students attending Nicolet High School in Glendale, Wisconsin in the senior level visual communications program. The researcher does not guarantee that other high schools will benefit from the data.
6. The research will utilize a questionnaire that has been developed by the researcher. The presence of the human element indicates that the questionnaire

may contain errors, misinterpretations, misstatements, or omissions not intended by the researcher.

7. This study will not investigate if the competencies identified as being needed will be applied to existing and future curriculum.

Assumptions of the Study

1. This study assumes that teaching professionals will answer truthfully and honestly about competencies needed at the technical and four-year college levels. They will thoroughly consider the student's skills required.
2. This study assumes that teaching professionals will answer truthfully and honestly in terms of present and new technology skills impacting students while in a postsecondary carrier. They will respond accurately about trends in current technology and consider the potential benefits of competencies influencing student's performance.
3. This study assumes that teaching professionals are wiling to improve communication between high school educators and two and four-year college instructors in the hopes of maximizing student achievement.
4. This study assumes that teaching professionals have access to equipment and opportunities to learn about new technology. They seek out educational and training opportunities to learn new technology and new skills and transfer learning to their educational environment.

Definition of Terms

Analog. Relating to, or being a device in which data are represented by continuously variable, measurable, physical quantities, such as length, width, voltage, or pressure.

Analysis. The separation of an intellectual or material whole into its constituent parts for individual study.

Competencies. Properly or sufficiently qualified; capable.

Compression. The process by which data is compressed into a form that minimizes the space required to store or transmits it.

Curriculum. All the courses of study offered by an educational institution.

Data. Numerical or other information represented in a form suitable for processing by computer.

Digital. Expressed in numerical form, especially for use by a computer.

Image Capturing. In this sense to use a peripheral to record a visual image into a digital format.

Image Decoding. To convert from a scrambled electronic signal into an interpretable one.

Image Encoding. To format (electronic data) according to a standard format.

Image Sampling. A reproduction of the form usually digitized that has been altered in resolution.

Image Scanning. To move a finely focused beam of light or electrons in a systematic pattern over an image in order to reproduce or sense and subsequently transmit an image.

Pre-production Planning. Defining your goals with specific plans for the construction of a visual communications product.

Processes. A series of actions, changes, or functions bringing about a result.

Stratified. To arrange or separate into castes, classes, or social levels.

Technology. The application of science, especially to industrial or commercial objectives.

Visual Communications. Communication processes that rely primarily on rich visual content as the means of conveying information: Photos, video, synthetic images -plus audio /text/data.

Visual Data Reduction. The ability to reduce the numerical or other information represented in a form suitable for processing by computer.

Methodology- A Brief Summary

This is a self-report research study. Surveying is the technique that will be used to perform the research. The survey method will be a mailed questionnaire. The mail survey technique was selected because it is relatively inexpensive and allows the researcher to gather information from respondents who may otherwise have been in accessible.

A stratified sampling of visual communication instructors from two southeastern Wisconsin technical college programs will help in population representation. Surveying the proportional clusters of instructors drawn from the sample, and presenting them with a confidential mailed survey the responses should represent the honest opinions of visual communication instructors. A Likert Scale to measure degrees of desirability will be used in the questionnaire. By mailing the instrument to the sample group during end of the first semester the instructors would be able to give clear valid responses to the survey, as all students will have completed one full semester of course work.

The competencies will give the 12th grade students at Nicolet High School in Glendale, Wisconsin a sense of the skills needed for a successful postsecondary education. The data collected from this study will lay the groundwork for a competency scale and educational dialogue between Nicolet High School, and the community and local colleges in southeastern Wisconsin.

This research will give the visual communication instructors a sound basis for prioritizing curriculum that is pertinent to the content area.

Chapter II: Literature Review

Introduction

This research attempts to identify the basic entry-level computer skills required of incoming freshman that have chosen to study visual communication at southeastern Wisconsin postsecondary schools. Consequently, the results of this study may ultimately be integrated into the visual communications curriculum at Nicolet High School, Glendale, Wisconsin.

Additionally, this study may lay the groundwork for improved communication between high school and the postsecondary instructors. The hope is that established communication lines between the two maybe advantageous in improving the retention of visual communication students.

This review of literature begins with a brief examination of visual communications as a discipline. Next, it presents an overview of postsecondary visual communication programs in southeastern Wisconsin. It will touch on the transition into visual communication-related careers and the application of basic computer mechanics skills — as well as the skills unique to visual communications. Finally, previous postsecondary competency studies will be examined in conjunction with a review of past postsecondary instructor surveys.

Brief Overview of Visual Communications

Visual communication is the communication of ideas through the visual display of information. Primarily associated with two-dimensional images, it includes: alphanumeric, art, signs and electronic resources. Recent research in the field has focused on web design and graphically oriented usability (Wikipedia Dictionary, n.d.). One may conclude that the study of visual communications can be traced back to the earliest man where simple hand signs and body

gestures conveyed a message. As our society has evolved, so has the way we visually communicate. We live in a media saturated world with an explosion of multisensory messages.

The explosion of media is not exclusive to the United States. According to a recent and authoritative academic study, "Young People, New Media," written and conducted in the United Kingdom by Sonia Livingstone and Moira Bovill, nearly all households with children have a television (TV) and a video recorder; two-thirds have TV-linked game machines; and nearly half have cable or satellite TV. According to Livingstone and Bovill (1998):

> This is just the tip of what has been called a 'media rich' bedroom culture in the UK, one in which many children have a variety of electronic media — including screen entertainment, music systems and PCs — in their bedrooms. Although there are class and gender differences in the relative priority given to certain types of media, a general trend is observable. Converging screen technologies will increasingly contribute to the blurring of boundaries between information, education, work and entertainment. (p. 2)

A recent, more definitive explanation of visual communication can be found online at the website for The Visual Communication Advocacy Program. Here, visual communication is defined as a "process that relies primarily on rich visual content as the means of conveying information: photos, video, synthetic images — plus audio/text/data (The Visual Communication Advocacy Program, 2005).

Meanwhile, Saul Carliner, one of the nation's leading educators in visual communications, offers a deeper explanation. According to Carliner, (2005), visual communications has both critical and practical parts.

The critical part is known as visual rhetoric, which explores the way that designers use visual elements to influence audiences. The practical part of visual communications has three areas of focus:

- Using a picture, icons and symbols to express ideas.
- Applying principles of graphic design and usability to prepare screens and pages so readers can quickly find information of interest, and comprehend the most information from them.
- Producing online and printed content so that it matches the design plans. (p. 1)

As our global society becomes more dependent on strong visual imagery to create and receive messages, the study of visual communications and the careers associated with it become more defined.

Careers in Visual Communications

What career paths does visual communication offer? A question frequently asked by seniors at Nicolet High School. One of the major sources for career exploration at Nicolet is WIS*Careers*.com. The guidance department and staff encourage students to use this paid website to explore career planning and development. WIS*Careers* is a database unique to Wisconsin and is an excellent resource made available to the students at Nicolet. Knowing that the nature of the work is in video, web design, animation and broadcast journalism, a WIS*Careers* search provided the following results:

- **Film and video editors:** Film and video editors select the portions of films or videotapes that will appear in industrial or commercial videos, motion pictures and television series. Scenes are not always filmed in the sequence that they occur in a story. Outdoor sequences, for example, are filmed when weather permits.

Therefore, film editors must assemble all the different sections of footage into a sequential series of activities. Film editors use editing machines or personal computer software programs to edit. They work with sound and picture editors to determine the exact frame where sound effects should begin and end. They then splice or join, the film segments into continuous reels as a finished product. (WisCareers, 2005).

- **Web designers:** Webmasters design, create and maintain sites on the Internet. They select sound and visual graphics to present an appealing public image on their home pages. Home pages introduce products or services to Internet users. In addition to home pages, web designers usually maintain other sites on the Internet; such sites market products and services or provide information. The designer may solve hardware and software problems that occur as they are developing the materials to be placed in on Internet sites. Webmasters are continually adding more information to their websites and maintain the content on an as-needed basis. They also update home pages to capture the interest of more Internet users. (WisCareers, 2005).
- **Animator:** Animators, who create 3-D animation or digital animation, use computers with special programs that allow them to create 3-D cartoons on their computer screens based on their cartoon character sketches. They create characters, design backgrounds, choose colors, and adjust brightness and clarity to refine the objects and characters. Other computer programs allow them to select the speed and direction that the cartoon characters will move. (WisCareers, 2005).

- **Broadcast technicians:** Broadcast technicians run electronic radio and television equipment. They also keep electronic equipment in good working order. There are several types of broadcast technicians. Transmitter technicians run and maintain broadcast transmitters, which send out sound waves that radios and televisions pick up and change into sound and pictures. Transmitter technicians watch control panels that keep track of broadcast signals. If problems occur in the signals, transmitter technicians find the cause of these problems and correct them. Audio technicians run the sound equipment used in broadcasting. They set up microphones and operate CD players and tape machines. Video technicians control the quality and brightness of television pictures; ensure that the television picture does not become too light or too dark; and may also run videotape machines. In large broadcasting studios, many broadcast technician's work together in teams. In smaller stations, one technician may perform all the technical duties (WisCareers, 2005).

The common thread between all these programs is the need for strong computer skills and a level of technical know-how. Whether one chooses to be involved in the creation of an appealing graphic, producing visual art, or using computers to transmit an electronic message, a career in visual communication will be technically challenging.

Postsecondary Programs in Southeastern Wisconsin

Southeastern Wisconsin is home to many public and private two- and four-year visual communication programs; however, this research is limited to a review of three local programs. These programs were selected based on the proximity of the schools and the familiarity the researcher has with the instructors due to past cooperative learning programs. The programs

reviewed are the University of Wisconsin — Milwaukee (UWM); Milwaukee Area Technical College (MATC); and Milwaukee Institute of Art and Design (MIAD).

The University of Wisconsin-Milwaukee is located in southeastern Wisconsin. At UWM, the Department of Journalism and Mass Communication houses the visual communication program. According to its Digital Arts and Culture (DAC) website the

> Digital Arts and Culture Certificate Program is designed to provide students with a balanced and comprehensive approach to studying information technology and emerging media forms. Combining courses in the arts, humanities and social sciences, DAC explores and makes use of a wide range of theoretical, practical and artistic possibilities with new media technologies. Students in the program will join an exciting community of students, faculty and working media professionals and digital artists in exploring cyber culture. Upon graduation, students in the program may seek employment in the media industries, as webmasters for organizations, or in the arts (University of Wisconsin, 2005).

The strength of UWM's program is the integration of fine art coursework requirement into the visual communication major, enhancing the technical aspect of the program. The understanding of fine arts elements and terminology should give the student a strong background in design and color theory — skills crucial to the visual field.

Another program to be reviewed is a two-year associate program at Milwaukee Area Technical College (MATC) where the emphasis is on vocational skills and no bachelors' degree is offered.

Milwaukee Area Technical College is located in the Business and Information Technology Division, of the downtown Milwaukee campus. According to the visual communications website:

> The visual communication/computer graphics coursework is designed to prepare you for a career using computer graphics, interactive design, animation and digital multimedia production. Coursework covers basic skills in computer graphics, graphic design, photography and digital audio/video production; and advanced skills in interface design, Web design, animation and interactive authoring/programming. Portfolio and internship courses are designed to help you prepare samples of your work and initiate a job search. Employment opportunities are excellent for skilled multimedia experts. This program is also a good choice for teachers, trainers and advertising and marketing staff that work with digital media. Core skills include familiarity with computer operating systems; word processing and the Internet; good color and depth perception; and a talent for visual problem solving (Milwaukee Area Technical College, 2005)

MATC's strengths lie in the length of the program and its emphasis on career skills. Programs like MATC's program are desirable for the student not wanting to attend a four-year college directly out of high school. UWM's program offers a more broad-based education. The animation facet is highly desirable; however, misleading for students intending on a career in film animation. Typically, the schools that offer film animation are fine art colleges with programs similar to the one offered at MIAD.

Milwaukee Institute of Art and Design is located in downtown Milwaukee and is a premier design school in this area. Students who major in visual communication would take up the study of time based media. According to MIAD's website, students who "have a unique

combination of skills. You think in sequences, in stories, and see the interaction of time, movement, and space in everything around you. Breaking down narratives into their core components and recombining them through a pencil, computer or sculpture is the foundation of your visual process. You understand how light can convey mood, and how to capture emotion through drawing. You love technology, and hope to harness its power to define our world. As the name implies, MIAD's Time-Based Media major focuses attention on work that changes with time. Time-Based Media combines video, animation and interactive digital media into one cohesive program of study" (Milwaukee Institute of Art and Design, 2005)

In contrast to UWM and MATC, MIAD's number one focus is the fine art element of visual design. A student's number one strength must be their artistic prowess. Visual communication students attending MIAD must have a strong animation portfolio and a desire to enter the field of film animation — artistic or commercial.

The commonality of all three programs is the intense application of computer skills; because of this, entry-level freshman must establish strong computer mechanics skills. However, this is not always the case. Research has found that faculty becomes mired in teaching computing basics to upper division students that do not have a strong computer literacy background. More importantly, the faculty believes students are missing out on powerful learning opportunities that technology provides to increase learning in academic subjects and increase student's skills (Sweaney, Manley, & Meeks, 2001). By pinpointing the computer skills that are common to all technology programs and unique to visual communications, offers the opportunity to reevaluate what qualifies the college freshman as computer literate.

Basic Computer Mechanics Skills

There are certain basic computer skills sets that are desirable regardless of the student's field of study. Lack of those — and more importantly proficiency of those skills can add a level of anxiety and frustration for incoming freshmen.

According to Kieffer (1995), many university administrators and faculty accept the premise that students enter college possessing basic computer skills. However, in a study conducted by Johnson, Ferguson, Vokins, and Lester (2000), they concluded that students did not have a common core of computer experiences, lacked confidence in their computer skills, and had a low level of computer knowledge. A September 2001 United States Census Bureau report on computer and Internet use in the United States stated that of the 11,354 people aged 15 to 17 years 89.6 percent use a computer at school; however, only 59.5 percent use the internet at school (United States Department of Census, 2004). Considering those statistics one might consider it safe to assume that with the influx of computer usage in secondary schools the student's skills have risen; however, there is little correlation between the students' usage and the student's computer confidence, skills and knowledge.

After an extensive review of the multitude of suggested freshman competency posted on the World Wide Web, one list suggests a solid overview of skills without being overly cumbersome and content specific. Purdue University has a published a skill set titled "Basic Computer Technology Competence Required" for all incoming freshman (Purdue University, 2004) Purdue has categorized the different areas of knowledge and skills required to use computer-based information as follows:

Can you perform the following activities using the Windows (95, 97, 98, 2000, XP, NT) operating system?

1. Perform the basic mouse operations: right-click, double-click, drag and right-drag?
2. Identify objects on the desktop?
3. Open, minimize, maximize and restore a window?
4. Copy, move, rename and delete files and folders?
5. Launch an application, create or name a document, and save on the desktop.
6. Open and modify a document on the desktop?
7. Create a folder on the desktop and move documents to it?
8. Add and delete shortcuts on the Start menu?
9. Open a folder, document, and application program from a window?
10. Display drive and folder properties?
11. Cascade and tile open windows on the desktop?
12. Display, expand and open drives and folders?
13. Close, move, resize and scroll a window?
14. Use the Run command?

Can you perform the following activities using a word processing program?

1. Undo commands or actions? Select text (word, line, paragraph, document)?
2. Change the font style and size of text?
3. Check spelling and grammar?
4. Right-align, left-align, center or justify a paragraph?
5. Bold, italicize, or underline text?
6. Insert a line, section, and page break?
7. Insert clip art into a document and resize?

8. Create a bulleted list?
9. Find and replace text?
10. Create, modify & format a chart from a Word table?
11. Cut, copy and paste text?
12. Insert a Word table, enter data and format the table?
13. Set and use tab stops?

Can you perform the following activities using an e-mail program?

1. Send an e-mail message?
2. Add a file attachment to an e-mail message?

The major draw back to this list of skills is that it is Windows specific with no mention of a Mac-based platform.

In contrast, in an article by Thierry (2000), Thierry goes on to provide a computer literacy inventory checklist to use in assessing your computer literacy. She lists the content as the five basic computing areas: basic operations and concepts; file management; Internet; electronic mail; and word processing. The strong point of Thierry's list is that it is not format specific and covers areas regarding presentation tools, database management, multimedia, as well as maintenance and troubleshooting. Her list becomes too task specific when she explores areas specific to creating a simple spreadsheet with rows, columns and headings unique to database operations.

Thierry's list for the management of presentation tools is strong because it is universal to both formats and many applications. The list is as follows:

1. Create presentations using wizards, design templates or blank presentation layouts
2. Create slides using standard layouts and designs
3. Modify standard layouts and design templates

4. Edit slides and insert slides from other presentations
5. Format text fonts, add bullets or numbers
6. Use spell checker to check for typos and misspelled words
7. Add objects such as clip art, pictures, video clips and sound
8. Add animations and transitions
9. Include tables and charts in your presentation
10. Move and resize objects
11. Navigate between slides and switch between different views (slide, outline, notes)
12. Re-sequence slides
13. Create notes and handouts
14. Set up a slide show

While both checklists have common elements, the Purdue list, in contrast, has specific areas of knowledge and skills required to use computer-based information that are needed within many applications and operating systems.

Computer Competencies in Visual Communications

Despite recognition of the many benefits of technical graphics communication instruction in grades 9-12 technology education, there currently are no rigorous, well-tested, standards-based, nationally distributed materials to support such instruction in our nation's high schools. Even as the nation's high school technology education classes have begun using sophisticated graphics tools to create 2-D documents and 3-D models, many have remained narrowly focused on traditionally applied technology areas (Wiebe, Clark, Ferzli, & McBroom, 2003).

Desktop publishing and multimedia software and hardware are being used as forms of communications technology, but not as legitimate sources of knowledge in their own right (Wiebe, Clark, Ferzli, & McBroom, 2003).

Meanwhile, Ohio has consistently come forward as a maverick in publishing a comprehensive set of information technology competencies. What makes *The Ohio Information Technology Competency Profile* notable is that the units within the document have content specific to digital media design, as well as video and film production. According to the profile it, "includes a comprehensive set of information technology competencies that are grounded in core academic subject areas and built around four occupational clusters: information services and support, network systems, programming and soft wear development, and interactive media."(Ohio ITAC, 2001) This complete profile is available on the Internet at www.itworks-ohio.org.

Units 10, 12, and 13 of the document titled, Graphic Design Fundamentals, Digital Media Design, and Video/Film Production, are excellent examples of comprehensive computer competencies unique to visual communications. This profile was developed in an attempt to provide a seamless integration of programs and courses in Ohio's secondary schools, colleges and universities. It is an admirable undertaking to allow secondary and postsecondary instructors an opportunity to offer their input into what visual communication competencies should be addressed. In order for a comprehensive basic computer skills set to be developed, an open line of communication between the secondary and the post secondary instructors is required. Only then will the needs of the visual communication student's postsecondary computer competencies be addressed.

Review of Past Postsecondary Computer Competency Studies

After conducting a study of 140 incoming business freshmen to determine if the students had adequate computer knowledge and the skills to exempt the introductory computer fundamentals course, Wallace and Clariana (2005) found that by using online testing software they were able to test the students on both computer skills (Excel) and computer concepts. The skills reflected what the students were expected to master at the completion of an introductory computer fundamentals course. What Wallace and Clariana (2005) concluded was that the students' average test scores were 60 percent, which is significantly below passing. This study also found that only 36 percent of the students tested could exempt or "test out" of the course if given that option.

After doing a search regarding the effectiveness of online testing the review, it was discovered that little has been written on this subject. This lack of data may be due to the newness of the methodology, or it is possible that online testing is viewed as just one more mode in which to deliver a message. It is possible that ease of using larger and more manageable sample groups may be one of the advantages of online testing. Another positive factor is that online testing lends itself to effortless updates and revisions due to the ease of the technology. What is true is of any computer literacy study is the need to continually update the skills sets as the technology changes.

According to Phillips (2001), the expectation of computer literacy is both a burden and an opportunity. The specific technology installed in any workplace constantly changes in sophistication and function. Even though computers have become easier to use over time, their continually advancing capabilities and the increasing variety of available functions and features result in a consistent need for more training. In addition, Phillips notes that skill requirements

change over time for any profession and professional positions in organizations that work extensively with computer technology change almost yearly. With such rapidly evolving technology, the student's competencies may be affected simply by the school district's ability or inability to keep current with the latest technology.

Another contributing factor to the results of freshman computer competency testing could be a student's attitude toward computers and technological advances. One of the most important social cognitive factors that affect a student's use of technology is attitude and self-efficacy (Dusick, 1998). Bandura (1986) has suggested that self-efficacy has the greatest impact on a person's individual mastery of skills. Compeau and Higgins (1995) found that computer self-efficacy was a significant determinant in computer usage. Students who have little confidence in their ability to use the computer, and who may be dissatisfied with their computing skills, or are uncomfortable using the computer may be said to have a poor self-efficacy image (Cassidy & Eachus, 2002). Self-efficacy is not designed to measure existing skills, it reflects what people believe that they can do with the skills they already have (Eastin & LaRose, 2000).

Lim and Lee (2000) observed, "most students have some reasonable computer skills at the start of their university studies, but the level of skill is not uniformly high" (p. 215) and educators working with freshmen students have not overlooked this lack of confidence. This observation was presented in an article tilted IT skills of university undergraduate students enrolled in a first year unit. Published in the *Australian Journal of Educationa*l technology.

A 2005 article published in the *The Journal of Information Technology Education* (Wallace & Clariana, 2005) concluded that the assumption that incoming freshmen business students possess adequate knowledge of both computer concepts and computer literacy skills is not accurate. In fact, the average score of 58 percent on the concepts pre-test and 60 percent on

the Excel pre-test suggests that students do not possess the necessary skills to function in an undergraduate school of business. Also in this study, 64 percent of the students failed, or scored below 60 percent in one of the two tests. In addition, the percentage that failed both tests was 39 percent.

This data indicates that only about one-third of the freshman business students tested could exempt or "test out" of the course if given that option. It would be interesting to see the results of the data regarding those students qualifying for the test-out option to see if they had the self-confidence to do so.

Review of Past Postsecondary Instructor Surveys

Many studies have examined freshmen students' perception of their computer competency skills; however, few have examined the desired skills by surveying the post-secondary instructors. One might find that unusual considering that the college instructors are highly affected by the student skills or lack thereof. In finding instructor-based surveys, two highly different studies will be reviewed. Both studies are similar in that the opinions of the postsecondary instructors' expectations were analyzed as a means to establish computer competency needs for freshmen. Unfortunately, this review is limited because data was only found for technical college programs. It is not the intention of this thesis to exclude the programs found at a four-year college, but current data was not available. What should be noted is that neither of the studies is unique to study of visual communications and both studies are broad-based, addressing all fields of study.

The study of basic computer literacy skills expected of students by instructors at Wisconsin Indianhead Technical College (WITC) was facilitated by Robert Pennings (2001). In this study, conducted through the use of an online survey, instructors at WITC were surveyed on

their current and future (two year) expectations of entry-level students' basic computer literacy skills. After surveying 143 instructors, Pennings' (2001) research received only 29 responses to the online survey. With a response rate of only 22 percent Penning (2001) sought a much higher response rate for the study. He speculated that the original survey's response rate might have been so low because of the online medium by which it was conducted. Similarly, when looking at the survey instrument, it must be noted that it did have content validity since its design and items were derived from researched studies and reports.

A Likert Scale was used for the questionnaire's response format. The numeric scale of 1 to 5 corresponded to the item's demand with the higher number equating to the higher demand. The descriptions of demand on the 1 to 5 scale were: Not Required, May be Required, Seldom Required, Frequently Required, and Absolutely Required. Each item in the questionnaire was rated twice — once for current expectations and again for future expectations. One of the important aspects of the data was that an increase in future expectation was indicated on every item in the questionnaire. This may indicate an importance of increased basic computer literacy skills for first year students. Speculating on the future can be difficult especially when it comes to computer skills, as they can be easily outdated.

The survey was broken down into five categories with the results as follows:

1. Hardware or equipment-related knowledge and skills scored the highest current expectations but showed the smallest increase in future expectations
2. System knowledge and skills scored current expectations as 'seldom required' but showed high increases for future expectations as being frequently required.
3. Applications software knowledge and skills, scored current expectations as 'seldom required' but scored high the highest increases for future expectations

possibly due to the high expectations in word processing, web browsing and e-mail.

4. Knowledge and skills associated with the use of the information system itself scored the lowest for both current and future expectations
5. Knowledge and Skills Associated with using the information that is contained in the source or service scored current expectations as 'seldom required' but showed high increases for future expectations.

Pennings' (2001) results found that no item in the study was expected to be de-emphasized within the next two years, and because of this competency studies involving instructors input should be conducted. Pennings' (2001) research felt that it might be important to incorporate future changes in computing technology into the studies to see how the changes will be used in the educational setting. This may be beneficial but highly difficult due to the evolving technological hardware and software. Rather, it may be wise to deal with the known skill sets and update competencies for future studies. What is true of this study is that a larger set of data should be collected to in order to make generalizations of the entire group surveyed. For that data one must look to a larger sample group.

A comprehensive study was conducted to at Johnson County Community College (JCCC) in Overland Park, Kansas, surveying faculty and staff. This study was conducted in response to a comment made that "the students lacked rudimentary computer skills needed of incoming freshmen" (Weglarz, 2004, p. 2). According to a study titled, Importance of Computer Competencies for Entering JCCC Students: A Survey of Faculty and Staff, Weglarz (2004), found that the faculty were spending time in non-computer related classes teaching students basic computer skills. Weglarz (2004) stated that, "As a result of this discussion a survey was designed

to identify faculty and student services perceptions of basic computer skills necessary for entering JCCC students" (p. 2).

The surveys were distributed in winter 1999-2000 to all full- and part-time faculty, admissions and records, as well as the financial aid, and counseling staff. A total of 218 surveys were completed and returned (for an approximate response rate of 20 to 25 percent). The research did acknowledge that due to the way the surveys were distributed, an exact response rate could not be calculated. A five-point Likert Scale was used to rank the importance of the computer skills with five weighed as very important to one as not at all important. Some of the major findings were as follows:

Almost 85 percent of the respondents indicated that students' computer skills were very or somewhat important in achieving success in the courses they teach or in successfully using the services that they provide. This data supports a strong argument when dealing with the question of computer competencies and freshmen success. What is really impressive is that when the statement was broken down into the various departments of computer instruction and media services, (business and technology, liberal arts, science and health care, and math) the highest two scores of 4.79 and 4.16 were from the two fields of visual communication. Computer instruction and media services, as well as business and technology, are fields associated with visual communications.

When rating the 10 most important computer skills based on mean importance by rating very basic computer literacy skills that range from the highest of computer start up and shut down at 4.20 to the lowest of downloading information at 3.61 all were skewed to the very to somewhat range. Another interesting result appears when comparing the responses from the full-time faculty to those of the part-time staff. The importance of computer skills has scored higher

with the full time staff. Their emphasis on computer skills may be due to the possibility that more academic and degree programs run during day classes while evening tends to be adult education and enrichment.

What the JCCC study did was allow the faculty and staff to identify the most important computer skills that students should have as entry-level freshman. The information is being considered when developing computer competency guidelines for entering JCCC students, development of a computer competency test and an addition of a required "Intro to Computing" course to the curriculum.

Summary

Today's high school student has grown up in a technologically driven society, where the coursework in visual communication, and the careers associated with the field are no longer abstract. As more students are exposed to computer-related studies the computer competencies unique to those fields must be addressed. More importantly, as high school technology programs have changed so must the curriculum and competencies. Past technology education courses were driven by hand held tools, now we find sophisticated software and external devices. As more academic areas look to find alternative forms of assessment they demand all students use sophisticated multimedia software. The skills needed to use the software and external devices must be addressed. The New American High School program provides recognition to secondary schools with rigorous academic standards. A review of schools that were recently named to this list revealed inclusion of such curriculum topics as: computer applications; computer industrial design; and computer repair and maintenance (Dembicki, 1999).

Some believe that computer literacy has involved preparations of persons to serve as worthy citizens in their communities and understand how society operates in an informational age (Burniske, 2001; Costello, 1997).

Chapter III: Methodology

Methods and Procedures

The following research was conducted to determine the basic computer competencies that may be required of entry-level students attending three different post-secondary visual communication programs in southeastern Wisconsin. The methods and procedures of this study are explained in this chapter under the headings of (1) method of study; (2) subjects; (3) instrumentation; (4) procedures followed; (5) limitations; (6) data collection and recording; and (7) data analysis.

Method of Study

Several techniques were employed to determine which basic computer competencies will be required of college freshman students enrolled in three southeastern Wisconsin post-secondary visual communication programs. This study attempts to obtain quantitative information by utilizing a descriptive research method to determine the specific computer competencies required of incoming freshmen at three visual communication programs located in southeastern Wisconsin: Milwaukee Area Technical College (MATC), the Milwaukee Institute of Art and Design (MIAD) and the University of Wisconsin-Milwaukee (UWM). The implementation of a descriptive research method required the gathering of data via a mailed questionnaire. Electronically mailing an online survey was contemplated; however, the paper-pencil questionnaire method was chosen because it could be sent simultaneously to a large sample group for a minor cost. According to Leedy, questionnaires consequently do have their drawbacks. "Typically, the majority of the people who receive questionnaires don't return them, and the people who do return them are not necessarily representative of the originally selected sample" (Leedy, 2001).

The surveys objectives were as follows: 1) To identify what two and four year visual communication program the respondent is associated with; 2) To determine what, if any, basic computer competencies are desired for entry-level students planning on a post-secondary training in visual communications; 3) To determine if there are any response differences based on the respondents demographics.

Once the objectives were established, specific questions were developed to identify the perceived competencies and their relative importance; these questions became the foundation for the survey instrument. The mailed survey consisted of 14 questions that were weighed using a Likert Scale. The list of 14 questions was a condensed version of a less manageable broad-based list drafted from the Nicolet High School Technology Committee. The questionnaire was developed, reviewed and piloted for usability before it was sent out to 64 visual communication instructors of three southeastern Wisconsin postsecondary programs.

The survey established the subject as an instructor. Then it sought to identify what program he/she was associated with. This was done in attempt to utilize this data when comparing variables.

Subjects

The population sample of post-secondary visual communication instructors was gathered by doing an electronic search of visual communication programs located in Milwaukee County. Subject selection consisted of postsecondary visual communication instructors presently teaching in the content areas of:

1. Film production
2. Visual Design
3. Broadcast Television

4. Animation

These content areas were selected because the post-secondary instructors were involved in the computer generation aspect of their discipline. Since the aforementioned instructor's classes are directly affected by the computer competencies. To increase survey response rate only instructors of incoming were chosen. The instructors that met the above criteria were selected from a list generated through the individual electronic staff directories located on their respective school's website. This search was conducted during the Fall 2005 term.

The first sample group represented the UWM's public system — as well as the only school of film in the area. The second group, MIAD, was chosen because it represented the only four-year accredited private school of visual design located in Milwaukee County. MATC, the last group, was chosen because it represented the only two-year technical college visual communication program that offers credit transfer to the University of Wisconsin System.

A side benefit in this sample selection was the familiarity of the researcher with several staff members at the sample visual communication programs. Given these relationships, it was the researcher's intention to use these contacts to possibly increase the response rate of the mailed survey. In addition, the students attending Nicolet High School are familiar with all three programs and sample group programs have strong reputation in the Nicolet community.

UWM employs 36 visual design instructors in the departments of journalism and mass communication, visual arts and film. Of those instructors, only 14 instructors were surveyed. These UWM instructors were chosen because their course's content meets the criteria of being a computer driven classroom. Twenty-two instructors were left out of the study because their coursework was lecture or theory-based content and required no hands on computer skills unique to the field of visual communications.

MIAD employs 51 instructors; 27 instructors teach in the School of Design, 26 teach in the School of Fine Arts. Of these instructors, two teach content from both areas of study. All 26 fine arts instructors were excluded from this study because they primarily teach post-secondary programs that do not involve any extensive computer use. For even distribution of each program category, the entire group of design instructors was included in this study. This was required to generalize this study's results.

Milwaukee Area Technical College (MATC) employs 24 instructors in the visual communication, computer graphics and television broadcast programs. The entire group of visual communication, computer graphics and television broadcast instructors were included in this study because an even distribution for each program category required the entire population from the program to be surveyed in order to generalize this study's results.

Table 1

Instructors Surveyed by Institution

Institution	**Instructors Surveyed**
UWM	14
MIAD	26
MATC	24
Total	64

Instrumentation

In terms of instrumentation, an e-mailed survey was the first choice to collect the data. After reviewing past studies conducted at the University of Wisconsin-Stout where e-mailed surveys were utilized a pattern of poor response rate was noted (Greco, 2004; Paydon, 2002). With this finding in mind, the researcher conducted an electronic search comparing the response rate of e-mail and mail distribution and found one study published by *The International Journal of Human-Computer Interaction* (Andrews, Nonnecke, & Preece, 2003) titled "Electronic Survey Methodology: A Case Study in Reaching Hard-to-Involve Internet Users."

Andrews, Nonnecke and Preece (2003) concluded: "Using the Internet to conduct quantitative research presents challenges not found in conventional research. Paper-based survey quality criteria cannot be completely adapted to electronic formats" (p. 185). Another factor may be the inability to assess length or time needed for completion. In addition the ease of exiting an electronic survey may be a factor. Or simply having a tangible paper-based survey is less likely to be ignored over a simple deletion of an electronic survey. Andrews, Nonnecke and Preece (2003) results did suggest that the use of some criteria may conflict and what researchers may experience when conducting electronic surveys in an on-line culture in which people are not tolerant of intrusions into on-line lives.

Once the survey technique was chosen, a general information and technology literacy suggestion list was solicited from the technology committee at Nicole High School. The technology committee is composed of a group of six high school instructors representing the multiple disciplines of math, business education, and technology education and information technology. The members of the committee created a broad-based list of skills that fell under the categories of:

1. General Computer Skills
2. Generic Network Items
3. Info Skills
4. Ethics
5. E-Mail
6. Graphics
7. Microsoft Word
8. Excel
9. PowerPoint
10. Database
11. Inspiration
12. Use of Turnitin.com
13. Webpage design
14. Digital Movie Making
15. Blackboard

With the use of the 134 suggestions solicited through the information and technology course, a construction flow chart was developed breaking the content down into five categories, creating a more manageable list of assessed skills:

1. Hardware or equipment-related knowledge and skills
2. Operating system knowledge and skills
3. Knowledge and skills associated with the use of the information system itself
4. Knowledge and skills associated with using the information that is contained in the source or service

5. Creation and management of files

Those skills were then used to create matrix to offer a visual alignment of the categories to be explored. Only the skills unique to the study of visual communications were included in the survey construction. This was not done to discount the proposed list but, rather, to target those skills unique to the study of visual communications. By condensing this list the researcher could see what, if any, competency commonalities exist between the visual communication instructor's perceptions and other educators at Nicolet High School.

Formulation of Survey Questions

Questions relating to the categories were formulated while reviewing the suggested broad-based skills proposed from Nicolet's information and technology committee along with reviewing articles and literature pertaining to freshman entrance competencies. These concepts became the foundation of the survey instrument.

The first question of the survey was used to establish the demographics of the subject determining if there are any differences in survey results based on the subject's school association.

Table 2

Survey Matrix – Research Objectives by Categories Against Survey Questions

	Research Objective by Categories				
Survey Question	1	2	3	4	5
1. Demographic identifier					
2.	X				
3.		X			
4.	X				
5.	X				
6.		X			
7.			X		
8.			X		
9.				X	
10.				X	
11.					
12.					X
13.				X	
14.					X
15.	X				

There were 14 survey questions representing the two major research objectives. Those objectives being: 1) identifying the technological demands in the first year of higher education for entry-level visual communication students and 2) Documenting a basic computer competency list specifically designed for visual communication students at Nicolet High School. Questions numbered two, four, five and fifteen solicited responses to category one pertaining to the hardware or equipment-related knowledge or skills. Questions numbered three and six solicited responses to category two operating system knowledge and skills. Questions numbered seven and eight solicited responses to category number three, knowledge and skills associated with the use of the information system itself. Questions numbered nine, ten and thirteen solicited responses to category number four, knowledge and skills associated with using the information that is

contained in the source or service. Questions numbered twelve and fourteen solicited responses to category number five creation and management of files.

The survey instrument had three parts an introduction page, a question page and a response card. The introduction page solicited participation in the survey — as well as the possible benefits of the results. Each greeting was unique to the individual program informing the respondent of the three visual communication programs involved. This was an intentional act in hopes of increasing response rate as well as a statement regarding opening an ongoing communication. The anominity and confidentiality disclaimer was a main component, as was a statement pertaining to the understanding that any of information given was done freely and voluntary.

The school and e-mail addresses of the researcher and the investigative advisor were provided in the event that there may be a complaint or concern pertaining to the survey. The contact information for the University of Wisconsin-Stout's Institutional Review Board for Protection of Human Subjects in Research was also provided in case of any questions or concerns arose. See Appendix A for copies of the introduction pages. In conclusion, the introduction page closed with completion procedure instructions and preferred response time.

The main body of the survey consisted of 14 questions requesting responses ranging from A) *Strongly desirable B) Desirable C) Neither desirable nor undesirable D) Undesirable E) Strongly Undesirable to* give the respondent the opportunity to weigh their responses using a Likert Scale. A useful definition for a Likert Scale can be found in the book *Practical Research Planning and Design* (Leedy & Ormrod, 2001). "Rating scales were developed by Rensis Likert in the 1930's to access people's attitudes; accordingly, they are sometimes called Likert Scales" (Leedy & Ormrod, 2001, p. 197) According to Leedy and Ormrod (2001), "A rating scale is more

useful when a behavior, attitude or other phenomenon of interest needs to be evaluated on a continuum of, say, inadequate" to excellent," "never" to "always," or "strongly disapprove" to "strongly approve." (Leedy & Ormrod, 2001, p. 197) Knowing that a competent act is a behavior using a Likert Scale seemed to be the appropriate response choice.

Question one was a demographic identifier addressing school association. It is the researcher's belief that sample group association was the only needed demographic information needed when soliciting attitudes toward desired competencies. Questions two, four and five addressed the categories of hardware or equipment-related knowledge and skills unique to visual communication. Survey questions three and six addressed competency concerns related to operating systems knowledge and skills. Questions seven and eight relates to the concerns of the skills associated with the knowledge and skills associated with the use of the information system itself. Questions nine, 10 and 13 address the attitudes and opinions associated with the knowledge and skills associated with using the information that is contained in the source or service while questions 12 and 14 address the creation and management of files.

Since it is possible that each individual sample group may have different expectations of the incoming freshmen in regards to competent skills, the final component of the survey was a simple scantron response card. The card was self-addressed with the proper postage. The scantron data collection card used was a quiz strip (815-E) a standard product in the educational arena manufactured by Scantron Corporation, headquartered in Irvine, California.

The survey was pilot tested by select faculty from Nicolet High School and subsequent corrections were made to insure flow and continuity of content. Subsequently, a finished hard copy of the instrument was submitted for approval to the UW-Stout Human Subjects Department. Content validity was established by faculty and administrator review.

To increase response rate, the researcher chose to hand deliver the paper-based surveys to make an interpersonal connection with the individual department chairs and researcher. The researcher presumed that the advantages hand delivering a paper-based were: 1) A face and a name to the research being conducted, 2) a reasonable window for collection of responses, and 3) a reduced response procrastination. Long term, such contact could prove advantageous since the human connection between the secondary and post-secondary instructors could establish a foundation for future dialogue.

Procedures Followed

In July of 2001, the research topic was explored during an introduction to research course at the University of Wisconsin-Stout. In June of 2002, following course work and an extensive review of the University of Wisconsin-Stout's thesis collection, a topic was chosen. In July of 2003, a meeting with the tentative research advisor was set to determine a possible research topic and appoint the investigation advisor. The topic was selected based upon the researcher's own experiences while teaching visual communications at the high school level. The first topic had a great deal of breath, but lacked depth, so after a second meeting in the fall of 2004 the statement of the problem was refined, given focus and accepted by the investigation advisor. A concentrated review of literature extended from fall of 2004 until late summer 2005. Determination that a survey would be the most effective way to collect the data needed for this descriptive research was established at this time.

In mid-September of 2005, during a meeting with the technology committee at Nicolet High School, a list of possible broad-based information technology standards was drafted. Through reviewing the literature and using the Nicolet Technology committee's standards, possible content specific questions were created. The survey questions were developed on the

basis of the articles reviewed. The articles reviewed dealt with proposed freshman competencies at both two and four year post-secondary visual communication programs.

The researchers own beliefs were the essential factor when determining the final 14 questions. During October of 2005, the completion of University of Wisconsin-Stout's web-based Human Subjects Training in order to conduct research was completed. The completion of this training informs the researcher to the regulations, rules and guidelines relating to obtaining data through instruments. An abstract describing the method of study, statement of the problem, categories and type of instrument intended to collect the data was sent to the Institutional Review Board for approval.

During October of 2005, 15 survey questions were developed to meet the categorical objectives of the study. The first draft of the survey was submitted to the research advisor for review and approval. After making the suggested revisions corrections were made regarding punctuation, verbiage, and appropriate word tense. After the corrections were made the final survey was approved.

The survey contained one question that was an identifier of the three sample groups followed by 14 content specific competencies. On a separate cover page the instrument contained an introduction by the researcher; an explanation to the proposed participant as to how they were selected; a declaration that their participation was voluntary; and that all of the data collected would remain strictly anonymous, how to complete the survey and return it, and a deadline.

On October 31, 2005, a preliminary survey was given as a pilot survey to the members of the Nicolet Technology Committee. They were asked to take the survey, critique it, and provide feedback as to the usability and validity of content changes. A final hard copy of the survey was completed by November 2005 and submitted to the University of Wisconsin's-Stout's

Institutional Review Board for approval. On December 2, 2005 the approval was granted and all 64 surveys were hand delivered to the individual department chairs from each individual sample group. After a two-week completion period all the completed surveys were collected and the data analysis was run.

Of the 64 surveys distributed, only 10 were returned. The two weeks to respond expired and data was collected on nine responses. There was no follow up due to the time constraints.

Data Collection and Recording

As the respondents sent in the completed surveys the completed surveys were accumulated in an envelope to be scanned after the two-week response window. On December 22, 2005 the completed response cards were sent through the Scantron reader at Nicolet High School and the results were tabulated.

Data Analysis

Table 3 was developed to show the nine respondents and their response to question number one the only demographic identifier.

Example: *Using the attached scantron sheet with and a number 2 pencil please identify the school that you are associated with:*

1. A) University of Wisconsin Milwaukee B) Milwaukee Institute of Art and Design C) Milwaukee Area Technical College

Table 3

Instructors Responses by Institution

Institution	Instructors Surveyed	Instructors Responses
UWM	14	0
MIAD	26	4
MATC	24	5
Total	64	9

Note: The data analysis is shown in the next chapter.

Limitations

The lack of sufficient data may be due to certain conditions that arose as the survey was conducted and data collected. These limitations are listed as follows:

1. Only the fall semester was utilized to deliver the survey, collect the data and analyze the results. This needed to be completed before the spring semester started.
2. The survey content was limited to instructors of digital media.
3. Website directories may not be current or reflect full time active instructors.
4. Not all of the survey packets delivered was needed for current instructors.
5. Instructors may disregard open documents in their school mailboxes as one more form of departmental correspondence.
6. Survey saturation on the part of the postsecondary instructors
7. Some of the survey packets were postponed due to the two-week reply window.

8. The list of visual communication instructors had included non-computer related instructors.

By using a descriptive data research method and a survey instrument to collect data relating to the possible computer competencies needed by entry-level freshman attending southeastern Wisconsin's visual communication programs at both the two-year technical programs and four-year universities, the assumption was made that valid data would provide information to prepare Nicolet High School's visual communication students with adequate computer competencies needed for a successful post-secondary education. However, limitations have caused a low response rate therefore creating an insignificant amount of data to draw any conclusions.

Chapter IV: Results

Results and Discussion

The purpose of this study was to identify the computer competencies that the postsecondary instructors want of visual communications graduates from Nicolet High School's technology education program. A survey instrument was developed and designed to establish computer competencies associated with successful entry level visual communication skills for high school seniors planning on attending Wisconsin area technical and four-year colleges. The data will be used to create and update Nicolet High School's computer competency list for the visual communication program.

The research data will provide a format for the design and implementation of skill levels to properly prepare the graduates from Nicolet High School in the areas of visual communications. The data will assist the high school instructor in their abilities to align content with the computer competencies needed at the technical and four year college level. A system for updating computer competencies would be an asset.

This chapter will review the methodology used in the study then review the data by question then by research category.

Review of Methodology

While reviewing literature pertaining to basic entry-level computer skills required of incoming freshman, information was discovered that suggests this is not a problem unique to the study of visual communication. It seems that many entry-level post secondary instructors share the feeling that a general lack of rudimentary computers skills prevalent of most incoming freshmen. While doing a review of literature it was also discovered that often faculty becomes mired in teaching computing basics to students that do not have a strong computer literacy

background. Many programs across the nation are currently suggesting a computer literacy course. It is possible that a basic computer application course may be as a pre requisite of all computer generated courses. There is a general movement that suggests also giving a competency test to all incoming freshmen. However, colleges are willing to allow competent students the opportunity to test out and go directly into the intended course. This alone would make a computer literacy set desirable for all high school students intending on going to any college.

The decision to obtain quantitative information by utilizing a descriptive research method in determining basic entry-level computer skills required of incoming freshman in visual communication took the form of a survey. Perhaps local post secondary instructors were encountering the same problems as the published instructors included in the literature review. If this is true, then that factor alone gave validity to this paper. It would be very helpful to establish some guidelines for high school instructors intending on arming their students with adequate computer competencies. Those students could possibly move directly into the computer driven courses and skip the time and expense of extra course work.

A set of categorical objectives was established to identify specific aspects regarding this topic. The survey was designed to meet those categories seeking information and data pertaining to the topic. The survey consisting of one opening identifier and 14 weighted responses ranging from strongly desirable to strongly undesirable was developed, reviewed, tested and sent out to 64 visual communication instructors of three southeastern Wisconsin post-secondary programs. The following information is the accumulation of the results of the survey and discussion of the results found.

Return Rate

A total of 64 surveys were hand distributed to the individual department chairs however only nine were returned. Figure 1 organizes the total number of surveys into a visible grouping showing the percents of responses received and not received.

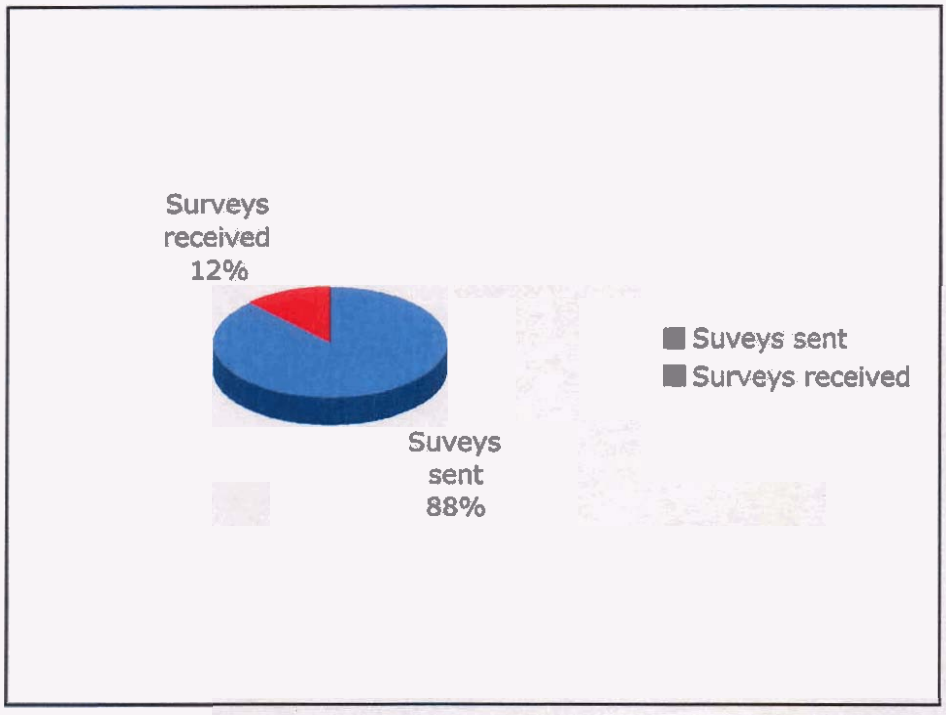


Figure 1. Response Pie Chart

The pie chart above represents the 64 surveys sent out. The large blue portion of the pie represents the 56 or 88 percent of surveys not returned. The red portion of the pie represents the 9 or 12 percent of surveys actually returned by the two and four year post-secondary visual communication instructors.

The findings relating to question number one the demographic identifier were as illustrated in the following pie chart.

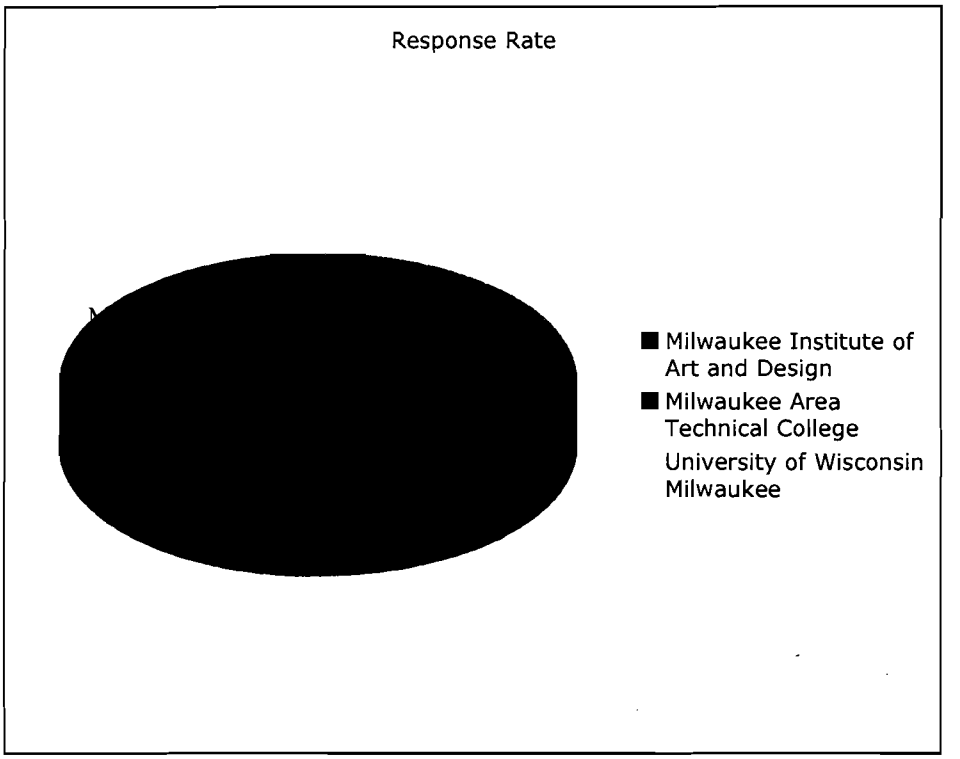


Figure 2. Responses to Question 1

Of the nine surveys returned, four were returned from the Milwaukee Institute of Art and Design (MIAD), and five were returned from Milwaukee Area Technical College (MATC). There was a zero response rate from the University of Wisconsin-Milwaukee (UWM).

Findings by Survey Question

Question 2 asked respondents whether they felt it would be beneficial for students to use mouse options on touch pads and desktop computers. All nine respondents answered the question. Table 4 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 4

Question 2

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	2	2	0	0	0	1.5	.578
MATC	5	2	2	1	0	0	1.8	.837

Of the four respondents from MIAD, two respondents felt that using mouse options on touch pads and desktop computers would be a strongly desirable skill while the two remaining respondents felt it was simply desirable. Of the five respondents from MATC two respondents felt that the skills are strongly desirable, while two respondents felt those skills were simply desirable. However one respondent felt that the skill was neither desirable nor undesirable.

Question 3 asked respondents whether they felt it would be beneficial for students to identify key commands using both platforms. All nine respondents answered the question. Table 5 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 5

Question 3

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	1	1	2	0	0	2	1.155
MATC	5	2	2	1	0	0	1.8	.837

Of the four respondents from MIAD, a solo respondent felt that the ability to use and identify key commands, while using both platforms, would be a strongly desirable skill. Once again, one respondent felt it was simply desirable, leaving the two remaining respondents with the neither desirable nor undesirable response. As far as the five respondents from MATC, two respondents choose the strongly desirable response while two of the respondents felt that mouse skills were simply desirable. As with the two respondents from MIAD one respondent felt that the skill was neither desirable nor undesirable.

Question 4 asked respondents whether they felt it would be beneficial for students to be able to import and export to peripherals such as digital video cameras. All nine respondents answered the question. Table 6 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 6

Question 4

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	2	2	0	0	0	1.5	.578
MATC	5	2	2	1	0	0	1.8	.837

Of the four respondents from MIAD, two respondents felt that the ability to be able to import and export to peripherals, such as digital video cameras, would be a strongly desirable skill, while the remaining two respondents felt it was simply desirable. The four respondents from MATC mirrored MIAD's response with the exception of one solo respondent feeling that the skill was neither desirable nor undesirable.

Question 5 asked respondents whether they felt it would be beneficial for students to be able to target and import from photo scanners, OCR's, mics, and still cameras. All nine respondents answered the question. Table 7 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 7

Question 5

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	1	2	1	0	0	2	.817
MATC	5	3	2	0	0	0	1.4	.548

The four respondents from MIAD varied in their reaction to the desirability of targeting and importing from photo scanners, OCR's, mics, and still cameras ranging from that skill being strongly desirable to neither desirable nor undesirable. Of the five respondents from MATC, three respondents felt that the skill would be strongly desirable while two respondents felt those skills were simply desirable.

Question 6 asked respondents whether they felt it would be beneficial for students to be able to search and manage files on a server as well as internal and external storage systems. All nine respondents answered the question. Table 8 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 8

Question 6

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	1	3	0	0	0	1.75	.5
MATC	5	5	0	0	0	0	1	0

One respondent from MIAD felt that the ability to search and manage files on a server, as well as internal and external storage system, would be a strongly desirable skill leaving the remaining three respondents with the simply desirable response. The five respondents from MATC were united feeling that the skill would be strongly desirable.

Question 7 asked respondents whether they felt it would be beneficial for students to be able to discriminate between network connections, Ethernet, modem, wireless, DSL, ISP. All nine respondents answered the question. Table 9 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 9

Question 7

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	2	0	2	0	0	2	1.155
MATC	5	0	4	1	0	0	2.2	.445

In regards to the ability to discriminate between network connections, Ethernet, modem, wireless, DSL, ISP two respondents from MIAD felt the skill would be strongly desirable skill while two respondents felt it was neither desirable nor undesirable. Of the five respondents from MATC, not one respondent felt the skill was highly desirable however four of the respondents felt those skills were simply desirable leaving the remaining respondent was the neither desirable nor undesirable response.

Question 8 asked respondents whether they felt it would be beneficial for students to be able to conduct Internet searches using advanced search options, and Boolean language. All nine respondents answered the question. Table 10 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 10

Question 8

		Instructors Surveyed						
Institution	Instructors Surveyed	A	B	C	D	E	Mean	Sd.
MIAD	4	1	1	2	0	0	2.25	.955
MATC	5	2	1	1	1	0	2.2	1.302

When measuring desirability of conducting Internet searches using advanced search options, and Boolean language the four responses from MIAD remained varied. The responses ranged from highly desirable to two respondents choosing neither desirable nor undesirable The MATC respondents reversed the strengths of their responses. Two respondents felt those skill

would be strongly desirable allowing the response pattern to widen from desirable to that of an undesirable skill.

Question 9 asked respondents whether they felt it would be beneficial for students to be able to use e-mail, recognize spam, and reply to a threaded discussion, while understanding BCC and various replies. All nine respondents answered the question. Table 11 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 11

Question 9

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	2	0	2	0	0	2	1.155
MATC	5	1	2	2	0	0	2.2	.837

In regards to the ability to use e-mail, recognize spam, reply to a threaded discussion, while understanding BCC and various replies two of the respondents from MIAD, felt that skill would be a strongly desirable while the two remaining respondents felt that the skill was neither desirable nor undesirable. Not one respondent felt the skill was desirable. One respondent from MATC, felt that the skill would be strongly desirable while two respondents felt those skills were simply desirable. As with the respondents from MIAD, two respondents felt that the skill was neither desirable nor undesirable.

Question 10 asked respondents whether they felt it would be beneficial for students to be able to recognize ethics, acceptable use policies, copywriter infringement, e-mail etiquette, illegal downloading, and piracy. All nine respondents answered the question. Table 12 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 12

Question 10

		Instructors Surveyed						
Institution	Instructors Surveyed	A	B	C	D	E	Mean	Sd.
MIAD	4	1	3	0	0	0	1.75	.5
MATC	5	3	2	0	0	0	1.4	.548

Of the four respondents from MIAD, one respondent felt that the ability to recognize ethics, acceptable use policies, copywriter infringement, e-mail etiquette, illegal downloading, and piracy would be a strongly desirable skill while the remaining three respondents were united feeling the skill would be simply desirable. MATC had three respondents selecting the strongly desirable response while the remaining two respondents felt those skills were simply desirable.

Question 11 asked respondents whether they felt it would be beneficial for students to be able to format and file convert as well as print documents to a PDF. All nine respondents answered the question. Table 13 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly*

desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable

Table 13

Question 11

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	3	1	0	0	0	1.25	.5
MATC	5	2	3	0	0	0	1.6	.548

Of the four respondents from MIAD, three respondents felt that the ability to format and file convert as well as print documents to a PDF would be a strongly desirable skill while one respondent felt it was simply desirable. In contrast the five respondents from MATC, flipped their weight in their responses with two respondents feeling the skill would be strongly desirable while three respondents felt those skills were simply desirable.

Question 12 asked respondents whether they felt it would be beneficial for students to identify file properties and size while manipulating and sharing graphics among various applications. All nine respondents answered the question. Table 14 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert Scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 14

Question 12

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	1	2	1	0	0	2	.817
MATC	5	4	1	0	0	0	1.2	.445

Regarding the ability to identify file properties and size while manipulating and sharing graphics among various applications the four respondents from MIAD varied their choices from strongly desirable to that of neither desirable nor undesirable. In contrast the five respondents from MATC, had strong feelings regarding question twelve. Four of the respondents felt that the skill would be strongly desirable while one respondent felt those skills were simply desirable.

Question 13 asked respondents whether they felt it would be beneficial for students to be able to identify craftsmanship and quality content of digital products. All nine respondents answered the question. Table 15 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert Scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 15

Question 13

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	3	1	0	0	0	1.25	.50
MATC	5	3	2	0	0	0	1.4	.548

When measuring the desirability of a students ability to identify craftsmanship and quality content of digital products three respondents from MIAD felt that the would be a strongly desirable skill while one respondent felt it was simply desirable. The respondents from MATC mirrored those of MIAD feeling that the skill would be strongly desirable while two respondents felt those skills were simply desirable.

Question 14 asked respondents whether they felt it would be beneficial for students to be able to create formatted documents using margins, tabs, word count, spell check find and replace, and assorted corrective tools. All nine respondents answered the question. Table 16 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 16

Question 14

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	2	1	1	0	0	1.75	.946
MATC	5	3	1	1	0	0	1.6	.895

When accessing a student's ability to create formatted documents using margins, tabs, word count, spell check find and replace, and assorted corrective tools the four respondents from MIAD's responses varied. Two respondents felt the skill would be a strongly desirable skill while one respondent felt it was simply desirable. However, the last remaining respondent felt that the skill was neither desirable nor undesirable. As with the respondents from MIAD the responses from MATC varied. Three respondents felt that the skill would be strongly desirable, one respondent felt those skills were simply desirable however one respondent felt that the skill was neither desirable nor undesirable.

Question 15 asked respondents whether they felt it would be beneficial for students to be able to burn CD's DVD's as rewrite and write only disks. All nine respondents answered the question. Table 17 organizes the data to assist in explaining the results. The table illustrates the respondent's answers using the Likert scale where *A/1: represents strongly desirable B/2: represents desirable C/3: represents neither desirable nor undesirable D/4: represents undesirable E/5: represents strongly undesirable*

Table 17

Question 15

Institution	Instructors Surveyed	Instructors Surveyed						
		A	B	C	D	E	Mean	Sd.
MIAD	4	2	2	0	0	0	1.5	.577
MATC	5	2	3	0	0	0	1.6	.547

Of the four respondents from MIAD, all of the responses leaned toward the highly to desirable end of the scale. This was reflected by the two respondents choices that the ability to burn CD's DVD's as rewrite and write only disks would be a strongly desirable skill while two respondents felt it was simply desirable. As with MIAD the respondents from MATC, two respondents felt that the skill would be strongly desirable while the remaining three respondents felt those skills were simply desirable.

Findings by Research Categorical Objectives

The following paragraphs will state the findings related to the categories and the questions relating to those categories. The findings will be presented as follows: Category 1 with questions numbered 2, 4, 5, and 15 relating to the hardware or equipment-related knowledge and skills. Category 2 with questions numbered 3 and 6 relating to the operating system knowledge and skills. Category 3 with questions numbered 7 and 8 relating to the knowledge and skills associated with the use of the information system itself. Category 4 with questions numbered 9, 10 and 13 relating to the knowledge and skills associated with using the information that is contained in the source or service. Category 5 with questions numbered 11, 12 and 14 relating to the creation and management of files.

Research Categorical Objective #1: Hardware or equipment-related knowledge and skills. Findings for category one are covered in the following paragraphs. Questions 2, 4, 5, and 15 were designed to attempt to identify the hardware or equipment-related knowledge and skills. Question 2 asks the respondent if they feel that the knowledge and skills associated with the use of mouse options on touch pads and desktop computers is a strongly desired skill in an incoming freshman. Of the four respondents from MIAD, two felt it was a highly desirable skill while two felt it was desirable. Similarly, of the five respondents from MATC, two felt the skill was strongly desirable, two respondents felt it was desirable and one respondent felt it was neither desirable nor undesirable.

Question 4 attempts to identify whether the respondent found it desirable for students to import and export to peripherals such as digital video cameras. Of the four respondents from MIAD, one respondent found it strongly desirable, while three respondents found it desirable. In contrast of the five respondents from MATC, four responded with a strongly desirable response and one respondent felt it was simply a desirable skill. Question 5 addresses the skills associated with a student's ability to target and import from photo scanners, OCR's, mics, and still cameras. Of the four respondents from MIAD, two felt it was a highly desirable skill while two felt it was desirable. In turn of the five respondents from MATC, three felt the skill was strongly desirable, while two respondents felt it was desirable. Question 15 solicited the respondents feeling regarding a students ability to burn CD's and DVD's as rewrite and write only disks. Of the four respondents from MIAD, two felt it was a highly desirable skill while two felt it was desirable. Whereas of the five respondents from MATC, two felt the skill was strongly desirable, while three respondents felt it was simply desirable.

The results for questions 2, 4, 5, and 15 can be seen in Figure 3.

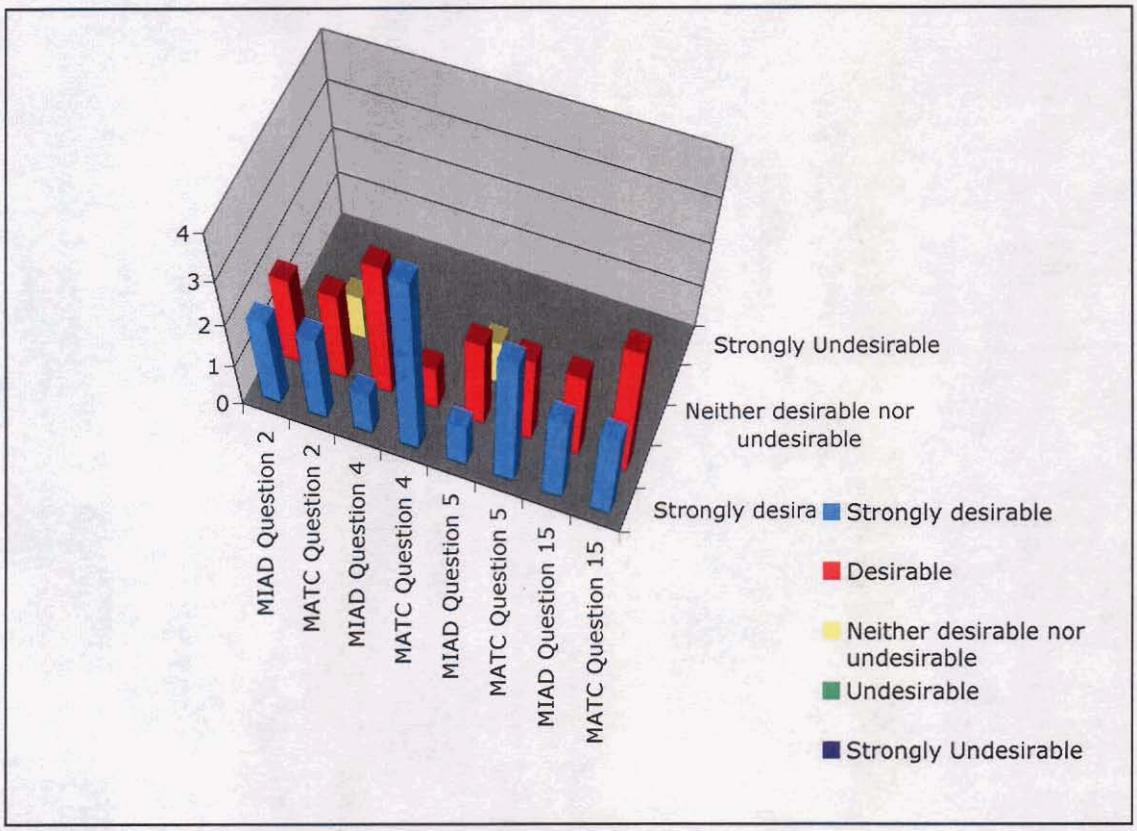


Figure 3. Responses to Questions 2, 4, 5, 15

Research Categorical Objective #2: Operating system knowledge and skills. Findings for category two are covered in the following paragraph. Questions 3, and 6 were designed to attempt to identify the skills associated with the knowledge of computer operating systems. Question 3 asks the respondent if they feel that the knowledge and skills associated with a student's ability to identify key commands using both platforms is a skill desired in an incoming freshman. Of the four respondents from MIAD, one respondent felt it was a highly desirable skill, one felt it was desirable and the remaining two felt it was neither desirable nor undesirable. In turn of the five respondents from MATC, two felt it was strongly desirable, two felt it was desirable and the remaining respondent felt it was neither desirable nor undesirable. Question 6 attempts to identify whether the respondent found it desirable for students to search and manage

files on a server as well as internal and external storage systems. Of the four respondents from MIAD, one respondent found it strongly desirable, while the remaining three found it desirable. In contrast, all five of the respondents from MATC choose a strongly desirable response.

The results for questions 3, and 6 can be seen in Figure 4 below.

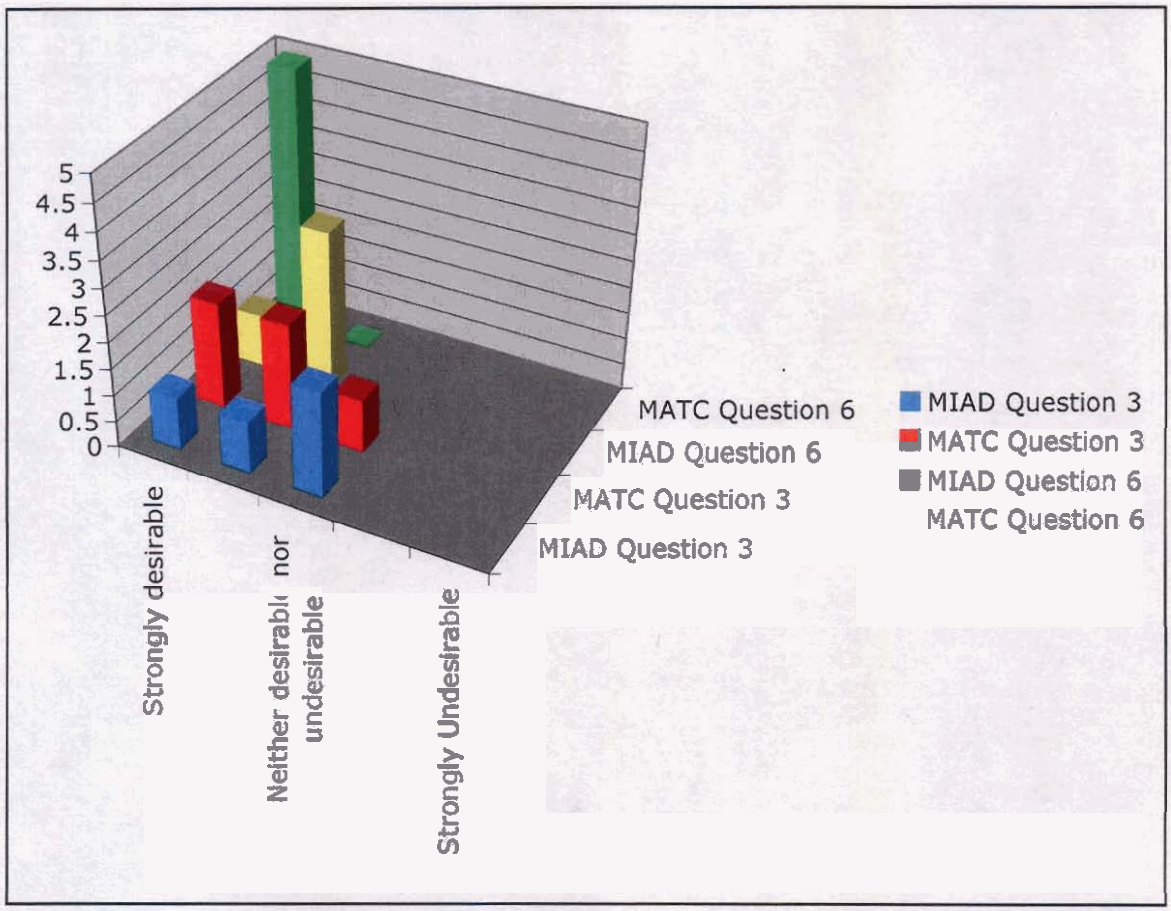


Figure 4. Responses to Questions 3, 6

Research Categorical Objective #3: Knowledge and skills associated with the use of the information system itself. Findings for category three are covered in the following paragraph. Question 7 and 8 were designed to attempt to identify the knowledge and skills associated with the use of the information system itself. Question 7 attempts to identify whether the respondent found it desirable for entry level freshman students to discriminate between network connections, Ethernet, modem, wireless, DSL, ISP. Of the four respondents from MIAD, two respondents

found it strongly desirable; however, two respondents found it neither desirable nor undesirable. Of the five respondents from MATC, four respondents found it desirable and one felt it was neither desirable nor undesirable.

Question 8 attempts to identify whether the respondent found it desirable for students to conduct Internet searches using advanced search options, and Boolean language. Of the four respondents from MIAD, one respondent found it strongly desirable, one respondent found it desirable however two respondents found it neither desirable nor undesirable. The five respondents from MATC had highly varied responses. Two of the respondents found it highly desirable, one found it desirable, and one found it neither desirable nor undesirable however one respondent felt it was undesirable.

The results for questions 7, and 8 can be seen in Figure 5.

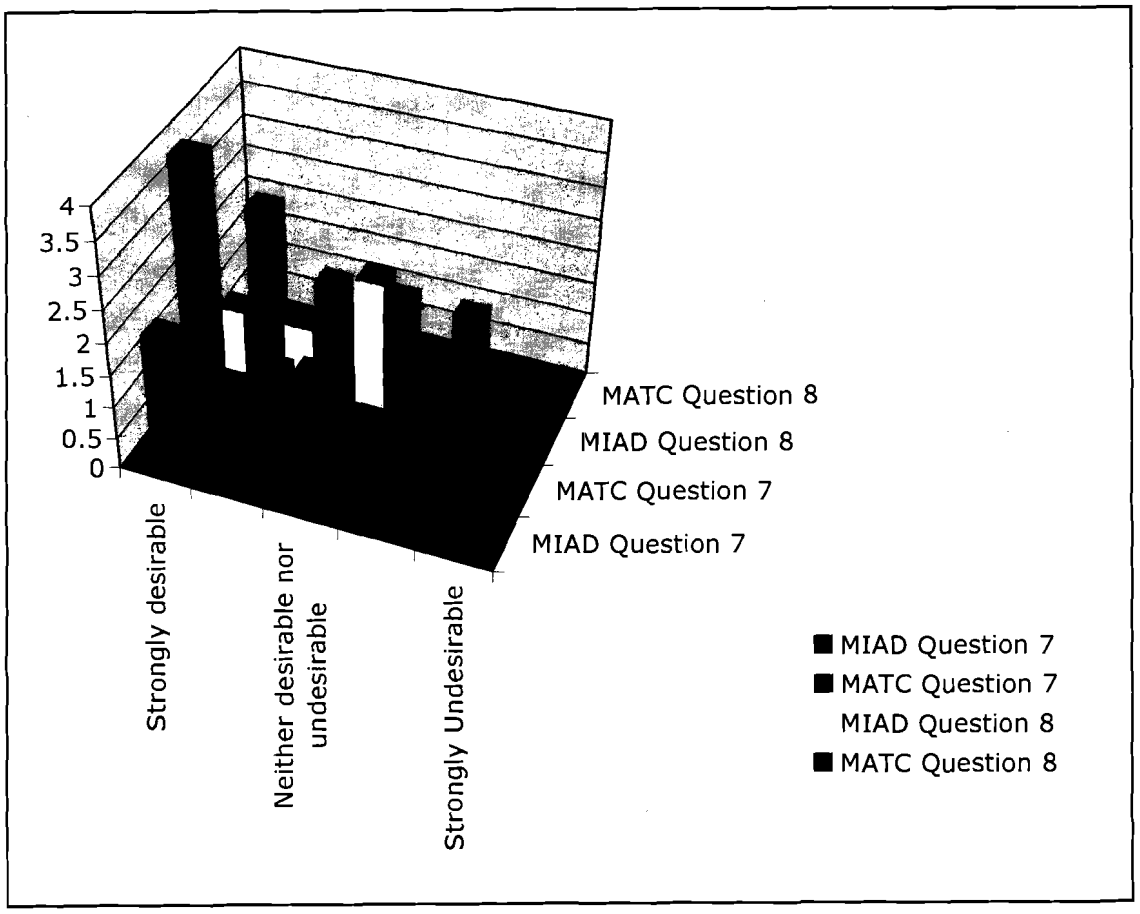


Figure 5. Responses to Questions 7, 8

Research Categorical Objective #4: Knowledge and skills associated with using the information that is contained in the source or service. Findings for category four are covered in the following paragraph. Questions 9, 10 and 13 were designed to attempt to identify the skills associated with using the information that is contained in the source or service. Question nine attempts to identify whether the respondent found it desirable for students to use e-mail, recognizing spam, replying to a threaded discussion, BCC and various replies. Of the four respondents from MIAD, two respondents found it strongly desirable, and two respondents found it neither desirable nor undesirable. In turn the five respondents from MATC ranged from the one

respondent that found it strongly desirable, to the two respondents that found it desirable, and the remaining two found that it neither desirable nor undesirable. Question 10 attempts to identify whether the respondent found it desirable for students to recognize ethics, acceptable use policies, copywriter infringement, e-mail etiquette, illegal downloading, and piracy. Of the four respondents from MIAD, one respondent found it strongly desirable, and three respondents found it desirable. The five respondents from MATC varied slightly from three respondents feeling a strongly desirable response, and two found it simply desirable. Question 13 attempts to identify whether the respondent found it desirable for students to identify craftsmanship and quality content of digital products. Of the four respondents from MIAD, three respondents found it strongly desirable, and one respondent found it desirable. While the five respondents from MATC ranged from three respondents choosing strongly desirable, and two felt it was desirable.

The results for questions 9, 10, and 13 can be seen in Figure 6 on the following page.

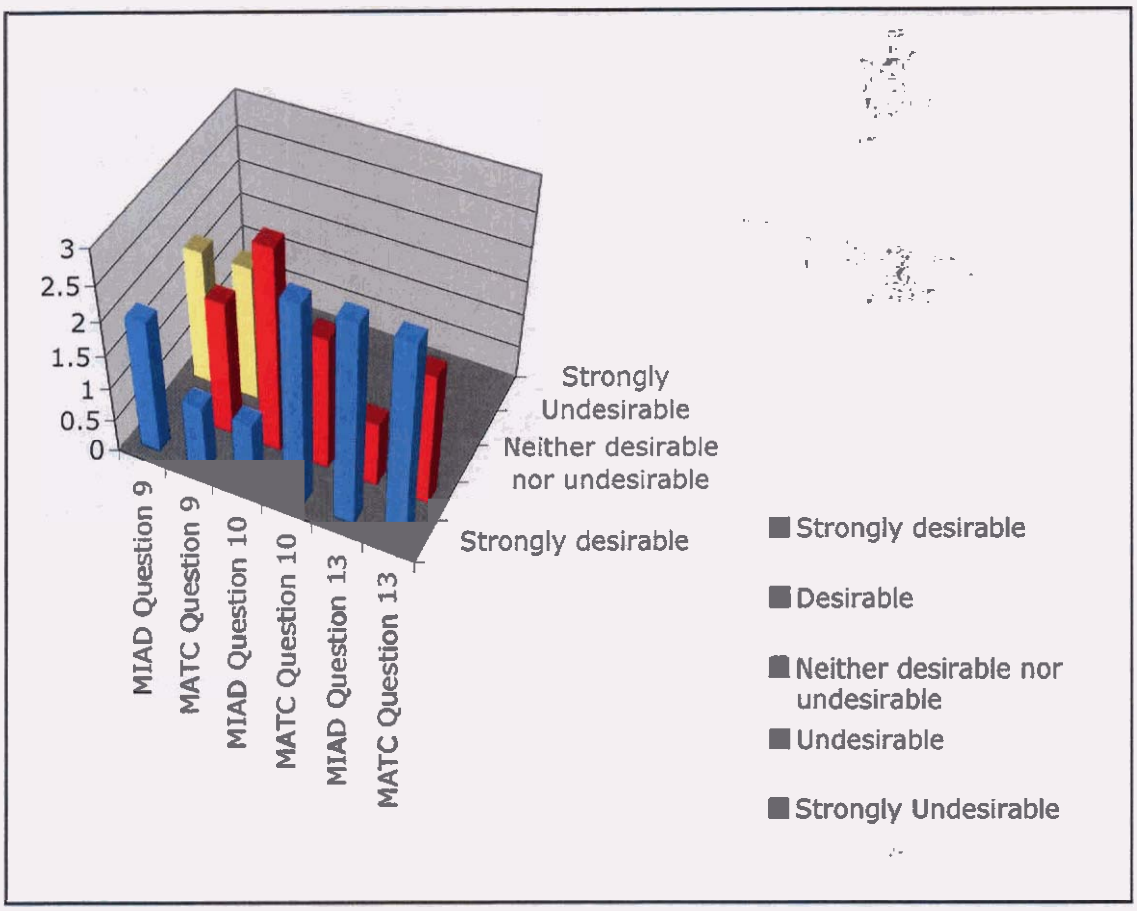


Figure 6. Responses to Questions

Research Categorical Objective #5: Creation and management of files. Findings for category five are covered in the following paragraph the last research category addresses the creation and management of files. Question 12 attempts to identify whether the respondent found it desirable for students to identify file properties and size while manipulating and sharing graphics among various applications. Of the four respondents from MIAD, one respondent found it strongly desirable, two respondents found it desirable and one respondent found it neither desirable nor undesirable. In contrast, the five respondents from MATC had four respondents that felt it was strongly desirable, and one respondent found it desirable. Question 14 attempts to identify whether the respondent found it desirable for students to create formatted documents

using margins, tabs, word count, spell check find and replace, and assorted corrective tools. Of the four respondents from MIAD, two respondents found it strongly desirable, and two respondents found it desirable. Where as the five respondents from MATC had two respondents that found it strongly desirable, and three respondents that found it desirable.

The results for questions 12, and 14 can be seen in Figure 7 below.

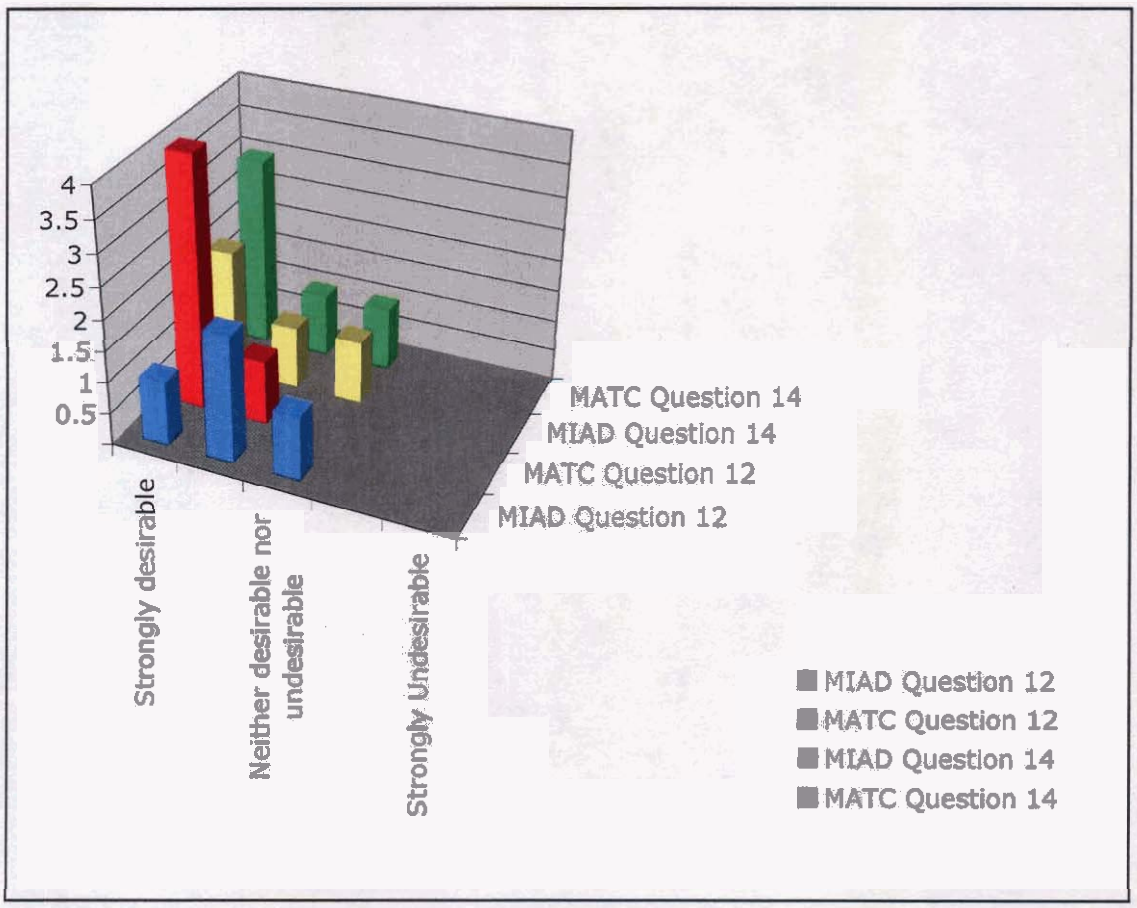


Figure 7. Responses to Questions 12, 14

Chapter V: Summary, Conclusions and Recommendations

After restating the purpose of the study as well as the statement of the problem, the following chapter is divided into three main parts: (1) summary (2) conclusions (3) recommendations.

Purpose of the Study

The purpose of the study was to identify the computer competencies that postsecondary instructors desire of visual communications graduates from Nicolet High Schools technology education program. A survey instrument was developed and designed to establish computer competencies associated with successful entry level visual communication skills for high school seniors planning on attending Wisconsin area technical and four-year colleges.

Restatement of the Problem

The visual communication curriculum has never been validated at Nicolet high School. The visual communications portion of the curriculum may not be meeting the needs of the students requiring future employment or placement into a post secondary program. The expertise within the technical and bachelor college has never been taped as to their opinions and perceptions of a high school visual communications course.

Summary

After reviewing literature pertaining to computer mechanic skills a pattern emerged. It was discovered that certain basic computer skills sets are desirable regardless of the student's field of study. Lack of those — and more importantly proficiency of those skills can add a level of anxiety and frustration for incoming freshmen. The decision was made to obtain quantitative information by utilizing a descriptive research method to assist in determining what computer competencies

postsecondary instructors find desirable of incoming freshman. In particular those freshman that are visual communication graduates from Nicolet High Schools technology education program.

The descriptive research method would be best conducted in the form of a survey therefore allowing specific questions regarding desirable computer competencies. It is possible that the technical and bachelor college instructor's opinions and perceptions of high school visual communication student's skills could assist the high school instructor's curriculum preparation. This curriculum may decrease the student's level of anxiety and frustration as they embark on their post secondary education.

The study evolved through researching literature pertaining to what defines the field of visual communications as well as the careers associated with. Three post-secondary programs located in southeastern Wisconsin were explored as well as some pre-established computer mechanics skills. Special note was made of those skills unique to visual communications. The research concluded with a review of past postsecondary computer competency studies along with past postsecondary instructor surveys. Objectives were established to identify specific aspects regarding the topic. The objectives are as follows: identify skills relating to the hardware or equipment-related knowledge, operating system knowledge and skills, use of the information system itself, the knowledge and skills associated with using the information that is contained in the source or service, and the creation and management of files. Questions relating to the objectives were designed to obtain information and data all in an attempt to pin point those skills unique to the study of visual communications. A matrix was designed to balance the number of questions addressing each objective, as well as offer a visual document showing which questions relate to each objective.

Shortly there after a preliminary survey was developed. The introduction to the survey explained to the respondent all responses will be strictly confidential and voluntary. The introduction of the survey also explained the process desired to return the survey as well as the desired return rate. Before the final survey was delivered a pilot of the survey was given to the technology committee at Nicolet High School to evaluate, critique, and make suggestions for content and readability.

The initial survey was returned and changes were made to the survey. Prior to sending the survey out the researcher completed the Human Subjects training required by the University of Wisconsin-Stout and a form to the Institutional Review Board was submitted with an attached abstract. This abstract contained a brief review of literature, statement of the problem, objectives and limitations and a copy of the instrument. The final survey was designed in alignment to the objectives seeking information and data pertaining to the perceived competencies and their relative importance; these questions became the foundation for the survey instrument. The mailed survey consisted of 14 questions that were weighed using a Likert Scale. The list of 14 questions was a condensed version of a less manageable broad-based list drafted from the Nicolet High School Technology Committee. The questionnaire was developed, reviewed and piloted for usability before it was sent out to 64 visual communication instructors from three southeastern Wisconsin post-secondary programs. The following paragraph will summarize the major findings after utilizing the survey instrument.

A summary of the major findings establishes 9 or 12 percent of surveys actually returned by the two and four year post-secondary visual communication instructors of the 64 surveys sent out.

The following paragraphs review the major findings of the survey. The purpose was to identify which computer competencies post-secondary instructors desire of visual communications graduates from Nicolet High School's technology education program. In Chapter Two, the review of literature, it seems the simple data gathered from the nine respondents did identify some desirable computer competencies.

Question 2 asked respondents their opinions concerning the use of mouse options on touch pads and desktop computers. The results show that responses were equally divided between both sample groups. The survey response indicates that this skill would be strongly desirable and/or desirable. However, one lone response from MATC felt it was neither desirable nor undesirable to have this skill. Given the results, it maybe beneficial to include this skill into the competency set.

Responses to question 3, shows that a student planning on attending MIAD is less likely to need key commands while using both platforms as a student planning on attending MATC. Given the results, it maybe beneficial to include this skill into a competency set especially for a student planning on pursuing a technical college education. However inclusion of this skill set into a list of competencies would be beneficial when addressing a broad base list.

When referring to question 4, respondents felt that it would be beneficial for students to have the ability to import and export to peripherals, such as digital video cameras. The results were equally divided between both sample groups with responses being strongly desirable and/or desirable. It should be noted that the sample group from MATC reflected a strong use of video products. Given the results, it maybe beneficial to include this skill into a competency set.

Results from question 5, shows that it would be benefit students to target and import from photo scanners, OCR's, mics, and still cameras. Again the results were equally divided between

both sample groups indicating this skill would be strongly desirable and/or desirable. However, one lone response from MIAD felt it was neither desirable nor undesirable to have this skill. Given the results, it maybe beneficial to include this skill into a competency set.

Addressing question 6, respondents indicated it would be highly beneficial for students to have the ability to search and manage files on a server, as well as internal and external storage system. The results were practically unanimous between both sample groups indicating this skill as strongly desirable and/or desirable. This was especially true for students attending MATC where all five respondents felt it was a highly desired skill. Given the results, it maybe beneficial to include this skill into a competency set.

Indirect response to question 7, respondents felt it beneficial for students to have the ability to discriminate between network connections, Ethernet, modem, wireless, DSL, ISP. Results were equally divided between both sample groups and shows that this skill would be strongly desirable and/or desirable. However, one lone response from MATC as well as two responses from MIAD felt it was neither desirable nor undesirable to have this skill. Given the results, it maybe beneficial to include this skill into a competency set with a lower priority.

Question 8 asked about the benefit for students to conduct Internet searches using advanced search options, and Boolean language as originally thought. Responses were scattered between both sample groups. The survey response indicating that this skill would be strongly desirable and/or desirable all the way to undesirable. Given the results, it may not beneficial to include this skill into a competency set or possibly prioritize the skill

Question 9 addressed the need for students to use e-mail, recognize spam, and reply to a threaded discussion, while understanding BCC and various replies. Responses were equally divided between both sample groups. The survey response indicating that this skill would be

strongly desirable and/or desirable or possibly neither desirable nor undesirable to have this skill. Given the results, it maybe beneficial to include this skill into a competency set but not as crucial as other skills.

When referring to question 10, respondents felt that it would be beneficial for students to have the ability to recognize ethics, acceptable use policies, copywriter infringement, e-mail etiquette, illegal downloading, and piracy, a result that was equally divided between both sample groups. The survey results indicated that this skill would be strongly desirable and/or desirable. Given the results, it maybe beneficial to include this skill into a competency set.

Responses to question 11, shows that it would be beneficial for students to format and file convert as well as print documents to a PDF, a result that was equally divided between both sample groups. The survey results indicated that this skill would be strongly desirable and/or desirable. Given the results, it maybe beneficial to include this skill into a competency set.

Addressing question 12, respondents indicated it would be beneficial for students to be able to identify file properties and size while manipulating and sharing graphics among various applications. The results were equally divided between both sample groups with responses being strongly desirable and/or desirable. However, one lone response from MIAD felt it was neither desirable nor undesirable to have this skill. Given the results, it maybe beneficial to include this skill into a competency set.

Indirect response to question 13, respondents felt it beneficial for students to be able to identify craftsmanship and quality content of digital products. Results were equally divided between both sample groups and shows that this skill would be strongly desirable and/or desirable. The survey response indicating that this skill would be strongly desirable and/or desirable. Given the results, it maybe beneficial to include this skill into a competency set.

When referring to question 14, respondents felt that it would be beneficial for students to have the ability to be able to create formatted documents using margins, tabs, word count, spell check find and replace, and assorted corrective tools, a result that was equally divided between both sample groups. The survey results indicated that the skill would be strongly desirable and/or desirable. However, one lone response from MATC as well as one response from MIAD felt it was neither desirable nor undesirable to have this skill. Given the results it maybe beneficial to include this skill into a competency set but may not be a high priority for some.

Responses to question 15, reflect that it would be beneficial for students to be able to burn CD's DVD's as rewrite and writes only disks, a result that was equally divided between both sample groups. The survey results indicated that this skill would be strongly desirable and/or desirable. Given the results, it maybe beneficial to include this skill into a competency set.

Conclusions

Four objectives were established to categorize desired computer competency skills. Each objective will be listed with a conclusion following.

Objective 1. Identify the technological demands in the first year of higher education for entry-level visual communication students.

Objective 1, Category 1 looked at the use of those skills relating to the hardware or equipment-related knowledge. There were four questions asking if those skills are desirable of incoming freshman. Respondents were asked if they felt that the knowledge and skills associated with the use of mouse options on touch pads and a desktop computer is a strongly desired skill in an incoming freshman. Would it be desirable for students to import and export to peripherals such as digital video cameras as well as having the ability to target and import from photo scanners, OCR's, mics, and still cameras? Could the student's ability to burn CD's and DVD's as

rewrite and write only disks help in the post secondary environment? Almost all of the respondents felt that skills and knowledge pertaining to hardware or the equipment was desirable if not highly desirable. Only one respondent from MATC felt that the ability to use mouse options on touch pads and desktop computers was neither desirable nor undesirable. The only other sole response was the respondent from MIAD that felt that ability to target and import from photo scanners, OCR's, mics, and still cameras was neither desirable nor undesirable.

The findings relating to Objective 1, category 2: the skills associated with the knowledge of computer operating systems. There were two questions asking if those skills are desirable of incoming freshman. The questions asked if they felt that the knowledge and skills associated with identifying key commands using both platforms as well as the ability to search for and manage files on a server as well as an internal and or external storage systems would be strongly desired skill. All nine respondents felt less strongly regarding key commands with responses ranging from strongly to neither desirable or undesirable but what was prominent was that all five respondents from MATC felt that managing files on a server as well as an internal and or external storage systems would be strongly desired skill. The responses from MIAD ranged between strongly to simply a desirable skill.

Objective 1, Category 3 asked about the use of the information system itself. There were two questions asking if those skills are desirable of incoming freshman. The questions asked respondents if they felt that the knowledge and skills enabling students to discriminate between network connections, Ethernet, modem, wireless, DSL, ISP are strongly desired skills in an incoming freshman? In turn is the ability to conduct Internet searches using advanced search options, and Boolean language helpful as well? Almost all of the respondents felt that skills and knowledge pertaining to the information system itself ranged from strongly to neither desirable

nor undesirable with one lone exception. One respondent from MATC felt that the ability to conduct Internet searches using advanced search options, and Boolean language was not desirable.

Objective 1, Category 4 asked about using the information that is contained in the source or service. There were three questions to determine if those skills are desirable of incoming freshman. The questions asked if they felt that the knowledge and skills associated use e-mail, recognizing spam, replying to a threaded discussion, BCC and various replies is a strongly desired skill in an incoming freshman. Would it be desirable for students to recognize ethics, acceptable use policies, copywriter infringement, e-mail etiquette, illegal downloading, and piracy? Could the student's ability to identify craftsmanship and quality content of digital products help in the post secondary environment? Again, almost all of the respondents felt that skills and knowledge pertaining to using the information that is contained in the source or service was desirable if not highly desirable. Only two respondents one from MATC and one from MIAD felt that the ability to use e-mail recognizes spam, reply to a threaded discussion, BCC and various replies were neither desirable nor undesirable.

Objective 1, Category 5 pertained to the creation and management of files. There were two questions asking if those skills are desirable of incoming freshman. The questions asked if they felt that the knowledge and skills associated with identifying file properties and sizes while manipulating and sharing graphics among various applications is a strongly desired skill in an incoming freshman. Would it be desirable for students to create formatted documents using margins, tabs, word count, and spell check find and replace, and assorted corrective tools? Responses were equally divided across the board from highly desirable to neither desirable nor

undesirable. There does not seem to be consistency pertaining to the creation and management of files.

Objective 2. Document a computer competency list specifically designed for visual communication students at Nicolet High School.

Of the sample group surveyed more than 50 percent of the responses indicated that the list was high to a desirable skill choice. This in conjunction with the extensive review of literature suggests that all 14 skills would be beneficial for high school seniors planning on post secondary training in visual communications. This is not to imply that the list is a complete set, simply a manageable list that could be added on to, and included into Nicolet High Schools ongoing curriculum process.

Objective 3. Identify post-secondary visual communication computer competency needs from both two and four year programs in southeastern Wisconsin.

The data collected and analyzed suggest that the post-secondary visual communication computer competency needs do vary from two and four year programs in southeastern Wisconsin. The 14 skill set identified would be included as part of the final skill set for a two or four year program.

Objective 4. Determine response differences on selected demographics of instructors.

There was not enough data collected to determine whether or not demographics had any effect pertaining to the computer mechanic skill sets for incoming freshman in a visual communication programs.

Limitations of the findings are critical to this study. The small and unique sample was limited to three small programs from southeastern Wisconsin. Visual communications is relatively new field of study that expands yearly, however in southeastern Wisconsin the

programs are still in their infancy at both the secondary and postsecondary level. Another enormous limitation was the lack of participation by the University of Wisconsin-Milwaukee. This may have been due to the chosen survey delivery approach. Another limitation may have been to limiting responses to a small window causing poor response rate. This response window had to be in late fall in order to manage the survey, collect the data and analyze the results. This study was limited due to time restrictions.

Recommendations Related to this Study

Recommendations are often based upon the conclusions stated above; however, there was not enough data collected in order to obtain significant information to make a conclusion based upon inferences made by the categories, in relation to the sample population of this study.

1. The results of this study showed that almost all of the respondents believe that certain basic computer skills sets are desirable regardless of the student's field of study.
2. The results of this study showed that desirability of some computer skills sets vary from institution to institution. In the case of MATC where all five respondents felt the ability to search and manage files on a server, as well as an external storage system would suggest that MATC relies highly on a server based storage system.
3. The results of this study showed a need for increased communication between the high school visual communication instructor and the postsecondary instructors from southeastern Wisconsin.

Recommendations for Further Study

Recommendations for further study pertaining to identify the computer competencies that postsecondary instructors desire of visual communications graduates from Nicolet High School's technology education program are as follows:

1. Further research pertaining to identify the computer competencies that postsecondary instructors desire of visual communications graduates from Nicolet High School's technology education program is still needed. In keeping with the less burdensome survey instrument, a new skill set could be presented as a possible add on to the existing competencies.
2. Further research pertaining to the needs of high school seniors from Nicolet High School's technology education program is and should be an ongoing process. Making computer competencies a component of Nicolet High School's visual communication curriculum may insure the time worthiness of the skill set. This should be done as the computer competencies required of incoming freshman are constantly changing.
3. Further research relating recommended competencies that postsecondary instructors desire of visual communications graduates from Nicolet High School's technology education program is still needed to insure open communication between the high school instructor and the postsecondary instructors. As an advocate for the study of visual communications the high school instructor must champion the cause.
4. Perhaps studies can be conducted relating to two and four-year degree institutions not located in southeastern Wisconsin. Expanding the study to include programs from the entire state of Wisconsin would be beneficial for all students continuing in a postsecondary experience in visual communications.
5. Reproducing a survey with a sample size larger that what was utilized would be beneficial in possibly providing more valid data. Including instructors from

computer-based areas of study our side of visual communications may present a new perspective showing commonalities. This problem of inadequate computer skills may not be unique to the study of visual communication.

References

Andrews, D., Nonnecke, B., & Preece, J. (2003). Electronic survey methodology: A case study in reaching hard-to-involve internet users. *International Journal of Human-Computer Interaction, 16*(2), 185-210

Bandura, A. (1986). Social foundation of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Becker, H. J. (1993). Computer experience, patterns of computer use, and effectiveness an inevitable sequence or divergent national cultures? *Studies in Educational Evaluation,* (19), 127-148.

Bureau of Labor Statistics, U.S. Department of Labor. (2004). *Occupational outlook handbook, 2004-05 Edition, Broadcast and Sound Engineering Technicians and Radio Operators*, Retrieved December 9, 2004 from http://www.bls.gov/oco/ocos109.htm

Burniske, R. (2001). Avaricious and envious confessions of a computer literate educator. *Phi Delta Kappan,* (March), 524-527.

Carliner, S. (2005). *What is visual communication?* Retrieved April 12, 2005 from http://saulcarliner.home.att.net/en6960/whatisvisualcommunication.html

Cassidy, S., & Eachus, P. (2002). Developing the computer self-efficacy (CUSE) scale: Investigating the relationship between computer self-efficacy, gender and experience with computers. *Journal of Educational Computer Research, 26*(2), 169-189.

City of Glendale. (n.d.). Retrieved July 29, 2004 from http://www.glendale-wi.org/info.htm

Compass Guide. (2004). *Guiding people toward education and career opportunities.* Retrieved July 29, 2004 from http://www.compassguide.org

Compeau, D. R., & Higgins, C. A. (1995, June). Self-efficacy: Development of a measure and initial test. *MIS Quarterly,* 189-211.

Conceptual map of visual communications. (1997, Autumn). *Journal of Visual Literacy, 17*(2). Retrieved June 18, 2001 from http://spot.colorado.edu/~moriarts/conceptmap.html

Costello, R. (1997). The leadership role in making the technology connection. *The Journal Technological Horizons in Education,* (November), 58-61.

Dembicki, M. (1999). The newest American high school. *Techniques,* (March), 32-33.

Dusick, D. M. (1998). What social cognitive factors influence faculty members, use of computer skills: results of a survey and focus group. *T. H. E. Journal, 2*(9) 68-71.

Eastin, M. S., & LaRose, R. (2000) Internet self-efficacy and the psychology of the digital divide. *Journal of Computed Mediated Communication, 6*(1). Retrieved November 12, 2002, from http://www.ascusc.org/jcmc/vol6/issue1/.

Education & Career Opportunities Systems (ECOS). (2004). Retrieved July 29, 2004 from http://ecos.princetonreview.com/public/AboutUs.asp

Greco, A. (2004). An analysis on whether Wisconsin high school educators obtaining training or certification, are encountering barriers. Retrieved November 30, 2004 from the University of Wisconsin-Stout's Thesis Collection.

Great Schools.Net. (2004), Retrieved July 29, 2004 from http://www.greatschools.net/modperl/browse_school/wi/print/531

Hadley, M., & Sheingold, K. (1993). Commonalties and distinctive patterns in teachers' integration of computers. *American Journal of Education,* 101, 261-315.

Heywood-Everett, G. (1991). Computer instruction in the classroom context. *Early Child Development and Care,* 71-79.

International Board of Standards for Training Performance and Instruction. (1999). Retrieved July 29, 2004 from April 8, 1999, from http://www.ibstpi.org/index.html

Johnson, D. M., Ferguson, J. A., Vokins, N. G., & Lester, M. L. (2000). Computer tasks required in selected undergraduate agricultural courses. Proceeding of the 27th Annual National Agricultural Education Research Conference, 15-29.

Journal of Visual Communication and Image Representation. (2004). Retrieved July 29, 2004 http://www.apnet.com/www/journal/vc.hmtl

Journal of Visual Literacy. (1997) Volume 17, Number 2, Autumn 1997 purchase at (http://www.ivla.org/forsale.htm)

Kieffer, L. M. (1995). *Establishing a computer literacy requirement for all students.* (ERIC Document reproduction Service No. ED 392436).

Kopac, P. A. (1991, June). *How to conduct questionnaire surveys.* Public Roads [On-line], 55(1).8, 8p. EBSCO host Academic Search Elite Full Display. Item number 9705163788.

Leedy, P., & Ormrod, J. (2001). *Practical research: Planning and design* (7th edition), ISBN-013-960360-3, Upper Saddle River, N.J.: Merrill Prentice Hall

Lim, K. F., & Lee, J. (2000). IT skills of university undergraduate students enrolled in a first year unit. *Australian Journal of Education, 16*(3), 215-238.

Livingstone, S., & Bovill, M. (1998). *Young people, new media.* Retrieved December 11, 2004 from Master FILE Premier Database.

Milwaukee Area Technical College's Web Site. (2005) Retrieved September 20, 2005 from (http://148.8.128.100/documents/catalog/visual_communication_computer_graphics.htm)

Milwaukee Institute of Art and Design's Web Site. (2005). Retrieved September 20, 2005 from http://miad.edu/enter.php

Miller, M. H. (2004). Four-year schools should take more cues from community colleges, some educators say. *Community College Week,* Retrieved December 11, 2004 from Master FILE Premier Database

National Center for Educational Statistics. (1997) *Statistics in brief.* (NCES Publication No. 97-944). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Nicolet High School Web Site. (2004). Retrieved July 29, 2004 from http:nicolet.k12.wi.us/frame.html?district/pages/feederschools.html:

Milwaukee Area Technical College's Web Site. (2005) Retrieved September 20, 2005 from http://www.matc.edu/student/offerings/vicom.html

Milwaukee Institute of Art and Design's Web Site. (2005). Retrieved September 20, 2005 from http://miad.edu/enter.php

Ohio ITAC. (2001) *Integrated technical and academic competency.* Ohio State Dept. of Education, Columbus Div. of Career-Tech and Adult Education. The complete profile is available on the Internet at www.itworks-ohio.org.

Pelgrum, W. J., & Plomp, T. (1993). The use of computers in education in 18 countries. *Studies in Educational Evaluation, 19,* 101-125.

Paydon, A. (2004) *A comparison of technology literacy between seventh and eighth grade students in a middle school technology program.* Retrieved December 6, 2002 from the University of Wisconsin-Stout's Thesis Collection.

Pennings, R. (2001). *The study of basic computer literacy skills expected of students by instructors at Wisconsin Indianhead Technical College (WITC).* Retrieved February 2, 2002 from the University of Wisconsin-Stout's Thesis Collection.

Phillips, J. (2001). Embracing the challenge of leadership. *Information Management Journal*, 35(3), 58-62

Standards for Technological Literacy. (2000). Retrieved July 23, 2004 ITEA, 2000 from http:ITEA.com

Successful Telecommuting Programs in the Public and Private Sectors. (1997, August). Retrieved July 23, 2004. A Report to Congress. *U.S. Department of Transportation*, pp.3-5.

Sweany, A., Manley, K., & Meeks, C. (2001). The Visual Communication Advocacy Program. (2005). *What is visual communication?* Retrieved April 12, 2004 from http://www.visualcommunications.info/

Thierry, P. (2000). *Computer skills for the information age, Part 2.* Retrieved December 14, 2004 from Master FILE Premier Database.

United States Department of Census. (2004). Retrieved July 29, 2004 from http:quickfacts.cesus.gov?cgi-bin/qfd/extract?htmlfile=staes/55/55079.html

University of Wisconsin (2005). Digital Arts and Culture -Milwaukee. Retrieved September 20, 2005 from http://www.uwm.edu/Dept/dac

Wallace, P., & Clariana, R., (2002). Paper–based versus computer–based assessment: key factors associated with the test mode effect. *British Journal of Educational Technology, 33*(5), 593-602. doi: 10.1111/ 1467-8535.00294

Weglarz, S. (2004). *Importance of computer competencies for entering JCCC students: A survey of faculty and staff.* Retrieved December 11, 2004 from Master FILE Premier Database.

Wiebe, E., Clark, A., Ferzli, M., & McBroom, (2003). The VisTE project: Visualization for improved technological and scientific literacy. Proceedings of the 2003 American Society for Engineering Education Conference and Exposition (Session 2438)

Wikipedia Dictionary. (n.d.) Retrieved July 23, 2004 from http://en,wikipedia.org/wiki/Visual_Communication

WisCareers. (2005) *Occupational information for animators, web masters & broadcast technicians.* Retrieved April 23, 2005 from the WisCareers Database http://WisCareers.wisc.eduWisconline. (2004). Retrieved July 29, 2004 from http://www.wisconline.com/greenmap/Glendale/population.html.

Wisconsin Department of Public Instruction. (2004). Retrieved July 29, 2004 from http:www.dpi.state.wi.us/dpi/standards/pdf/teched.pdf

Wisconsin's model academic standards for technology education. (1998). Bulletin No. 9006 ISBN 1-57337-066-5, ©1998 by Wisconsin Department of Public Instruction. Retrieved July 23, 2004 from http://:www.dpi.state.wi.us

Appendix A: Matrix

Survey Matrix

Research Objectives by Categories Against Survey Questions

1. Hardware or equipment-related knowledge and skills
2. Operating system knowledge and skills
3. Knowledge and skills associated with the use of the information system itself
4. Knowledge and skills associated with using the information that is contained in the source or service
5. Creation and management of files

Survey Question	Research Objective by Categories				
	1	2	3	4	5
1.Demographic identifier					
2.	X				
3.		X			
4.	X				
5.	X				
6.		X			
7.			X		
8.			X		
9.				X	
10.				X	
11.					
12.					X
13.				X	
14.					X
15.	X				

Category 1 = 4 questions
Category 2 = 2 questions
Category 3 = 2 questions
Category 4 = 3 questions
Category 5 = 2 questions

Appendix B: Survey

Tuesday, December 6, 2005
Hello,

Aleta M. Gretenhardt is conducting a survey for her Master Degree through the University of Wisconsin Stout. You were selected from a list of visual communication instructors obtained from the Milwaukee area Technical College's web site as well as instructors from University of Wisconsin Milwaukee, and Milwaukee Institute of Art and Design. Could you please take the time to complete this brief survey?

The survey can be answered by reading the attached document and filling out the Scantron sheet using a number 2 pencil After completing the Scantron please deposit the completed response card it the U.S. Mail. If have enclosed a small incentive as a thank you your time spent. The data will be used to identify the basic entry-level computer skills required of incoming freshman that have chosen to study visual communication at Southeastern Wisconsin postsecondary schools. Consequently, the results of this study may ultimately be integrated into the visual communications curriculum at Nicolet High School, Glendale, Wisconsin

This study may lay the groundwork for improved communication between high school and the postsecondary instructors. The hope is that established communication lines between the two maybe advantageous in improving the retention of visual communication students

Thank You,

Your name will not be included on any documents. We do not believe that you can be identified from any of this information. This informed consent will not be kept with any of the other documents completed with this project

Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. Should you choose to participate and later wish to withdraw from the study, you may discontinue your participation at this time without incurring adverse consequences.

This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

By completing the following survey you agree to participate in the project entitled, COMPUTER COMPETENCIES FOR VISUAL COMMUNICATIONS STUDENTS AT NICOLET HIGH SCHOOL IN GLENDALE WISCONSIN.

Investigator: *Aleta M. Gretenhardt, 414-764-4403, gretenhardtal@uwstout.edu.*
Services

IRB Administrator
Sue Foxwell, Director, Research

152 Vocational Rehabilitation Bldg.
Menomonie, WI 54751

1-715-232-2477
foxwells@uwstout.edu

Advisor: ***Name:*** *Dr. Howard D. Lee*
232-1251, LeeH@uwstout.edu.

Please respond on or before December 16, 2005

DIGITAL VIDEO PRODUCTION

COMPUTER COMPETENCIES FOR VISUAL COMMUNICATIONS STUDENTS AT NICOLET HIGH SCHOOL IN GLENDALE WISCONSIN

Using the attached Scantron sheet with and a number 2 pencil please identify the school that you are associated with:

A) University of Wisconsin Milwaukee B) Milwaukee Institute of Art and Design C) Milwaukee Area Technical College

Please fill in your proper response to the statements below using a likert scale where:

A) Strongly desirable B) Desirable C) Neither desirable nor undesirable D) Undesirable E) Strongly Undesirable

2. Use mouse options on touch pads and desktop computers
3. Identify key commands using both platforms
4. Import and export to peripherals such as digital video cameras
5. Target and import from photo scanners, OCR's, mics, and still cameras
6. Search and manage files on a server as well as internal and external storage systems
7. Discriminate between network connections, Ethernet, modem, wireless, DSL, ISP
8. Conduct Internet searches using advanced search options, and Boolean language.
9. Use e-mail, recognizing spam, replying to a threaded discussion, BCC and various replies
10. Recognize ethics, acceptable use policies, copywriter infringement, e-mail etiquette, illegal downloading, and piracy
11. Format and file conversion as well as printing documents to a PDF

12. Identify file properties and size while manipulating and sharing graphics among various applications
13. Identify craftsmanship and quality content of digital products
14. Create formatted documents using margins, tabs, word count, spell check find and replace, and assorted corrective tools
15. Burn CD'sDVD's as rewrite and write only disks