

A COMPARISON STUDY BETWEEN ON-LINE & TRADITIONAL  
COURSES TAUGHT BY MILWAUKEE AREA  
TECHNICAL COLLEGE'S  
ADULT HIGH SCHOOL

by

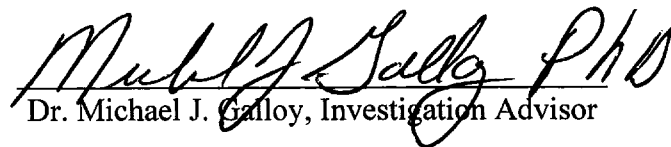
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A Research Paper

Submitted in Partial Fulfillment of the  
Requirements for the  
Master of Science Degree  
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A handwritten signature in black ink, appearing to read "Michael J. Galloy PhD". The signature is written in a cursive style and is positioned above a horizontal line.

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ABSTRACT

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A Comparison Study Between On-Line and Traditional Courses Taught by			
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This study was designed to analyze the difference in completion rates between traditional and on-line courses offered through the Adult High School of Milwaukee Area Technical College during the first sixteen-week semester of the 1999-2000 school year. Additionally, student perceptions of on-line courses were measured through an on-line survey.

Instructors who taught the same course(s) in both a traditional and on-line format were selected. At the conclusion of the semester data was collected to determine completion rates for the courses in question. The general findings of the study conclude that while completion rates do vary slightly depending on delivery

method, there is much greater variability depending on the instructor in question regardless of whether that instructor is teaching in a traditional or on-line classroom.

Student perceptions of on-line course work were mixed. In general, students indicated that on-line course work was less rigorous than traditional classroom experiences, but that it was also less engaging.

## Acknowledgements

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## Chapter I

### Research Problem and Objectives

Like many educational institutions, Milwaukee Area Technical College (MATC), and specifically its Adult High School, have begun delivering courses over the Internet in an attempt to better meet the needs of students and increase enrollment.

There are several reasons why students choose distance education. Brey and Grisby found that 41% of students choosing distance education did so because of work schedule conflicts. Fifty one percent cited distance and travel time as an incentive to studying from home while others simply opted for a new learning experience (1984). As of 1995, 75 universities and colleges offered on-line degree programs and often times at a lower cost than traditional degree programs (Lord, 1995). Web-based education and training have limitless applications and growth potential (Appleton, 1997) and there is even evidence which suggests students learn more effectively in an on-line environment (Campbell, 1997).

In 1995, MATC 's Adult High School did not offer on-line courses. As of June 1998, 20 courses are offered over the Internet and development grants have been awarded to several faculty members for on-line course construction (Gould, 1998). A series of professional development courses is offered year-round so that teachers can learn the latest software packages to assist them in teaching on-line. MATC is also committing dollars for such training and required equipment.

While studies into the effectiveness of web-based instruction are currently taking place at the University of Illinois' Sloan Center for Asynchronous Learning Environments (SCALE) and Columbia University among others, Milwaukee Area Technical College currently lacks a formal evaluation process to determine if on-line courses are successful especially when compared to their traditional "face-to-face" counterparts.

Additionally, MATC lacks policies and even an informal professional consensus as to the ingredients necessary for a successful web-based curriculum. Adult High School teachers are constructing on-line courses at a furious pace. Assignments are in the form of questions the answers to which can found at linked web sites. Once found, the students write their responses which are typically e-mailed to the instructor for feedback. Some instructors quiz and test on-line while others do not. For many the question now becomes which technologies, if any, shall be incorporated next?

Before any options are considered, there should be a study to determine whether or not students are learning in the Adult High School On-line Program, as it currently exists. If on-line course offerings are to be seen as a vehicle to increase enrollments, they should be evaluated according to student completion and satisfaction rates to determine their effectiveness. Such an evaluation will assist the Adult High School in attempting to insure that students will be successful, satisfied and prepared to matriculate into post-secondary programs of study.



## Problem Statement

While Milwaukee Area Technical College's Adult High School offers an increasing number of its courses on-line, there is no process to evaluate the effectiveness of on-line courses in terms of student completion rates when compared to more traditional teaching methods.

## Purpose

This study compared the effectiveness of on-line courses versus traditional course offerings within Milwaukee Area Technical College's Adult High School between August and December of 1999. Through student surveys additional findings include factors that led students to choose web-based instruction as well as their perceptions of the delivery method.

## Research Questions

The research questions answered in this study are:

1. What are the completion rates for on-line Adult High School courses?
2. What are the completion rates for traditional Adult High School courses?
3. What factors lead students to choose on-line instruction?
4. What are student's perceptions when comparing on-line courses with traditional classroom instruction?

## Significance of the Study

Technology has changed the manner in which students are trained and educated (Lindstrom, 1994). Such technologies fundamentally alter the relationship between teacher and learner. By providing criteria by which web-based courses can be

evaluated, the study aids the researcher both in the administration of MATC's Adult High School's On-line Diploma Program and as an on-line instructor. There is considerable literature regarding those factors, which foster student success in distance education in general, and web-based instruction specifically. Such information assists instructors in developing and administrating these courses. Finally it helps counselors and advisors identify students appropriate for on-line instruction.

### Limitations

There are several factors outside the control of the researcher which impact the results of the study:

1. Although the survey was pilot tested and deemed reliable, a variety of variables impacted return rates including, but not limited to, postal irregularities, a mobile student population, etc.
2. Completion rate data was collected from both Milwaukee Area Technical College's Office of Registration and Records and from individual teachers. Each has a distinct system of record keeping and this may have impacted the study.
3. There are currently only four courses taught by the same instructor in both an on-line and face-to-face format. While this illuminated some differences in both student performance and perceptions, more courses taught by more instructors in both formats would prove more reliable.

4. Because MATC's Adult High School is populated by at-risk youth and returning adult learners, it is not a typical high school. Thus, the results cannot be generalized beyond the walls of MATC.

## Definitions

The following terms are used throughout the study:

**Asynchronous Learning** - Instruction and learning that takes place at different times for each learner.

**Cyberspace** - The collective of computers located on multiple networks that communicate with other computers across the Internet (Teach, 1998).

**Discussion group** - A group of users who "post" messages of common interest for information or comment.

**Distance learning or education** - Instruction that takes place when teacher and students are geographically separated. Telecommunications technologies link them on an interdistrict, intrastate, or international basis.

**Distribution list** - A collection of e-mail addresses which can be triggered at a single command thereby conveniently sending a single message to multiple receivers.

**Download** - The electronic transferring, or copying, of a file from one computer to another. Files may be downloaded from another connected individual computer, from a computer network, a commercial on-line service or from the Internet (Teach, 1998).

**Electronic mail or e-mail** - Messages which are electronically sent or transmitted over the Internet from one person to another person or to a group of people (Dern, 1994).

**File** - Data, often a document or an application, saved on a disk or other storage medium (Teach, 1998).

**Internet** - The huge worldwide network or “network of networks” of government, business, and university computers. This global network connects more than two million computer hosts (Teach, 1998).

**Listserv** - An automated mailing list distribution system. A program that runs on a mainframe which responds to an e-mail request from a user to be added or removed from a discussion group. Lists generally concern themselves with a central topic and can be moderated or unmoderated (Fahey, 1994).

**On-line** - The state in which a computer is connected to another computer or server via a network. A computer communicating with another computer (Teach, 1998).

**Technology** - The application of knowledge, tools and skills to solve practical problems and extend human capabilities (Teach, 1998).

**Web Based Instruction (WBI)** - A form of distance learning in which the instructional materials reside on a web server and in which students may access these instructional materials from any location remotely (Teach, 1998).

**World Wide Web (WWW)** - A spider-like interconnection of millions of pieces of information and documents located on computers around the world. Web documents use a hypertext programming language which incorporates text, sound and graphical images and “links” to other files on Internet-connected computers. The WWW allows for “point and click” navigation of the Internet (Teach, 1998).

## Chapter II

### Review of Literature

#### Historical Perspective and the Growth of On-line Learning

For thousands of years, humans lived in a hunting and gathering economy. Approximately 10,000 years ago, humans made the transition to an agricultural economy. The agricultural society prevailed until about 200 years ago, when the Western world ushered in the Industrial Revolution. A few decades ago, the industrial economy began to give way to the technological/information-based society. Each society experienced an exponential amount of change in the way people live and work.

Initially, the technological/information-based era resulted in an improvement in task efficiency. Paper and pencil tasks and the typewriter could be replaced by the computer offering spreadsheets, calculations and word-processing. Today, the technological/information-based economy focuses on communications technology. The key to the use of computers for communication is connections. "Technology innovators are continually devising new ways to connect people to information, as well as to other people around the world" (Daggett, 1998, pp. 1-2). The Internet explosion is a prime example of how technology has changed our environment as it connects us to the world.

The Internet is a telecommunications network developed in the late 1960's by the U.S. Defense Department. Its original design was to allow quick transmission of data between researchers engaged in defense-related projects. Today there are 29,670,000 connected Internet users in 240 countries and territories. Statistics show a dramatic increase in hosts in the .us country domain which is used by elementary

schools, secondary schools and community colleges. As of January 1998 there were 1,076,583 hosts within the .us country domain. In January 1997 there were 587,175 hosts. It is predicted that there will be as many as 90 million users on the Internet by the turn of the century (Glave, 1998).

There has been a corresponding revolution in education over the past several years and acceleration in the use of on-line technologies to assist, or, in many cases, supplant traditional modes of instruction (Bjorner, 1993; Velsmid, 1997). Peterson's Guide reported in 1993 that there were 93 accredited colleges and universities engaged in distance education. The most recent edition of the publication reports that nearly 400 accredited colleges and universities in North America currently employ on-line instruction of some sort (Velsmid). In addition, Herther (1997) noted that over 150 accredited institutions offer entire bachelor's degree programs to students who rarely, if ever, visit campus.

#### Advantages to Institutions and Students

The asynchronous nature of many on-line programs together with their accessibility from home, office, or hotel room is an obvious advantage to students (Bjorner). Of all the distance education delivery systems, on-line course delivery is the most flexible as courses can be accessed 24 hours a day, seven days a week. Students need only the resources of a computer, modem and an Internet Service Provider (ISP). The majority of higher education institutions that offer distance education courses have computer labs located on campus and at satellite centers. Many local libraries are adequately equipped for access to on-line course delivery. There has been a corresponding increase in home-based computer activity. According to Daggett, there

is a direct correlation between family income and computers in the home. Fifteen percent of families earning less than \$25,000 annually have a computer, versus 85% of families earning more than \$70,000 a year (1998).

Additionally, as the cost of traditional education increases, market pressures are forcing more and more institutions to consider on-line offerings (Gubernick & Ebeling, 1997) that do not incur the costs of dormitories, athletic programs, etc. They also found the Florida State University System expects on-line programs to save about 40% over the cost of in-class programs. It should be noted, however, that Duke University charges a premium for its on-line MBA (\$82,000 versus \$50,000 for its on-campus equivalent).

#### Distance Education Student Profile

According to the Peterson's Distance Learning Guide, the typical distance education student is an individual over 25 years of age with over 50% being female. The student is highly motivated and self-directed (1997). The two most common characteristics of distance education students include issues of being time-bound and place-bound. Time-bound issues often focus around work/home responsibilities and schedules. Place-bound issues often focus around lack of mobility due to travel distance, family responsibilities or disability. Some students elect to take distance education courses because of the flexibility in scheduling, possible schedule conflicts with other on-campus courses and difficulty with time issues regarding adhering to weekly attendance. This type of student may not have any place-bound issues. In fact research shows that not all students enrolled in distance education courses live a distance from the college. Seton Hall University found that 40% of those who enrolled

in Internet on-line courses lived on or near the campus. These students did not have a "place-bound" concern, but enrolled in on-line courses due to "time-bound" issues (Kearsley, 1997).

It should be noted that the profile of students involved in this study from the Adult High School of Milwaukee Area Technical College differs markedly from that described in the literature reviewed. According to a student survey undertaken in the fall of 1998 for Northcentral Accreditation purposes, 370 students were surveyed of which 56.8% were female and 43.2% male. Fifty-six point eight percent of Adult High School students are under 21 years of age, while nearly three quarters are under 25 years old. Seventy-two point four percent of Adult High School students are working, more than half are working more than 20 hours per week and over a third work full-time. There is no data regarding the degree to which students are motivated or self-directed. All students can be described as "at-risk" since their mere enrollment indicates their inability to have earned a high school credential in one or more traditional educational settings (Sorensen, 1999).

#### Types of On-line Learning Opportunities

According to Elaine Strachota, Content Coordinator for On-line Courses at Milwaukee Area Technical College, there is a continuum of uses for on-line technologies in education. On one extreme, there are completely web-based courses where student and teacher may never meet face-to-face. These courses present content, assignments and assessment tools on-line. They may include one or more of the following communication tools: e-mail, conferencing, discussion lists and bulletin boards. At the opposite end of the spectrum are those traditional courses where the



instructor has chosen to use World Wide Web resources to enhance traditional classroom activities. Strachota has found that more and more instructors are moving toward the middle, creating "hybrids" where classes may still meet regularly, usually for purposes of assessment, but that students access most course materials and assignments via the Internet. This forces students to be more responsible for their learning, while offering them some freedom in terms of when and where to complete course activities. It also frees instructors to work more closely with those students experiencing difficulties (Strachota, 1999).

Currently MATC's Adult High School On-line courses consist of a single orientation session with all learning activities taking place on-line thereafter. Traditional Adult High School courses meet regularly face-to-face and are comprised of mostly traditional learning activities (lecture, text reading, tests, papers, projects, videos, etc.) though some World Wide Web resources are included (Sorensen, 1999).

#### Adult Learning Theories and Principles

Theories of knowledge construction or "Constructivism" support the idea that adult learners construct different cognitive structures based upon previous knowledge and life experiences. The adult learner is regarded as an individual replete with pre-existing knowledge, aptitudes and motivations (Khan, 1997, p. 60). Current thinking is that as adults learn they construct internal representations of knowledge, commonly referred to as mental models. These mental models become a personal explanation of a particular phenomenon or set of concepts. There is a reciprocal and iterative relationship between new and existing knowledge. New knowledge is assimilated to old and old knowledge changes to accommodate new knowledge. Therefore, instruction should be designed

with tasks to be accomplished or problems to be solved that have personal relevance for the learner. Adults need to connect new learning to their previous knowledge/experience base. Adult learning should be problem-centered and learner-centered rather than content-oriented. Whenever possible, on-line course instruction should therefore be designed to include case studies, problem solving situations and participatory activities to enhance learning (Lieb, 1998).

Situated Cognition theory stresses the need for knowledge construction to take place in a context that connects new knowledge to what is already meaningful for the adult learner and does so in a way that makes learning worthwhile. Kerr's theory of Andragogy makes the following assumptions about the design of learning: (1) adults need to know why they need to learn something, (2) adults need to learn experientially, (3) adults approach learning as problem-solving, and (4) adults learn best when the topic is of immediate relevancy and value (1991). Problem-solving situations, case study examples and simulations therefore should be considered as part of the on-line course design. These examples foster knowledge construction in context and require application of new knowledge to "real" phenomena. This is further supported by Khan (1997) who stated that on-line course design should have an authentic task orientation whenever possible thereby situating practice and feedback within realistic scenarios. If knowledge, skills and attitudes are learned in a context of use, they will be used in that and similar contexts by the learner in future applications.

### The Social Dimensions of Learning

An important part of the context in which adult learners construct knowledge is social. The social dimension of learning is critical to the construction of knowledge.

The social construction of knowledge concerns the relationships that exist between teachers and learners. According to Kearsley (1997) the single most important element of successful on-line education is the interaction among participants. Garrison, (1989) stated that if communication diminishes so does the quality of learning. It is the teacher's role as a facilitator to ensure that a high level of interaction occurs in an on-line course. Gibson and Gibson (1997) stated that regardless of the technology used, what determines learner satisfaction is the attention learners receive from their teachers and from the system. Holmberg and Keegan (cited in Amundsen, 1993) both see distance as something that must be bridged through various means of interpersonal communication. Discussion and feedback from the teacher and fellow students facilitates the building of a learning community where members feel connected. A common stereotype is "the loneliness of the distance learner". On-line course delivery cannot replace the face-to-face interaction that is present in a traditional classroom. Learning at a distance can be both isolating and highly interactive, and electronic connectedness is a different kind of interaction that leads to discomfort among some learners. Lack of nonverbal cues can create misunderstanding, but communication protocols can be established and relationships among learners developed. Social norms do develop in cyberspace, but they require new communication competencies. On-line courses often feature consensus building and group projects, through which learners can develop skills in collaborating with distant colleagues and cooperating with diverse individuals. Such skills are increasingly needed in the global workplace offering experiences in a situational context (Dede, 1996). On-line course delivery cannot duplicate the "community" of the traditional classroom, however Cook (1995) argued

that the assumption of a sense of community in traditional classrooms may be false. If community is defined as shared interests, not geographic space, electronic communities are possible (1995). Kerka (1996) concluded that building a learning community is of critical importance to the creation of a successful virtual classroom. Rheingold reports that:

Some people-many people-don't do well in spontaneous spoken interaction, but turn out to have valuable contributions to make in conversations in which they have time to think. These people, who might constitute a significant proportion of the population, can find written communication more authentic than face-to-face interactions (1993, p. 27).

Related to this, Biocca (cited in Khan, 1997) identified the concept of "social presence"- the sense of being present in a social encounter with another person. Social presence can be achieved "virtually," at a distance through the use of varying telecommunication systems such as the telephone, Internet, e-mail, computer-mediated communication (CMC), and two-way video conversations. Gunawardena's research supports the need for social presence and a sense of community as predictors of satisfaction in the CMC environment (Khan, 1997).

Students typically prefer to interact with the instructor, other students and the instructional media by asking questions and having discussions rather than listening to a lecture. On-line delivery allows for interaction and discussion, however the feedback often is not as immediate as in a traditional classroom (Khan, 1997). Willis (1998) identified the following suggestions as effective interaction strategies: (1) a letter

welcoming them to the on-line course, (2) a voluntary orientation session to the use of the Internet and course design format, (3) posting of faculty and student pictures, (4) faculty biography, (5) voluntary student biographies, (6) a telephone call during the first week of class, (7) responding to e-mail questions promptly, (8) pre-class study questions to encourage critical thinking and informed participation, (9) feedback regarding the evaluation of course content, relevancy, pace, delivery problems and instructional concerns and (10) on-line office hours through a synchronous environment.

### The Adult Learner

According to Knowles' theory of Andragogy, adults are self-directed and responsible. Learning improves when the learner is an active participant in the educational process. Learners that are self-directed and highly motivated put forth a high degree of effort (Burge, 1988). According to Keller (cited in Khan, 1997), motivation "refers to the magnitude and direction of behavior...it refers to the choices people make as to what experiences or goals they will approach or avoid, and to the degree of effort they will exert in that respect" (p. 96).

Keller's definition of motivation is a descriptive statement that best explains the behavior of the adult learner. Keller further identifies many variables that may interfere with student motivation and result in an unsuccessful outcome in an on-line course. These variables might include: personal crisis, lack of academic readiness, a phobia of technology, lack of skill in using technology, limited access to technology/equipment, inability to express learning needs, conflict in goals and/or English may be the learner's second language (Khan, 1997).

According to Khan (1997), three factors indicative of student success in completing distance education courses include: intention to complete the course, early submission of work and completion of other distance education courses. Other components that may influence student motivation are: (1) course design, (2) the degree of interaction and (3) the role of the facilitator/teacher (p. 94).

Moore and Kearsley (1996) identify the following six factors that influence the success of the distance learner: (1) the learner's past formal education and prior experience with distance education, (2) the learning style of the learner, (3) learner support, (4) relevancy of course work, (5) the nature and amount of interaction and (6) the feedback given to the learner.

#### The Role of the On-line Teacher & Course Design

The teacher plays a significant role in the outcome of any type of educational delivery. The teacher of the on-line course will be instrumental in the design of the course, the interactivity, selection of communication and course outcome results. The teacher, learner and the virtual environment all interrelate for overall effectiveness. "If the distance learner is to succeed, we as faculty must do more than provide access to information. We need to truly understand the learner and design learning environments that facilitate learning..." (Gibson & Gibson, 1997, p. 1). Keller (cited in Khan, 1997) identified a motivational-design model for successful delivery of Web-based courses. All courses should be designed to include: interest, relevance, expectancy and satisfaction. Interest refers to establishing and maintaining curiosity and learner arousal. Relevance refers to linking the learning situation to the needs and motives of the learner. Expectancy refers to the causes attributed to his/her behavior

and the likelihood that it will be repeated. Satisfaction is defined as continuous motivation as well as the pursuit of goals.

Keller and Burkman (cited in Khan, 1997) identified the following design strategies for successful on-line course delivery:

1. Make the initial impression of course work seem easy, rather than difficult so that the student is not too overwhelmed.
2. Make the instructional text well organized in small manageable segments and assignments.
3. Build a strong relationship between the objectives of the course, course content, the student's past experience and knowledge and the student's future goals.
4. Be an enthusiastic teacher who is also in the process of learning new things.
5. Provide opportunities for student interaction with the instructor, other students and the instructional materials.
6. Provide frequent conformational and corrective feedback.
7. Encourage collaboration between students with Web-based assignments.
8. Have students submit work early in the course.
9. Use graphics and interactive media that make the information easier to understand and hold the attention of the student.
10. Develop a diversity of Web instructional materials that appeal to different learning styles.
11. Reward accomplishments by using positive feedback- course points to sustain motivation.
12. Provoke mental conflict by introducing problems to be solved and contradictory facts. Send the students to different Web pages with contradictory opinions on a topic that is being studied. (1997, pp. 96-98).

The on-line teacher must feel comfortable with the current technology and realize that it continues to change as new systems and product lines are being developed. Early adapters seem to thrive on change, while others react negatively

whenever something alters their routine (Khan, 1997). Just as on-line course delivery may not be the “fit” for all students, many teachers may lack interest, motivation and energy to develop an on-line course. Teachers must be exposed to continuing professional development courses in order to feel adequately prepared for designing and delivering a course on-line.

### The On-line Learning Environment

On-line course delivery offers self-paced, flexibility through the use of both “open” and “fixed” interactive virtual learning environments. “Open” systems can be used by the learner independent of time and/or place constraints (asynchronous). The student determines which computer terminal to use and has access to on-line delivery 24 hours a day/ 7 days a week. This holds true, however, only for the student who has a personal computer or the support system of a college computer laboratory or library with 24/7 availability. Some students may not have the access flexibility of 24/7 however the place and time flexibility will be greater than in the tradition classroom. Some on-line courses may be designed to include a synchronous component where all learners participate in a scheduled “chat time” or discussion group which offers interactivity but less flexibility. The rapid growth of the Internet and the high bandwidth capabilities of the WWW mean that interactive learning is not limited to urban environments but is global and can be designed for delivery anytime, anywhere to anyone with a computer and a high-speed modem (Khan, 1997).

Potential disadvantages of on-line delivery environments include: lack of equipment access, equipment failure, failure of on-line connectivity, lack of technical skills needed for computer operations, lack of Internet navigation skills and the inability



to cope with technical challenges.

Although previously stated, the single most important element of successful on-line education is interaction among participants. Some teachers and learners may become overwhelmed by the volume of e-mail messages to read, reflect on and respond to on a timely basis. For effective management of on-line course delivery, the teacher must be willing to commit to the time requests deemed necessary for student feedback. Students should also be required to e-mail a minimally designated amount of times as part of a class participation requirement. This type of monitoring would hopefully prevent passivity of the learner and would lead to increased interaction.

#### Learner-Centered Web Instruction for Higher Order Thinking

On-line courses should be designed to include higher order thinking or reflexivity. The on-line environment should offer opportunity for analysis, debate, problem solving and reflection. The learner is not pressed to the immediacy of discussion as in the face-to-face environment and has time to reflect as part of a learning. Gibson & Gibson (1997) stated that computer conferencing accommodates reflective learners better than the face-to-face classroom. Learner-centered instruction encourages teachers to create challenging and novel environments that help learners link new information to old, seek meaningful knowledge, and think about their own thinking. Higher order thinking includes: creative thinking, critical thinking and cooperative learning. Creativity requires students to sense gaps in information, make guesses and hypotheses, test and revise ideas, and communicate results. Creative thinking techniques that can be part of the design of an on-line course include: brainstorming, creative writing, simulations, and "What If" situations. Critical

thinking can be used to select information, evaluate potential solutions, determine the strength of an argument, recognize bias, and draw appropriate conclusions. Critical thinking techniques that can be part of the design of an on-line course include: case-based reasoning, compare and contrast matrixes, debates, critiques, critical reflection, guided questioning and decision-making trees. Cooperative learning can occur through on-line instruction and can support social interactivity. Cooperative learning techniques that can be part of the design of an on-line course include: partner activities, asynchronous conferencing, synchronous conferencing, project-based learning, learning teams and structured controversy with netiquette rules (Khan, 1997).

#### Research Comparing On-line with Traditional Learning Models

As more and more on-line courses and programs proliferate, the questions of quality and comparability of such instruction with traditional methods naturally arise. Gubernick and Ebeling (1997) report a study conducted by the University of Phoenix (a private for-profit institution) that demonstrated standardized achievement test scores of its on-line graduates were 5% to 10% higher than graduates of competing on-campus programs at three Arizona public universities. While one may legitimately question the degree of comparability of the subject populations, these results are similar to those summarized by Vasarhelyi and Graham (1997) in which investigators at the University of Michigan concluded that computer based instruction yielded higher average scores than traditional instruction.

McCollum (1997) cited an investigation to evaluate the effectiveness of on-line instruction, which was conducted by Gerald Schutte at Cal State, Northridge.

Schutte randomly divided his statistics class into two groups. One attended class as usual, listening to lectures, handing in homework assignments, and taking examinations. The other took an on-line version of the course, completing assignments on a World Wide Web site, posting questions and comments to an electronic discussion list, and meeting their professor in an Internet chat room. After an orientation session, students in the virtual class went to Dr. Schutte's classroom only for their mid-term and final exams. On both tests, Dr. Schutte found, those students who were web-based outscored their traditional counterparts by an average of 20 percent (p. 23).

Other studies are less convincing. Schulman and Sims (1995) at Nova Southeastern University Fort Lauderdale, Florida conducted an investigation, which also employed pre and post-tests to determine outcome differences of five courses taught in both traditional and technology-based formats. Students who chose (self-selected) the on-line format scored higher on the pre-test than did their traditional counterparts. However, there was not a statistically significant difference between the groups on post-test performance. Thus Schulman and Sims concluded that learning of on-line students is equal to the learning of in-class students.

## Chapter III

### Research Methods

#### Introduction

This study compared the effectiveness of on-line courses versus traditional course offerings within Milwaukee Area Technical College's Adult High School between August and December of 1999. During the investigation, the following objectives were accomplished:

1. What are the completion rates for on-line Adult High School courses?
2. What are the completion rates for traditional Adult High School courses?
3. How do the completion rates compare between delivery formats?
4. What are student's perceptions when comparing on-line courses with traditional classroom instruction?

This chapter explains the methods used during the course of the study to satisfy the objectives above. Subsequent chapter sections include an explanation of the research design followed by a detailed description of the population and a justification for the sample studied.

#### Research Design

The design of the study was descriptive because it identified student success rates upon completion of both on-line and traditional courses. Completed surveys captured student's perceptions of on-line course work when compared with traditional or face-to-face delivery methods. The study was also quasi-experimental focusing on a

non-random student population that took courses in either a traditional or on-line format during the first semester of the 1999-2000 academic year. Through the analysis of completion rates, a comparison between the delivery methods was made.

Because the Adult High School schedules traditional courses over an eight-week period and on-line courses over a full sixteen-week semester, three instructors were selected who taught the same courses in both formats at some point during the sixteen-week semester. They did not alter their teaching techniques or course content for purposes of this study. At the conclusion of their courses, the completion rates were collected and surveys distributed. Those surveyed were adults and the information they provided remains confidential. Students were awarded extra credit points for their participation in the survey insuring an adequate response rate.

### Population and Sample

Students who attend MATC's adult High School are, by virtue of their attendance, defined as "at-risk". The State of Wisconsin defines "at-risk" to mean one or more years behind in school with a pattern of non-completion or as having any number of characteristics that act as barriers to successful school completion. For a variety of reasons, these students did not complete their high school diploma within their home school districts and are returning to school for that purpose. Some of the students are required to attend by virtue of their minor status or disposition within the state's criminal justice system. Many have work and parenting responsibilities. Due to the nature of this "at-risk" population, completion rates for Adult High School courses are assumed to be lower than those of "regular" high schools. Most Adult

High School students are between the ages of 18 and 25. There are a relatively small number of minor students in attendance under contract with their sponsoring district under Wisconsin's Public Law 118.15 who were excluded from the study for issues relating to the protection of human subjects.

The survey included questions to capture demographic data including gender, age, parental status, work status and full or part-time student status.

During the first semester of the 1999-2000 academic year, the Adult High School offered 20 on-line courses while 31 traditional courses were conducted. To achieve objectives one through three above, the population is comprised of those students in five courses taught in both on-line and traditional face-to-face formats by three different teachers each of whom taught a subject in both formats. Course completion rates were analyzed for each.

To meet objectives four and five as outlined above, a five-point range Likert survey was placed on-line for students to complete at course completion and extra credit awarded for participating in the survey.

### Instrumentation

To determine completion rates, data was collected from individual instructors at the onset and conclusion of the semester. Completion rates for on-line and traditional courses were determined by calculating the number of students who had initially enrolled for a course and who by receiving a final passing grade, received credit. The rate is equal to the number who completed divided by the number who initially enrolled. The resulting decimal is multiplied by 100 to arrive at the percentage (rate).

Students who withdrew from the course during the semester were not counted. To understand why students chose on-line instruction and their perceptions of on-line courses in contrast to their traditional counter-parts, a five-point range Likert survey was placed on-line for students to complete. The survey included questions to capture demographic data including gender, age, parental status, work status and full or part-time student status which could be used for further analysis.

Assured of confidentiality, completed surveys were electronically submitted to the researcher and not subject to review by the course instructor. A copy of the survey can be found in the appendix.

### Data Analysis

Official completion data was retrieved from the Registrar of Milwaukee Area Technical College. Those students who enrolled, did not drop, and were not dropped by the instructor from the course in question were used for the study. They were further classified as either having completed and received credit or not completing and thus not receiving credit. Percentages were determined by dividing completers by non-completers for each of the courses. Completion rates were then compared using a two-tailed or two sampled t-test.

The surveys were placed on-line for student completion throughout the first sixteen-week semester of the 1999-2000 academic year. Survey results were then transferred into a spreadsheet program which yielded mean and median responses for each of the eighteen items found on the Likert scale.

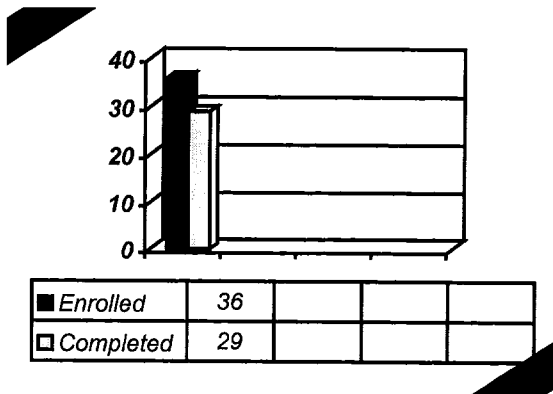
## Chapter IV

### Research Results

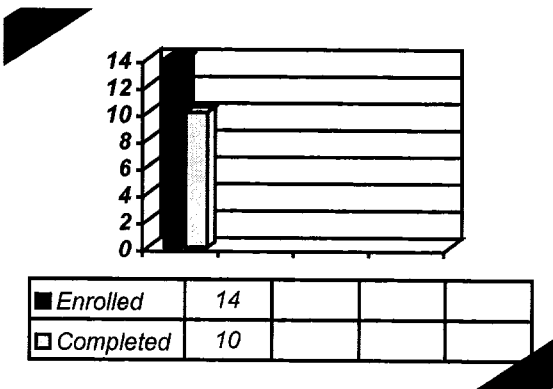
#### Completion Rates for Adult High School On-line Courses

Completion rate data for five on-line courses taught by three different instructors during the first semester of the 1999-2000 school year was gathered. Seventy-two (72) were enrolled while fifty-one (51) successfully completed receiving credit. This reflects a completion rate of seventy-one (71) percent. The breakdown by course (there were two sections of the Criminal Law course) is detailed in the following charts:

#### **Criminal Law (combined) 81% Completion**

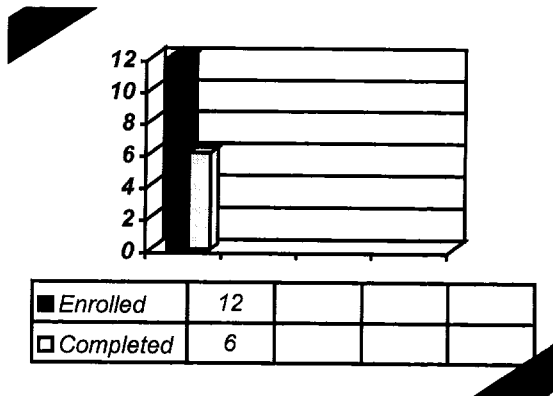


#### **Civil Law 71% Completion 1**

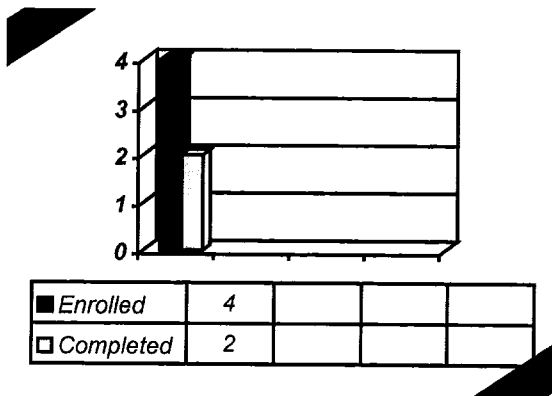




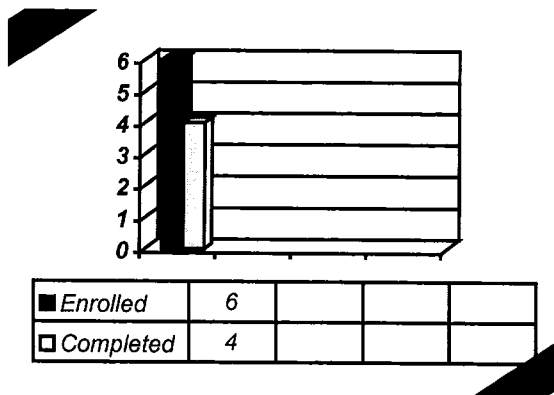
### Biology I 50% Completion



### Biology II 50% Completion 1



### Economics 67% Completion

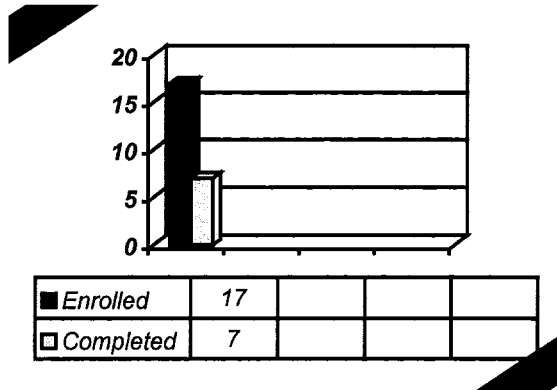


### Completion Rates for Traditional Adult High School Courses

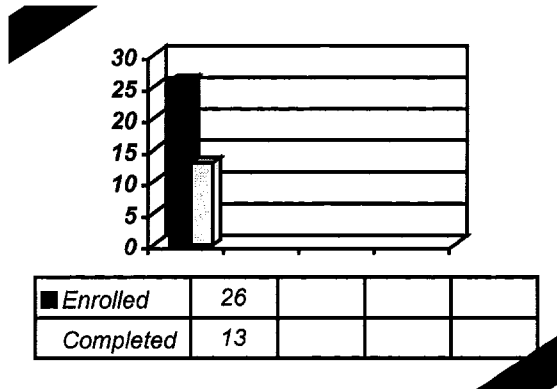
Completion rate data for five face-to-face courses taught by the same instructors during the first semester of the 1999-2000 school year was gathered. One hundred and six (106) were enrolled while eight-three (83) successfully completed receiving credit.

This reflects a completion rate of seventy-eight (78) percent. The breakdown by course (there were two sections of the Economics course) is detailed in the following charts:

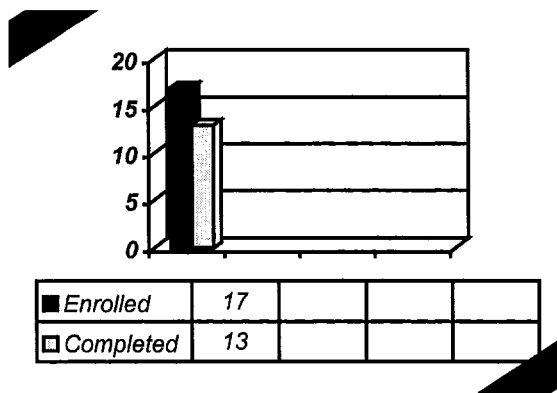
**Criminal Law 41% Completion**



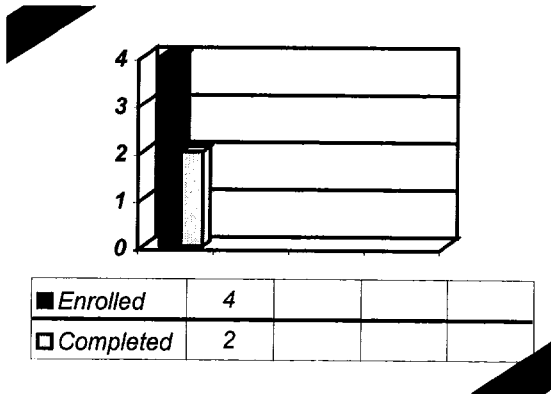
**Civil Law 50% Completion**



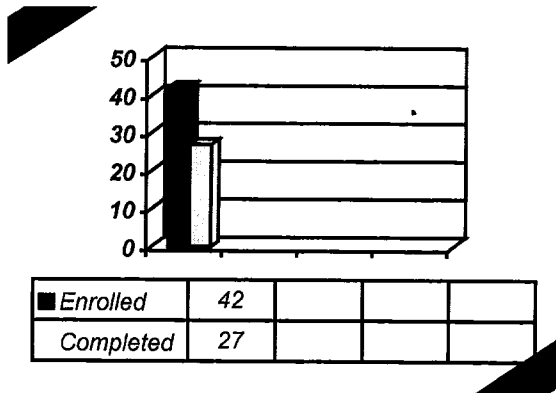
**Biology I 76% Completion**



### Biology II 50% Completion



### Economics 64% Completion

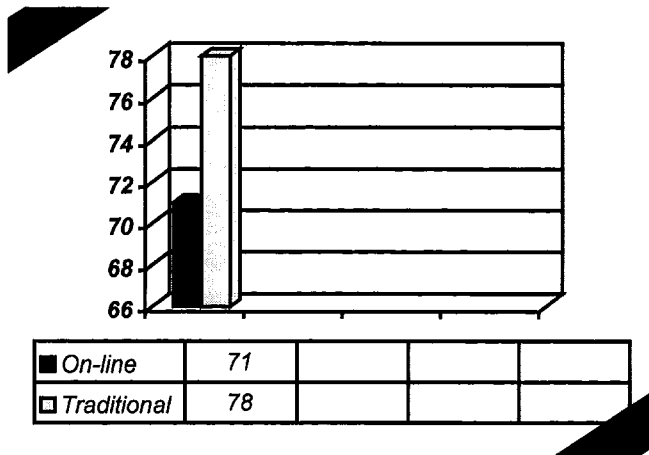


### Comparison of On-line & Traditional Course Completion Rates

Seventy-two students were enrolled in the selected on-line courses for the first semester of the 1999-2000 school year and 51 successfully completed for a rate of 71 percent.

One hundred and six students were enrolled in the same courses but taught in a traditional, face-to-face format and 83 successfully completed for a rate of 83 percent.

The following graph details the completion rates between on-line and traditional formats, 71 and 78 percents respectively.



A two sample t-test was used to compare the percentages of students completing on-line and traditional courses. When using a Level of Significance of  $P=.05$ , which has a Confidence Interval of 95%, the calculation of the t value is .88. The critical value for t with eight degrees of freedom is  $t=\pm 2.31$ . These results demonstrated that there was no significant statistical difference between the two groups. These results are summarized in the following table.

Completion Rates

On-line		Traditional	
Course	%	Course	%
Criminal L.	81	Criminal L.	41
Civil L.	71	Civil L.	50
Biology I	50	Biology I	76
Biology II	50	Biology II	50
Economics	67	Economics	64
Mean = 63.8		Mean = 56.2	
S.D. = 13.6		S.D. = 13.8	
N = 5		N = 5	

### Student Perceptions of On-line Versus Traditional Course Formats

Ninety-five on-line students (30 male and 65 female) completed an on-line survey to determine how they perceived their on-line course experience. The survey was constructed as a five-point Likert scale and the results processed (pasted from an on-line form into an Excel spreadsheet) to determine mean responses. Surprisingly, no data was missing from survey responses. Eighteen (18) questions were constructed (and the results displayed) in pairs and triplets in an effort to confirm perceptions.

Students were asked to respond on a five-point scale where the following values apply:

One (1) equals "strongly disagree" and five (5) equals "strongly agree." The results were:

I would like to take another Internet Course	1.31
I prefer not to take on-line courses	2.08
I would prefer to take a regular class	2.54
Internet Courses as much work as Regular Courses	1.81
Internet Courses are easier than I thought	4.01
Internet courses are harder than I thought	2.96
I am more successful when a teacher is present	4.39
I work better when I am left alone	2.99
I can manage my time constructively	3.34
I need deadlines to be successful in my school work	4.46
Studying on-line is boring	3.70
On-Line Courses are interesting and stimulating	2.71
I prefer the interaction of a regular classroom	2.54

It was someone else's idea for me to take an on-line course	2.62
I just have too much to do to be a successful student	3.85
I have enough time for school, work and a social life	3.95
Someone needs to push me to be successful	3.33
I am self disciplined	2.03

The results of the survey were mixed. The most striking responses are that students feel they are more successful when a teacher is present (4.39) and that they need deadlines to be successful in their school work (4.46). With a value of 4.01 it is clear that students find on-line courses easier than traditional classrooms. But they also indicate that on-line course work is somewhat boring in comparison with a mean response of 3.70. In terms of perceptions of self, results are even more discrepant. On the one hand students claim that they have too much to do to be a successful student (3.85) and yet simultaneously claim they have enough time for school, work and a social life (3.95). It is interesting to note that in demographic data gathered through the survey 51 of the 95 students, 54 percent, reported that they worked more than 40 hours per week. When one includes those who reported working 30 or more hours per week, the total climbs to 70 students or 74 percent.

## Chapter V

### Conclusions & Recommendations

#### Comparison of On-line & Traditional Course Completion Rates

Though no significant statistical difference was found between the completion rates of on-line versus traditional courses, clearly Milwaukee Area Technical College's Adult High School would like to "narrow the gap" between the two. But it should be noted that had five (5) more of the seventy-two (72) on-line students successfully completed, the on-line completion rate would mirror its traditional counterpart. Further when one analyzes the completion rate by instructor there are revealing results as well. Instructor "A" taught both the Criminal and Civil Law courses. Instructor "A" had an on-line completion rate of 78% and yet only a 47% percent completion rate in his regular classroom. But instructors "B" and "C" had similar completion rates regardless of format. Instructor "B" who taught Biology I & II had an on-line completion rate of 50% percent and a traditional completion rate of 63%. Instructor "C" had an on-line completion rate of 67% and a traditional completion rate of 64% percent.

It is also clear that while analyzing instructors who taught identical courses in both formats limited the number of variables considered, it also yielded a sample too small for serious analysis.

#### Student Perceptions of On-line Versus Traditional Course Formats

Perhaps the key to improving on-line instruction lies in the perceptions students hold regarding the format. Generally, students feel it is both somewhat boring and too easy at the same time. They also admit they require deadlines and the presence of a

teacher to be successful in their studies. The key to making on-line courses more interesting may be found in Keller's recommendations of making all courses include relevance, expectancy and satisfaction (1997). Without the physical presence of an instructor to consistently remind and rationalize with students over subjects and their associated topics to be explored, rational and relevancy must be built-in to the on-line experience. Further, as Willis suggested, teachers must use strategies (letters to students, posting of teacher and student photos, orientation sessions, telephone calls, responding to e-mails promptly, etc.) that will bond students to the on-line experience making it as close to the classroom experience as possible (1998).

### Recommendations

Milwaukee Area Technical College has already adopted a modified version of the On-line Student Survey that was created for this research. The survey is attached to each on-line course for the students to complete. The college's Content Coordinator monitors survey results and keeps teachers informed of student perceptions. An investigation now takes place comparing the completion rates for all Adult High School courses and they are strikingly similar. It is the perception of Adult High School's administrator that completion rates vary by instructor and not by delivery method though additional analysis in this area is needed to confirm such perceptions. On-line instructors should be encouraged to keep current in emerging technologies which will make on-line courses more interesting for students. Currently, MATC's office of Professional Development offers dozens of courses in current technologies, but often instructors only take them when in need of certification credit. In addition to formal course work, instructors should



be encouraged to attend seminars and conferences regarding distance education issues, again, in an effort to keep current in course content and delivery technologies.

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## Appendix

# ON-LINE STUDENT SURVEY

Thank you for taking a few minutes to fill out this survey. Your answers will be used for research purposes and to improve the quality of MATC's Adult High School's On-line Diploma Program. Please read the directions and answer each item.

I am: \_\_\_\_\_ male \_\_\_\_\_ female

I am: \_\_\_\_\_ 16-18 years old  
 \_\_\_\_\_ 19-21 years old  
 \_\_\_\_\_ 22-25 years old  
 \_\_\_\_\_ 26 or older

I work: \_\_\_\_\_ 10-20 hours a week  
 \_\_\_\_\_ 21-30 hours a week  
 \_\_\_\_\_ 31-40 hours a week  
 \_\_\_\_\_ 41 hours or more a week  
 \_\_\_\_\_ I do not work

I am a: \_\_\_\_\_ Freshman  
 \_\_\_\_\_ Sophomore  
 \_\_\_\_\_ Junior  
 \_\_\_\_\_ Senior

For each of the following questions circle **1** if you **STRONGLY DISAGREE**, **2** if you **SOMEWHAT DISAGREE**, **3** if you are **NEUTRAL**, **4** if you **SOMEWHAT AGREE** or **5** if you **STRONGLY AGREE**.

Strongly Disagree..... Strongly Agree

- |     |  |   |   |   |   |   |
|-----|--|---|---|---|---|---|
| 1.  | I would like to take another internet course.....                | 1 | 2 | 3 | 4 | 5 |
| 2.  | Internet courses are as much work as regular courses.....        | 1 | 2 | 3 | 4 | 5 |
| 3.  | I am more successful when a teacher is present.....              | 1 | 2 | 3 | 4 | 5 |
| 4.  | I need deadlines to be successful in my schoolwork.....          | 1 | 2 | 3 | 4 | 5 |
| 5.  | Internet courses are harder than I thought.....                  | 1 | 2 | 3 | 4 | 5 |
| 6.  | Someone needs to push me for me to be successful.....            | 1 | 2 | 3 | 4 | 5 |
| 7.  | I can manage my own time constructively.....                     | 1 | 2 | 3 | 4 | 5 |
| 8.  | I am self-disciplined.....                                       | 1 | 2 | 3 | 4 | 5 |
| 9.  | I have enough time for school, work and a social life.....       | 1 | 2 | 3 | 4 | 5 |
| 10. | Internet courses are easier than regular classes.....            | 1 | 2 | 3 | 4 | 5 |
| 11. | I work better when I am left alone.....                          | 1 | 2 | 3 | 4 | 5 |
| 12. | I prefer the interaction of a regular classroom.....             | 1 | 2 | 3 | 4 | 5 |
| 13. | Studying on-line is boring.....                                  | 1 | 2 | 3 | 4 | 5 |
| 14. | On-line courses are interesting and stimulating.....             | 1 | 2 | 3 | 4 | 5 |
| 15. | I would prefer to take "regular" classes.....                    | 1 | 2 | 3 | 4 | 5 |
| 16. | I just have too much to do to be a successful student.....       | 1 | 2 | 3 | 4 | 5 |
| 17. | It was someone else's idea for me to take an on-line course..... | 1 | 2 | 3 | 4 | 5 |
| 18. | I prefer not to take on-line courses.....                        | 1 | 2 | 3 | 4 | 5 |

## AHS Totals

### Adult High School Raw Demographics

<b>Number of Males</b>	<b>16-18</b>	<b>10-20 Hours</b>	<b>Complete Prior Online Class</b>	<b>Freshman</b>
30	39	10	<b>Yes</b>	30
<b>Number of Females</b>	<b>19-21</b>	<b>20-30</b>	<b>No</b>	<b>Sophomore</b>
65	21	9	38	41
	<b>22-25</b>	<b>30-40</b>	58	<b>Junior</b>
<b>Total Students</b>	22	19		4
95	<b>Over 25</b>	<b>Over 40</b>		<b>Senior</b>
	14	51		17
		<b>Don't Work</b>		
		6		

### Adult High School Survey Totals

#### Population Data

#### Survey Data

<b>Percent Female</b>	68.42%	<b>Like to take another Course</b>	1.31
<b>Percent Male</b>	31.58%	<b>Internet as much work</b>	1.81
<b>Ave Age</b>	21.04	<b>More success teacher present</b>	4.39
<b>Ave Work Hours</b>	34.61	<b>I need deadlines</b>	4.46
<b>Complete Class</b>	39.58%	<b>Internet courses harder</b>	2.96
<b>Ave Grade Level</b>	10.09	<b>Someone needs to push me</b>	3.33
		<b>I can manage time</b>	3.34
		<b>I am self-disciplined</b>	2.03
		<b>I have enough time for</b>	3.95
		<b>Internet Courses easier</b>	4.01
		<b>I work better alone</b>	2.99
		<b>I prefer regular classroom</b>	2.21
		<b>Studing on-line boring</b>	3.70
		<b>On-line interesting/stimulating</b>	2.71
		<b>I prefer to take regular class</b>	2.54
		<b>I have too much to do</b>	3.85
		<b>Someone else's idea to take</b>	2.62
		<b>Prefer not to take on-line</b>	2.08