An Analysis of Adapting a Fire Science Course for Blended On-line Delivery

By

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ABSTRACT

The intent of this study was to analyze the process for developing on-line classes for the Fire Science Program at Milwaukee Area Technical College (MATC). The introduction of the Internet into educational institutions has created a new pool of opportunity for institutions, teachers and students. Currently MATC has over 200 different on-line courses, yet none are located in the Fire Science Program. As a result of this study, it is anticipated that more courses will be offered to Fire Science students. This will open new opportunities for MATC and its students.

Research objective one was to identify the current curriculum for the Fire Science Program in Fire Investigations. Analysis showed that the course is organized in a very traditional format that includes an 18-week schedule of lecture based classes with accompanying readings, assignments and tests.

The second research objective was to create a new syllabus, including a blended portion, using the Blackboard delivery system. This included identifying content that could be readily adapted to on-line delivery, as well as modifying the schedule of classes to incorporate on-line activities.

The third research objective was to develop the curriculum for the blended portion of the Fire Investigation course in Blackboard. There were four lesson plans developed in the Blackboard delivery system.

The results of this study provide a template that other instructors can use to develop on-line delivery for other courses in the Fire Science Program.

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Acknowledgments

The journey back to school to complete a Bachelor's degree was not on my "to do" list. That changed, and not for the standard monetary motivation, but for the idea that I could better myself and maybe those around me. My daughter Cassandra, who is now eight, may need the encouragement to know that even her father was able to attain this measure of education late in life. Now at age 45, a Master's Degree is an accomplishment that I could not have attained without the support and encouragement of others.

I would like to express my gratitude to my advisor, Dr. Michael Galloy, who was always accessible and willing to assist me. He has a profound understanding of the real world. His experience, support, honesty and knowledge were apparent throughout my years at UW-Stout. Without his assistance, this thesis could not have been completed.

My parents, Cashmire and Sandra Salbashian, taught me many things, but one of the most important lessons was taught by actions rather than traditional parent lectures. Their constant presence, support and encouragement taught me the importance of family, health, education and time. Their examples have made me a better person and father. This is the true overall measure of successfulness. This thesis and degree is dedicated to them. Thank you.

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Chapter One: Introduction

Introduction

The Internet has opened a new chapter in our lives. We now have the ability to post and acquire information on virtually any topic 24 hours a day. We can sell a house, buy a car, join chat rooms, discussion boards and even get a college degree on the Internet. This has opened up many new opportunities for universities and technical colleges, but it has also created some new challenges. Potential students are no longer bound to a school in their locale. They are now able to attend a class at a college that is hundreds, even thousands, of miles away without ever leaving the comfort of their own home.

Educational institutions must react to this new technology and use it in their favor. The Wisconsin Technical College System (WTCS) is no exception. Milwaukee Area Technical College is one of 16 WTCS Fire Training facilities in the State of Wisconsin. All 16 colleges offer State of Wisconsin Fire Service Certification training programs and several also offer an associate degree in Fire Science. All 16 colleges also offer specialized courses that cover various areas or fundamentals of the Fire Service (WTCS, 2007).

MATC instructors have been working hard to convert their course offerings to computer-based learning. The rationale for this shift is that any physical campus has a finite capacity. Increasing that capacity is a very expensive and political process. In order to increase revenue the school can increase the tuition per credit (an unpopular decision), or increase the number of enrolled students using the same resources. More efficient use of resources is seen as the most viable alternative. In a digital environment more students can be served with these finite physical resources, thereby generating additional revenues.

Milwaukee Area Technical College (MATC) currently offers over 400 on-line (MATC, 2009) classes to students. Of these 400 classes, there are none in the Technical and Applied Science division (T&A). The major T&A program cluster is as follows:

- Protective Services
- Transportation
- Manufacturing
- Constructing, Drafting, and Design

The Fire Service Program consists of two full-time instructors and 28 part-time instructors. The program offers an associate degree, Wisconsin State Certification Courses and Specialized Training for firefighters.

Fire Protection Technician, Associate Degree

The Fire Science Associate Degree program constitutes a two-year 70-credit curriculum with 45 of those credits in technical studies. The current delivery approach uses traditional face-to-face classroom teaching methods. The technical classes in this program include:

FIRE 139 – Principles of Emergency Services
FIRE 142 – Firefighting Principles
FIRE 143 – Building Construction
FIRE147 – Fire Protection Systems
FIRE 156 – Strategies, Tactics and Management
EMS 144 – EMT Basics for Fire
FIRE 109 – Emergency and Disaster Planning
FIRE 151 – Fire Prevention
FIRE 152 – Hazardous Materials
FIRE 155 – Fire Protection Hydraulics
FIRE 114 – Employability Skills
FIRE 116 – Fire Department Management
FIRE 157 – Fire Investigation
(MATC 2008)

Upon completion of the two-year program, the student receives an associate degree as a Fire Protection Technician. The program teaches the student about the many aspects of a firefighter and prepares them for life in the firehouse. The fire service is a semi-military organization,

meaning that it is not quite military but operates on the military style command rank structure. The student must be able to adapt to that lifestyle. The list of classes above gives the student an understanding into many aspects of the fire service and continues that preparation with a traditional delivery method of education. The courses are delivered over a four-semester period using a logical progression of delivery (WTCS, 2009).

Wisconsin State Certification Courses

The Wisconsin State certification courses are not mandated by the state. Certification is a way individuals and firefighters can document proof that they have demonstrated a level of proficiency. This higher level of proficiency is established through a national consensus. The Wisconsin Technical College System has created a Fire Service Certification Program Policy and Procedures Manual to assist the student through the process of becoming Wisconsin State Certified. The courses are currently available through all 16 Wisconsin Technical College Districts (WTCS 2008). Currently these certification courses are only delivered face-to-face; none are completed 100% on-line. Students must satisfactorily complete the course requirements, which are based on the National Fire Protection Agency (NFPA) standards. The testing process of being certified consists of successfully completing a written and practical skills examination. Once completed, the Wisconsin Technical College System issues the student a certification number. These courses are:

Entry Level Firefighter, Parts 1 and 2
Fire fighter I
Hazardous Materials Operations Level
Fire Fighter II
Entry Level Driver/Operator-Pumper, Parts 1 and 2
Fire Apparatus Driver/Operator-Pumper, Parts 1 and 2
Entry Level Driver/Operator-Aerial
Fire Apparatus Driver/Operator-Aerial
Entry Level Fire Officer
Fire Officer Fire Officer I

Fire Officer Fire Officer II
Fire Inspector I Parts 1 and 2
Instructional Techniques for Company Officers
Fire Instructor I
(WTCS, 2009)

Specialized Courses

The instructors in the Fire Service Program provide courses that meet the needs of area fire departments and the community. The courses are either designed by our instructors or are an extension of the National Fire Academy (NFA) courses offered through MATC. Some of the specialized courses being offered at MATC are:

410 – Basic Live Fire Investigations
411 – Fire/Arson Detection
412 – Community Based Education Great Looks 1989
427 – Sprinkler Seminar
443 – Mastering Oral Interviews
454 – Firefighter Physical Agility Training I
455 – Firefighter Physical Agility Training II
485 – Flashover Principles
486 – Get Out Alive
495 – Flashover Simulator Training
499 – Fire Department In Service
(MATC, 2008)

Statement of the Problem

The Fire Service Department at Milwaukee Area Technical College is not utilizing the Internet as a teaching delivery method for any fire related courses.

Purpose of the Study

The purpose of this study is to adapt an existing course at Milwaukee Area Technical College, specifically in the Technical and Applied Science division, into the Fire Service Program.

Research Objectives

1. Identify the current curriculum for the Fire Science (3) credit course Fire Investigation.
2. Create a new syllabus, including a blended portion, using the Blackboard delivery system.
3. Develop the curriculum for the blended portion of the Fire Investigation course in Blackboard.

Assumptions of the Study

The assumptions of this study are:

- The administration is interested in implementing blended courses in the T&A division at MATC.
- The Fire Investigation course will remain a required course in the Fire Science Program at MATC.
- The course will meet on-line requirements set forth by MATC.

Definition of Terms

The following definitions relate to the terminology used to describe the many aspects required to encompass computer Internet based learning at MATC.

- Internet - An electronic communications network that connects computer networks and organizational computer facilities around the world (Merriam-Webster On-line Dictionary).
- On-Line - Connected to, served by, or available through a system and especially a computer or telecommunications system (as the Internet) <an *online* database>;

also: done while connected to such a system (Merriam-Webster On-line Dictionary).

- Blackboard - Web-based software that allows teachers and students to interact outside of the classroom.
- MATC - Milwaukee Area Technical College (MATC) is located in Milwaukee County, Wisconsin. MATC has four main campuses and many outreach centers.
- Fire Investigation - This is a three-credit course in the Fire Science Program at MATC.
- Fire Science Program - This is a listing of the technical courses to be completed to obtain a degree in Fire Science.
- Whiteboard - This is an interactive computer-based learning delivery system in the classroom.
- NFPA - National Fire Protection Agency is a nonprofit organization whose mission is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating scientifically based consensus codes and standards, research, training, and education.
- CAD – Computer Aided Design.

Chapter Two: Literature Review

Is there a need for MATC to offer the Fire Service courses using an Internet based instruction? This will require a look at current teaching methods, the history and mission of MATC, the Fire Service Department, and a brief history of the Internet. Further research will show if any other colleges are offering Internet based instruction for fire service courses.

History of MATC

In 1911 Wisconsin became the first state to pass continuation school legislation in the country, thanks to Charles McCarthy (Chapter 616, Laws of 1911). MATC was founded in 1912 and was designed to provide a vocational-technical education to 14 to 16 year old learners so they could secure a job. Wisconsin also became the first state to set up an apprenticeship agreement (Chapter 347, Laws of 1911). These regulations made it mandatory for employers to excuse 14 to 16 year old students for part-time classes (Chapter 505, Laws of 1911). In 1917 the Wisconsin legislature changed the name of the state Board of Industrial Education to the State Board of Vocational Education (Chapter 494, Laws of 1917). In 1959 MATC became the first two-year technical college in the United States to earn accreditation. In 1967 the state consolidated the Vocational, Technical and Adult Education (VTAE) system to 16 districts with local board of directors for each. Three of the districts (including MATC) were authorized to offer courses that would transfer to four-year colleges. In the early 1990's the VTAE system evolved into what is known today as the Wisconsin Technical College System. This helped change the view of technical education to a collegiate system. The WTCS is also required to work with the University of Wisconsin to further opportunities for learners to earn higher degrees (WTCS, 2009).

Teaching Methodology

MATC offers many options for the learner to choose and pursue that which will advance them successfully through their education, both short and long-term. There are pre-college education-type courses that offer students the ability to earn a high school diploma and prepare them for college. Students can go on to earn an associate degree, diploma or certification in many fields. If a bachelor's degree is desired, the student can transfer many of MATC's credits to hundreds of four-year colleges across the country. Currently there are over 360 program-to-program transfer agreements. MATC is actively involved in the community, offering many community-based courses directly relating to the needs of local employers. In the Milwaukee area, one in five people in the workforce received some type of education at MATC (MATC news story, 2009).

Because education is a dynamic environment, MATC has a methodology of instructional delivery that is designed to be flexible to meet the changing needs of the learner (MATC Mission, 2009).

Of the 200 degree, diploma, certificate and apprentice programs, the 57,000 students that attend MATC each year have choices for course delivery. Most of the courses at MATC utilize the traditional face-to-face delivery format. MATC currently offers five diplomas and six certificate programs utilizing 100 percent on-line delivery methods. This does not include the hundreds of additional on-line courses or blended courses that are available (MATC news story, 2009).

MATC instructors use a wide variety of teaching methods but they can be divided into three classifications. The most popular is the traditional face-to-face delivery method, the second would be a technology based delivery method and the third would be a blended course utilizing

both traditional and technology based delivery format. Currently 14% of the total enrollment is utilizing the on-line courses offered.

History of Internet Based Instruction

In 1957 the USSR launched Sputnik, the first artificial earth satellite. In response, the USA formed the Advanced Research Projects Agency (ARPA). The first paper on the packet-switching (PS) theory was written in 1961, called Information Flow in Large Communication Nets, by Leonard Kleinrock. In 1960 Paul Baran and Donald Davies invented Packet switching, independently. By the late 1960's the Internet was beginning to form as a way for the government to communicate in the case of a nuclear war. Lawrence Roberts, using the packet switching technology, created ARPANET (Abbate, 1999 p.8).

The 1970's proved to be a slow but steady growth period for ARPANET. Other countries found the new technology interesting and joined the network. Other networks were created including USENET, a network for Unix based systems. USENET was launched in 1979 as a way of connecting Duke University and the University of North Carolina (Grimes and Bolton 1997).

By 1980 there were over 200 computers on ARPANET and the government wanted a separate secure system, so they split it into two separate networks. This would soon lead to what is known as the Internet (MATC Master Plan, 1985). The Internet is made up of computers and computer services connected together all over the world. Wikipedia credits Tim Berner credited inventing the World Wide Web in 1990. He was the first person to successfully communicate between computers using an http client and server over the Internet (Wikipedia).

In 1980 MATC responded to the shift in economic conditions by offering "high technology" training. The system that was put in place was called Computer-Aided Design, or

CAD. The CAD system was used in a number of technical and industrial programs at MATC. In 1983 the CAD system was upgraded to include a Computer-Aided Manufacturing (CAM) component. This allowed for a manufacturing system to be developed using robotic control, a computer graphics laboratory, a computer-aided pharmacy technician program, computer typesetting, keyboarding, microprocessors and office machine deployment. MATC knew that the new technologies they had acquired would keep evolving and that they needed to stay on top of the high technology market. The increased demand for these high technology programs came from students and employers and required MATC to keep up with their needs by continually upgrading equipment and faculty (MATC Master Plan, 1985).

In 1988 MATC actively began to upgrade its technology and instructional technology by offering course delivery to include two-way video, compressed video, Instructional Television Fixed Services (ITFS), the Internet, on-line courses, the telephone system, personal computers and a high definition television tower for digital TV. All of this technology was supported by T1, 1.5-megabit, data transfer lines. MATC recognized the importance of distance learning and is embracing this continued challenge (MATC Master Plan, 1985).

Change

Today's business leaders are not interested in facts and basic abilities, but rather they are interested in a high level of work ethic, communication, critical thinking and the person who will hold themselves to a higher standard not just at work but all the time (Apple Inc., 2008).

Marguerita McVay Lynch (2002) identified three rules of web-based education. The first is to accept change and move out of what we are used to and what is currently accepted as the norm. The second is to plan your change, how will you change and to have a plan if things don't

work out the way you anticipated. The third rule is interactive communication with the instructor and the peers through different methods (p.3-4).

Curriculum has traditionally been limited to a few sources of textbooks or other learning materials. Future curricula should implore the idea that there are six major characteristics. This begins with the learner being able to communicate and be a productive part of a team. The second idea is to create a curriculum that is valid and appropriate. This curriculum must not be exercise based to fit a grade book, but it must be created to meet the challenges of the real world. The third requires the teacher to facilitate in a manner that uses real world tools and techniques. The learner has to be able to understand the real world application of the learned material and not just the answer written on a piece of paper. The fourth idea illustrates the need for the facilitator to utilize many different types of informational delivery methods. The delivery method must be relevant to each subject to better serve the learner. The fifth idea is to create a learning environment filled with rich authentic content. This aspect increases the learner's efficiency and utilizes more of a forward thinking experience in the lesson. The sixth idea is to connect the learner to the outside world. The facilitator must expand the course work out of the classroom. The idea is to get the learner involved with technology that will allow them to interact, not only with each other, but also with the community and beyond (Apple Inc., 2008).

Mission Statement

The mission statement of MATC is to provide a high quality program for the learner interested in a progressive education. MATC strives to encourage diversity, well-being and a good understanding of the many cultures within the community. These courses offer the necessary skills and competencies to meet the needs of general education and labor markets providing an increased productivity for individuals in the district (MATC Mission, 2009).

Chapter 3: Methodology

Chapters one and two of this study detailed the number of courses required for the Fire Science Associate Degree. Also described were the Wisconsin State Certification Courses and other specialized training courses for firefighters and other people interested in additional fire fighting competencies. Therein lies the problem; very few of these course are available through on-line delivery. Within the Fire Service Department at Milwaukee Area Technical College, only a few instructors are utilizing the Internet as a teaching delivery method. Therefore, the purpose of this study is to convert an existing face-to-face course into a blended Internet delivery format. This course can then serve as a model for additional on-line course development of Fire Science courses at Milwaukee Area Technical College.

There are many benefits and barriers to Internet based instruction. Some of the benefits include an on-line meeting place or communications center that would allow the learner to acquire all documents relating to the course, as well as a communication connection with the other learners (or facilitator) that has a better response time. The on-line delivery method also provides flexibility in access for learners who otherwise could not attend.

Some of the barriers might include technology that does not work, students who are not familiar with the Internet, or those who have very limited computer skills. Both students and instructors often experience an increased workload with on-line delivery. Many complain that the on-line interaction is not as good as face-to-face interaction, thus degrading the learning process. Additionally, students who struggle with self-motivation often find it difficult to pace their time for successful completion of on-line courses.

As stated earlier, MATC and other technical colleges are at the leading edge of on-line course delivery. Fire Science instructors need to understand the importance of using this methodology to prepare current and future firefighters for the state of Wisconsin.

Description

The purpose of this study is to convert an existing face-to-face course into a blended Internet delivery format. In order to achieve this, the following objectives will be met:

1. Identify the current curriculum for the Fire Science three-credit course, Fire Investigations.
2. Create a new syllabus that includes a blended portion.
3. Create the blended portion (five lessons) of the Fire Investigations course in Blackboard.

Accomplishment of these objectives will require a thorough review of literature related to current fire investigations. It will require training on the use of Blackboard as a delivery methodology. Following the training, course structure (syllabus) and course material development (on-line lesson planning) will be studied. The results of the literature review and Blackboard training will be a syllabus and accompanying materials, thus ensuring a successful blended Internet delivery of FIRE 157, Fire Investigations.

Data Collection

FIRE 157, Fire Investigations, is a three-credit course required for all Fire Science associate degree students. The curriculum currently being used will be reviewed and five lessons will be identified for development into Internet delivery. The remaining lessons will remain as traditional classroom lessons. The newest of Kirk's Fire Investigation, by John D., will be used as the course text. It will be reviewed to help determine which five lessons will be most adaptable to the Blackboard Internet delivery system. The transformation from a full face-to-face

course to a blended course will begin with the understanding that a blended course is both face-to-face and on-line.

A new syllabus will be created utilizing the new curriculum and text. The curriculum will be adjusted to accommodate required on-line days that will include a reading assignment, on-line discussion board, and a written or practical assignment or presentation. The new syllabus will be designed to create the flow and sequence required for a successful blended Internet delivery course.

MATC has a required format that they use for all on-line course development. MATC resources will be used to request and create a Blackboard shell for the on-line portion of the Fire Investigation course. All new curriculum materials will be entered into the Blackboard shell. All materials will be submitted for approval to the MATC Technical and Applied Science Dean.

Summary

The purpose of this study is to convert an existing face-to-face course into a blended Internet delivery format at Milwaukee Area Technical College, specifically in the Technical and Applied Science division of Fire Science. As a result of the review of literature about fire investigations, as well as a review of FIRE 157 Fire Investigations curriculum and training on Blackboard, a new blended course for FIRE 157 will be developed.

Chapter 4: Results

There are a number of courses required for the Fire Science Associate Degree, Wisconsin State Certification or other specialized training courses for firefighters. Within the Fire Service Department at Milwaukee Area Technical College, very few instructors utilize the Internet as a teaching delivery method. Therefore, the purpose of this study is to convert an existing face-to-face course into a blended Internet delivery format. This course can then serve as a model for additional on-line course development of Fire Science courses at Milwaukee Area Technical College.

Current Curriculum

The first research object was to identify the current curriculum for the Fire Science (3) credit course Fire Investigation. The original curriculum utilized a traditional face-to-face delivery method with no on-line assignments. The course was offered for three hours a day, one day a week, for 18 weeks. Every other semester the course is run in the evenings and only runs 16 weeks. The course subject matter is spaced evenly over the length of the semester with one week lost due to spring break or fall recess, respectively. The schedule used in this study is the 18-week spring semester.

The structure of the traditional face-to-face course curriculum was as follows:

- Week 1 - The first week of class consisted of a lecture on the Introduction to Arson. The reading assignment for week 2 is the chapter on Chemistry and Fire Behavior.
- Week 2 - Deliver a lecture on Chemistry and Fire Behavior. A worksheet was handed out covering fire terminology and directions on how to complete the semester long project. The reading assignment for week 3 is the chapter on Sources of Ignition.
- Week 3 - Deliver a lecture on Sources of Ignition. The assignment for week 4 is to read the chapter on Arson as a Crime.
- Week 4 - Deliver a lecture on Arson as a Crime. After the lecture, quiz one would be administered on paper. Next weeks class would meet in the cafeteria.

- Week 5 – Students are provided with a laptop computer and assigned various subjects to research on the Internet. This initiates the semester research project. The assignment for week 6 is to read the chapter on Electrical Fire Cause.

- Week 6 – Deliver a lecture on Electrical Fire Cause. The assignment for week 7 is to read the chapter on Structural Fire Cause.

- Week 7 - Deliver part 1 of the lecture on Structural Fire Cause.

- Week 8 - Deliver part 2 of the lecture on Structural Fire Investigations. Students are given a review for the midterm exam.

- Week 9 – Take the midterm exam. The assignment for week 10 is to read the chapter on Wildland Fires.

- Week 10 - Deliver the lecture on Wildland Fires. The assignment for week 11 is to read the chapter on Automobile Fires.

- Week 11 – Deliver a lecture on Investigating Automobile Fires. The assignment for week 12 is to read the chapter on Fire Deaths.

- Week 12 – Deliver a lecture on Fire Deaths. The assignment for week 13 is to read the chapter on Elements of Proof.

- Week 13 - Deliver a lecture on Elements of Proof. Remind students that semester projects are due in 2 weeks.

- Week 14 - Spring Break.

- Week 15 - Students present semester projects.

- Week 16 - Students present semester projects. Instructor presents a review for the final exam.

- Week 17 – Take the final exam.

- Week 18 - Last week of class. All make-up work is due. Instructor meets with any student requesting a one-on-one conference about final grade

Blended Syllabus

The second research object was to create a new syllabus, including a blended portion using the Blackboard delivery system. The current fire investigation text, *Kirks Fire Investigation, 6th Edition*, notes, reference materials and other instructional materials from the current course were gathered and reviewed. Course schedule and structure was reviewed and aligned with Milwaukee Area Technical College's semester schedule. The course meets for three hours every Wednesday, for 18 weeks. Because the Associate Degree students at MATC may not be familiar with on-line courses, it was decided to wait until the fourth week to begin using the on-line format. This would allow plenty of time to set the stage and prepare students to use the on-line format. The instructor will teach various components of the Blackboard on-line delivery system, leading up to the first, complete, on-line lesson plan. Due to the fact that computers have become commonplace in homes and schools nationwide, waiting until the fourth week to use the on-line delivery format will eventually not be needed because incoming students will be more computer savvy.

- Week 1 - Begin with introductions and expectations and walk students through the syllabus and Blackboard. Let them practice in the chat boards and make sure they know how to navigate through the tabs. Deliver a 1.5-hour lecture on Introduction to Arson. The assignment for week 2 consists of reading Chapter 3, pages 23-54, Fire Behavior.
- Week 2 - Deliver a 2.5-hour lecture on Chapter 3, Fire Behavior. The assignment for week 3 is to read Chapter 4, Combustion Properties of Liquid and Gaseous Fuels and Chapter 5, Combustion Properties of Solid Fuels. There will be an on-line study guide available for quiz 1 located in the "study guide" tab.
- Week 3 - Deliver a 1.5-hour lecture on Chapter 4, pages 65-83, Combustion Properties of Liquid and Gaseous Fuels and Chapter 5, pages 102-116, Combustion Properties of Solid Fuels. After the lecture students will sign on to Blackboard, select the quiz tab, enter the password provided in class and take quiz 1. The assignment for week 4 will be to read Chapter 10, Electrical Fires.
- Week 4 - On-line Blackboard assignment 1. The reading assignment listed in week 3 is directly related to the on-line assignment for this week. The on-line assignment will be

posted in Blackboard the Sunday prior to class. The student will select the assignments tab and then choose "Blackboard assignment 1." There will be a pdf document that must be downloaded. This document will instruct the student on how to complete Blackboard assignment 1. The reading assignment for week 5 is Chapter 9, Automobile Fires. There will be an on-line study guide available for quiz 2 located in the "study guide" tab.

- Week 5 - Deliver a 1.5-hour lecture on Chapter 9, Automobile Fires. After the lecture students will sign on to Blackboard, select the quiz tab, enter the password provided in class and take quiz 2. A midterm review will be given for the up-coming midterm exam on week 7. The assignment for week 6 will be to read Chapter 6, Sources of Ignition.

- Week 6 - On-line blackboard assignment 2. The reading assignment listed in week 5 is directly related to the on-line assignment for this week. The on-line assignment will be posted in Blackboard the Sunday prior to class. The student will select the assignments tab and then choose "Blackboard assignment 2." There will be a pdf document that must be downloaded. This document will instruct the student on how to complete Blackboard assignment 2. The reading assignment for week 7 is Chapter 7, Structural Fire Investigation, pages 197-228.

- Week 7 - The midterm exam will be administered, and then a lecture on Chapter 7, Structural Fire Investigation, pages 197-228. The assignment for week 8 will be to read Chapter 7, pages 228-291, Structural Fire Investigation. There will be an on-line study guide available for quiz 3 located in the "study guide" tab.

- Week 8 - Deliver a 1.5-hour lecture on Chapter 7, Structural Fire Investigation, pages 228-291. After the lecture students will sign on to Blackboard, select the quiz tab, enter the password provided in class and take quiz 3 on Sources of Ignition and Structure Fires. The assignment for week 9 will be to read Chapter 7, Documenting the Fire Scene, pages 293-305, and appendix D in the back of the text.

- Week 9 - On-line Blackboard assignment 3. The reading assignment listed in week 8 is directly related to the on-line assignment for this week. The on-line assignment will be posted in Blackboard the Sunday prior to class. The student will select the assignments tab and then choose "Blackboard assignment 3." There will be a pdf document that must be downloaded. This document will instruct the student on how to complete Blackboard assignment 3. The reading assignment for week 10 is Chapter 16, Arson as a Crime.

- Week 10 - Deliver a 2-hour lecture on Arson as a Crime. The reading assignment for week 11 will be to read Appendix F, Sketching Fire Scenes, and to sign into Blackboard and select the "activity tab." There will be a pdf document that will explain what the activity for week 11 is and what materials they will need to bring to class. The activity will be sketching a fire scene. There will be an on-line study guide available for quiz 4 located in the "study guide" tab.

- Week 11 - The class will begin with the students signing on to Blackboard and selecting the quiz tab, entering the password provided in class and taking quiz 4, Arson as a Crime, Documentation and Evidence. After the quiz the students will be directed to three

different types of fire scene sketches, which they read about after week 10. Each of the three sketches will be completed on 18 x 24 inch sketching paper. The lab assignment is due next week and students must be prepared for the hands-on incendiary device recognition lab in week 12.

- Week 12 - Students will meet in the apparatus bay for roll call and then head out to the burn tower to present their semester project for ignition sources. All projects will be ignited, studied and documented. The reading assignment for week 14 will be Chapter 17, Elements of Proof, pages 648-655; Sources of Information, page 655; Spoilation, page 667; Chain of Evidence, page 660 and Report Writing, pages 661-662.

- Week 13 - No class, spring break.

- Week 14 - On-line Blackboard assignment 4. The reading assignment listed in week 12 is directly related to the on-line assignment for this week. The on-line assignment will be posted in Blackboard the Sunday prior to class. The student will select the assignments tab and then choose "Blackboard assignment 4." There will be a pdf document that must be downloaded. This document will instruct the student how to complete Blackboard assignment 4. There will be an on-line study guide available for quiz 5 located in the "study guide" tab.

- Week 15 - Class will begin with a quiz on Elements of Proof, Sources of Information, Spoilation, Chain of Evidence and Report Writing. After the quiz the instructor will discuss all the topics studied this semester and how they fit together.

- Week 16 - This day will be used as a review for the final exam. Different methods will be applied such as a direct review of information, question and answer period and jeopardy games.

- Week 17 - The final exam will be administered and after it is completed students will fill out an evaluation form on the course and instructor.

- Week 18 - Make-up and voluntary one-on-one conferences.

Blackboard Lesson

The third research objective was to develop the curriculum for the blended portion of the Fire Investigation course in Blackboard. There were four lesson plans developed in the Blackboard delivery system. They are provided below.

Week 4 lesson plan, On-line assignment 1

Assignment 1, Week 1, Parts 1, 2 and 3

You should have completed the assigned reading of Chapter 10, Electrical Causes of Fire. Late or partially completed work will not be accepted, and no partial credit will be awarded. If all parts of this assignment are not completed you will be recorded as absent for the on-line day and receive a "0" as an assignment grade. Remember all assignments must be completed to pass this course. Read the directions closely and email me if you have questions, or use the chat area in the discussion tab to post questions with your classmates or myself.

Part 1

In the discussion board tab, post a question you have that was unanswered or not clear in the reading or a comment relating to the reading. Your discussion question should force the class to think and require more than a yes or no answer. **Do not post a question that has already been posted.** If you do it will be removed by the instructor without notice. Postings are due by Saturday, February 28, 2009, at 12:00 midnight.

Read all other postings and type a 100-word minimum ***researched*** reply to 5 topics you found to be of interest to you. Your reply is not about what you think or what you believe; it is about facts. You may include your opinions after the 100-word minimum has been attained. This will require you to utilize the information in your text or other sources, monitor your original posting and reply to any comments or questions directed to you. Each posting is limited to the first three replies. In other words, only three people may reply to each posting. Your replies must be well written. This is due Wednesday, March 4, 2009, at 1:00 p.m.

The instructor will monitor the posting and reply statistics.

Part 2

Using your fire investigation class manual or other resources, write a minimum one-page paper addressing the topic listed by your name below. The paper must be written in MS Word, Apple Pages or Appleworks programs using the 12 pt. Times font, double-spaced. On page two of your paper you will list your references used. This assignment will be uploaded to the Electrical Fires safe assignment tab in the assignments button on the main page. (If you have questions email me ASAP or post a question in the chat area to your peers). This assignment is due Wednesday, March 4, 2009, at 1:00 p.m.

These assignments are checked for plagiarism, so make sure you are submitting your own words.

Student Name -**Electrical Fire Statistics**
Student Name - **Static Electricity and Arcs and Sparks**
Student Name -**Alternating, Direct Current**
Student Name - **Electrical Appliances as Ignition Sources**
Student Name - **Overheating by Excessive Current**
Student Name - **Electric Motors**
Student Name - **Fixed Heaters and Heat Tape**
Student Name - **Ignition by Electrical Means**

Student Name - **Conductors and Insulators**
Student Name - **Electrical Incendiary Devices**
Student Name - **Accidental Electrical Fires**
Student Name - **Ground Fault Interrupter**
Student Name - **Over Current Devices and Fire Investigation**
Student Name - **Identify and explain some postfire indicators for possible cause**
Student Name - **Explain the three factors to determine resistance of a conductor**
Student Name - **Aluminum Wiring**
Student Name - **Overheating by Poor Connection**
Student Name - **Breakers and Fuses**
Student Name - **Determine which electrical appliances deserve special attention because of a higher possible contribution to fire causation.**

Part 3

Electrical appliances have been the center of controversy in the fire investigation community. Spend some time on this site getting familiar with it. Search the U.S. Consumer Product Safety Commission site and choose any product that has been recalled due to electrical fire threat. Post your findings with a minimum 50-word explanation and a link to your topic in the discussion board under Electrical Recalls (www.cpsc.gov). This assignment is due Wednesday, March 4, 2009, at 1:00 p.m.

Week 6 lesson plan, On-line assignment 2

Assignment 2, Week 6

You should have completed the assigned reading of Chapter 6, Sources of Ignition. Late or partially completed work will not be accepted, no partial credit will be awarded. If all parts of this assignment are not completed you will be recorded as absent for the on-line day and receive a "0" as an assignment grade. Remember all assignments must be completed to pass this course. Read the directions closely and email me if you have questions or use the chat area in the discussion tab to post questions with your classmates or myself.

Part 1

In the discussion board tab, post a question you have that was unanswered or not clear in the reading or a comment relating to the reading. Your discussion question should force the class to think and require more than a yes or no answer. **Do not post a question that has already been posted.** If you do it will be removed by the instructor without notice. Postings are due by Saturday, February 28, 2009, at 12:00 midnight. Make it easy on your classmates and post early.

Read all other postings and type a100-word minimum ***researched*** reply to five topics you found to be of interest to you. Your reply is not about what you think or what you believe; it is about facts. You may include your opinions after the 100-word minimum has been attained. This will require you to utilize the information in your text or other sources, monitor your original posting and reply to any comments or questions directed to you. Each posting is limited to the first three replies. In other words, only three people may reply to each posting. Your replies must be well written. This is due Wednesday, March 4, 2009, at 1:00 p.m. Make it easy on your classmates and post early.

The instructor will monitor the posting and reply statistics.

Part 2

Choose an igniter from the list below or email me your idea. Post your choice in the discussion board under "My Ignition Choice." Only three people per topic, so the first three posted will be assigned their request. Because you will use the source of ignition you choose all semester you need to understand it well. There is a lot to understand on each igniter: matches, lighters, candles, sparks/arcs, hot objects/hot surfaces, friction, radiant heat or chemical reaction, lightning, electrical appliances designed to create heat, electrical appliances not designed to create heat and cigarettes.

Create a PowerPoint or Apple Keynote presentation identifying your chosen source of ignition. Your presentation should last between three and five minutes. If possible, include photos or video clips. Burn it to a DVD, VHS, or flash drive and bring it to class on Wednesday, March 4, 2009, at 1:00 p.m., where you will present it to the class. Keep a copy for yourself; you will be using it with future assignments.

Criteria for Evaluation

Late or partially completed work will not be accepted, and no partial credit will be awarded. If all parts of this assignment are not completed you will be recorded as absent for the on-line day and receive a "0" for the assignment. Make sure you meet minimum requirements for each part of the assignment. Following directions and completing tasks are pivotal components of the fire service. If the directions are difficult to understand don't hesitate to ask questions.

Week 9 lesson plan, On-line assignment 3

Assignment 3, Week 9

You should have completed the assigned reading of Documenting the Fire Scene, pages 293-305; Chapter 17, Collection of Evidence, page 299 and Appendix D. Late or partially completed work will not be accepted; no partial credit will be awarded. If all parts of this assignment are not completed you will be recorded as absent for the on-line day and receive a "0" as an assignment grade. Remember, all assignments must be completed to pass this course. Read the directions closely and email me if you have questions or use the chat area in the discussion tab to post question with your classmates.

Part 1

In the discussion board tab, post a question you have that was unanswered or not clear in the reading or a comment relating to the reading. Your discussion question should force the class to think and require more than a yes or no answer. Do not post a question that has already been posted. **If you do it will be removed by the instructor without notice. Postings are due by Saturday, March 21, 2009, at 12:00 midnight. Make it easy on your classmates and post early.**

Read all other postings and type a100-word minimum ***researched*** reply to five topics you found to be of interest to you. Your reply is not about what you think or what you believe; it is about facts. You may include your opinions after the 100-word minimum has been attained. This will require you to utilize the information in your text or other sources, monitor your original posting and reply to any comments or questions directed to you. Each posting is limited to the first three replies. In other words, only three people may reply to each posting. Your replies must be well written. Replies are due Wednesday, March 25, 2009, at 1:00 p.m.

The instructor will monitor the posting and reply statistics.

Part 2

Select an item to use as physical evidence of an incendiary fire from the list on pages 300 and 301. Your evidence should, in some way, be related to the source of ignition you chose in assignment 2. Place the item in a room in your house if it is not already in your house. Following what you have learned in Chapter 7, Structural Fires and Their Investigation, photograph the evidence and scene as noted in your text. Then properly collect the evidence and secure it in the **correct** container as listed on pages 242 and 243. Properly mark all collected evidence. This means each piece of evidence needs to be sealed and marked with an evidence tag. You may need to do some further research on this subject. Next, create and complete a chain of custody, access control log, evidence log and photo log forms from the appendix. You may copy the forms or create your own. If someone scans them and posts them in the chat area you may download them and use them. Bring this assignment, including all collected and properly packaged evidence, to class on Wednesday, March 25, 2009, at 1:00 p.m. It is due when class starts. You will be presenting all your work to the class. Do not forget to do any part of this assignment.

Criteria for Evaluation

Late or partially completed work will not be accepted; no partial credit will be awarded. If all parts of this assignment are not completed you will be recorded as absent for the on-line day and receive a "0" for the assignment.

- The 100-word reply is a minimum per question.
- Photographs must be accurate and included.

- A properly collected piece of evidence placed in the proper container and properly marked. All forms created and properly completed. *Content must be accurate.* Following directions is a pivotal part of the fire service. If the directions are difficult to understand don't hesitate to ask questions.

Do not use guns or any type of weapon as evidence. Never bring any type of weapon or flammable liquids to school. Simulate flammable liquids with water.

Week 14 Lesson Plan 4

Assignment 4, Week 14

You should have completed the assigned reading of Chapter 17, Elements of Proof, pages 648-655; Chain of Evidence, page 660; Report Writing, pages 661-662; Sources of Information, page 655 and Spoilation, page 667. Late or partially completed work will not be accepted, no partial credit will be awarded. If all parts of this assignment are not completed you will be recorded as absent for the on-line day and receive a "0" as an assignment grade. Remember, all assignments must be completed to pass this course. Read the directions closely and email me if you have questions or use the chat area in the discussion tab to post questions with your classmates.

Part 1

In the discussion board tab, post a question you have that was unanswered or not clear in the reading or a comment relating to the reading. Your discussion question should force the class to think and require more than a yes or no answer. **Do not post a question that has already been posted.** If you do it will be removed by the instructor without notice. Postings are due by Saturday, April 25, 2009, at 12:00 midnight.

Read all other postings and type a100-word minimum ***researched*** reply to five topics you found to be of interest to you. Your reply is not about what you think or what you believe; it is about facts. You may include your opinions after the 100-word minimum has been attained. This will require you to utilize the information in your text or other sources, monitor your original posting and reply to any comments or questions directed to you. Each posting is limited to the first three replies. In other words, only three people may reply to each posting. Your replies must be well written. Replies are due Wednesday, April 29, 2009, at 1:00 p.m.

The instructor will monitor the posting and reply statistics.

Part 2

This assignment consists of two parts, which will require research from other sources as well as your text. You must complete both parts.

This assignment will be completed in MS Word or Apple pages. When completed upload it to the Wisconsin search and seizure tab in the assignment folder. This assignment will be checked for plagiarism. This portion of the assignment is due Wednesday, April 29, 2009, at 1:00 p.m.

Research and explain the Wisconsin search and seizure law as pertaining to fire scenes. Your paper must have more than one paragraph. Word process using 12 point font. Include your references on the last page. Upload to the Wisconsin search and seizure tab and label it **"your name."**

You need to bring this part of the assignment to class. It is due Wednesday, April 29, 2009, at 1:00 p.m. Prepare a fire report based on the evidence you collected from your house in assignment 3. The only difference is you must now implement the fire to your scenario. Make sure you document all steps needed for your particular fire scene. Follow the examples in your text including the appendix. You may use an existing form from any other source as long as you make sure your report fully reflects your fire scene. Make sure you report is complete with al facts and figures. You will be graded on thoroughness.

Criteria for Evaluation

Late or partially completed work will not be accepted; no partial credit will be awarded. If all parts of this assignment are not completed you will be recorded as absent for the on-line day and receive a "0" for the assignment. The 100-word reply is a minimum per question. Papers in part 2 must meet required minimums and match content. References must be included. Points are subtracted for inaccuracies. Following directions is a pivotal part of the fire service. If the directions are difficult to understand don't hesitate to ask questions.

Chapter Five: Summary and Conclusions

This chapter includes discussion on the results reported in Chapter Four. It will provide a summary of the findings, as well as conclusions based on the findings. Additionally, recommendations will be presented based on the research, along with some suggestions for future research opportunities.

Discussion

Milwaukee Area Technical College is one of the 16 Wisconsin Technical College System districts that offer approved fire service training. Fire Service training consists of certification training programs and testing, as well as an associate degree in Fire Science. Additionally, MATC also offers specialized courses that cover various areas or fundamentals of the Fire Service, such as hazardous materials and community-based training.

MATC instructors have been working hard to convert their course offerings to computer-based learning. The rationale for this shift is that any physical campus has a finite capacity. Increasing that capacity is a very expensive and political process. In order to increase revenue the school can either increase the tuition per credit (an unpopular decision), or increase the number of enrolled students using the same resources. More efficient use of resources is seen as the most viable alternative. In a digital environment more students can be served with these finite physical resources, which then generates additional revenues.

Purpose of the Study

The purpose of this study was to adapt an existing course at Milwaukee Area Technical College, specifically in the Technical and Applied Science division in the Fire Service program. The research objectives for this study are:

- Identify the current curriculum for the Fire Science (3) credit course Fire Investigation.

- Create a new syllabus including a blended portion using the Blackboard delivery system.
- Develop the curriculum for the blended portion of the Fire Investigation course in Blackboard.

The review of literature in Chapter Two presented information and research about on-line course offerings and MATC's evolving role in providing distance and digital educational opportunities for its students. It concluded with a review of MATC guidelines for developing on-line materials.

Research Objective Number One

Research objective number one sought to identify the current curriculum for the Fire Science (3) credit course Fire Investigation. The research found that an 18-week course structure that met every Wednesday from 1:00 p.m. to 3:55 p.m. worked effectively for many learners. It effectively uses time, space and content in order to meet the educational needs of Fire Science students. There is adequate time to complete the assignments and other course requirements.

However, it has been an on-going issue to keep students on task as it relates to the reading assignments. This may be related to this type of student environment, but it seems to be most likely a combination of the length of the reading assignments and comprehension of the learner. The required text, Kirks Fire Investigation, 6th edition, can be considered a little advanced at times and some students have a hard time understanding some of the verbiage. If the student is struggling to comprehend what they are reading they tend to quit because of frustration. One way to correct this would be to separate advanced material from basic material in the reading assignments. The instructors in the Fire Science program are all experienced instructors who can use personal experiences to help clarify more complex concepts. Besides making the material understandable, personal stories also engage the learners' imagination.

These personal accounts of real world situations will help keep students more engaged in the materials, which should lead to greater understanding.

Research Objective Number Two

Research objective number two was to create a new syllabus, including a blended portion, using the Blackboard delivery system. Creating the syllabus needs to start with the instructor understanding the need for it. The syllabus must be considered a very important part of the course. It is more than just a timeline or a schedule of events. The old, existing, face-to-face course cannot be utilized without modification.

The first section of the syllabus for this Fire Investigation course will contain the course name, meeting dates, times and instructor information. The second section will consist of a short description of what demographic the course is aimed at and what topics will be covered. This section will also discuss the type of delivery method. For the purpose of this study the course will have four on-line days of instruction, thereby classifying it as a blended format. The on-line days will be spaced in a manner that spreads them out over the semester, but most of all makes sense and works well with the traditional portion of the course. The instructor must decide what assignments are appropriate, along with evaluations of the student, the course and the instructor. The third section will cover the course core abilities. This course will include core ability categories in effective communication, collaboration with others, diversity, responsibility, critical thinking, technology and applying math and science. The fourth section will cover the grade percentages and schedule. The fifth section will discuss attendance requirements, teaching methods and learner expectations. This section will also explain the on-line portion of the course, all quizzes, exams and special accommodations. The last section of the syllabus will consist of the actual dated timetable of all scheduled activities for the entire semester. Some of the biggest

challenges are getting the students to read and comprehend the expectations of the course. The syllabus should be read to the students in its entirety, while asking questions along the way. Students should also have to sign some type of syllabus card stating the instructor has read and explained the syllabus and that they understand what is expected of them, because at the end of the semester when grades are near completion there is always the student that will say you never told them or you did not make it clear.

Research Objective Number Three

Research objective number three sought to develop the curriculum for the blended portion of the Fire Investigation course in Blackboard. Creating lesson plans for Blackboard begins with the instructor becoming familiar with the on-line blackboard application. MATC continually runs various workshops that train people to use Blackboard. There is also a Blackboard help desk that can respond to specific questions. Another good resource available is the Blackboard manual. The manual provides detailed information about creating and managing courses.

The following steps are suggested for creating the blackboard portion of a course:

- The first step is to create the content area. This includes uploading any course documents, syllabus, assignments, study guides, podcasts and lecture notes that the students should be able to access.
- The next step is to create the course tools section. This includes the announcement page. The announcement page is the set default that the students first see when they open the Blackboard system, but can be modified to any page. This section will also contain the discussion board, collaboration area and instructor or staff information. There is also a safe assignment upload folder that checks papers for plagiarism.

- The next step is to create the assessment section. This section is where tests and other assessments are created, stored and exported to the text manager. The grade book is also in this section. Once created, the test will wait for deployment to the students test folder on a pre set date and time. This section also contains all course track statistics for monitoring student participation.

Another useful tool in Blackboard is the podcast. If students are having trouble keeping up with in-class readings, lectures and discussions the podcast can be a very useful tool. It offers the option of listening to a video or audio recording of the in-class activity. Using the podcast, the instructor can record lectures or other class materials more thoroughly. For example, because firefighting terminology can be difficult to understand, the podcast allows the instructor to explain things using layman's terms. Personal experiences, also known as "war stories," can also be used to help students relate real world experiences to concepts from text materials. All the instructors at MATC are either present or retired firefighters with a lot of experiences to share. Once the podcasts are uploaded into Blackboard the student can access the lecture as often as needed to assist them in understanding. Because of the easy-to-use digital format, the student can interact with the material in the way that works best for them.

Recommendations for Further Research

This research effort reviewed on a small aspect of the online teaching and learning environment within a very specific application. The digital, online learning movement provides many opportunities for additional research. Providing on-line courses has been available to students on a growing scale for about a decade. There needs to be continuing research to assess the effectiveness of the learning experience. It should include perspectives from both students and instructors. Additionally, institutions that use digital delivery systems should assess the services and support that is required to make online learning effective.

Additional research could also include the economics of online education. It could include an analysis of the efficiency of using the digital environment as weighed against the perceived quality of the learning experience.

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