Fall 8-2010

# Exploring the Use of Video-Teleconferencing for On-Duty Training in the St. Charles Fire Department and St. Louis Metropolitan Emergency Response Community

Robb F. Watkins
*Lindenwood University*

# Exploring the Use of Video-Teleconferencing for On-Duty Training in the St. Charles Fire Department and St. Louis Metropolitan Emergency Response Community

by

Robb F. Watkins

A Dissertation submitted to the Education Faculty of Lindenwood University

in partial fulfillment of the requirements for the

degree of

Doctor of Education

School of Education

Exploring the Use of Video-Teleconferencing for On-Duty Training in the St. Charles Fire Department and St. Louis Metropolitan Emergency Response Community

by

Robb F. Watkins

This dissertation has been approved as partial fulfillment of the requirements for the degree of

Doctor of Education

at Lindenwood University by the School of Education

Cynthia Bice — 8-9-10

Dr. Cynthia Bice, Dissertation, Co-Chair — Date

Owen van den Berg — 8/9/10

Dr. Owen van den Berg Dissertation, Co-Chair — Date

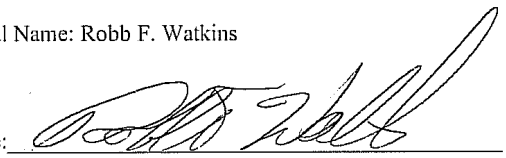
Graham M Wier — 8/9/10

Dr. Graham Wier, Committee Member — Date

Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

Full Legal Name: Robb F. Watkins

Signature:  Date: 8/9/2010

Acknowledgements

I want to dedicate this paper to my family for their never ending support of my educational efforts. To my wife Cherity, for putting up with all those years of me being gone for class, for being my editor and for your support. To my children Jordyn and Evan, who have so patiently dealt with my absences while I pursued my education. I love you all and thank you for your support.

I also need to thank my employer, the St. Charles Fire Department and the IAFF Local 757 membership of the St. Charles Fire Department. The mission Statement of the St. Charles Fire Department is:

*Service without Boundaries*

*Compassion and Integrity in all we do*

*Courage to move forward*

It is this mission statement and the support of Fire Chief Ernie Rhodes, the Administrative staff of the St. Charles Fire Department and International Association of Fire Fighters (IAFF) Local 757 that made this study possible. I would like to thank them for their patience and guidance during the study and research of this project. Thank you for having the courage to believe in me and in taking a chance to solve organizational training and communication issues.

I would also like to thank Rob Wolfe of E-Sponder, in O'Fallon, Missouri for his guidance e and encouragement during this project. Without Rob's technical guidance we would still be looking for a solution.

## Abstract

This study was conducted because the St. Charles Fire Department needed to identify a way to change its training delivery system to accommodate training in quarters for on-duty companies. St. Charles was experiencing: budget reductions, staffing shortages, delayed responses due to training, and increasing response times. The department identified video teleconferencing (VTC) as a possible solution to their training delivery dilemma.

This study was a qualitative study including surveys and interviews that evaluated the VTC implementation process. The research question was, "How can fire department training be constructed to enhance the frequency and adequacy of training and reduce the need for companies to be out of district?"

Internal and industry reconnaissance showed that personnel valued response times, the time that elapses between the 911 call for assistance and the arrival of assistance, enough to make changes to their training delivery systems. Local training officers reported shortages in staffing, training support staff, budgets and a lack of organizational support for training. National practitioners in VTC reported similar issues in their organization prior to the implementation of VTC.

The literature review, national training officer interview and private sector interviews assisted in building a Best Practices model for emergency training delivery. I implemented this model at the St. Charles Fire Department and recorded the process through field notes, and personal reflections. I concluded by evaluating what worked, what did not work, and what I would do differently next time.

The study research revealed that nationwide the fire service was experiencing the same delayed response issues. The VTC solution chosen by the St. Charles Fire Department was able to address many of the issues caused by traditional training models. Changing the training model to utilize VTC allowed the St. Charles Fire Department to enhance the frequency and adequacy of training and reduce the need for companies to be out of district. VTC was not the only identifiable factor in keeping response times low and keeping units in their response areas, but VTC had a positive effect of reducing response times at the St. Charles Fire Department.

Table of Contents

List of Abbreviations

AHA. American Heart Association

ALS. Advanced Life Support

BLS. Basic Life Support

CIP. Capital Improvement Project

DHS. Department of Homeland Security

EEOC. Equal Employment Opportunity Commission

EOC. Emergency Operations Center

EMS. Emergency Medical Services

Gbs. Giga bits per second

Haz-Mat. Hazardous Materials

HIPPA. Health Information Protection and Portability Act

IAFF. International Association of Firefighters

IM. Instant Message

ISDN. Integrated Services Digital Network

IST. Incident Support  Team

ISO. Insurance Services Office

IT. Information technology

JIT. Just in Time

Kbs. Kilo bits per second

LMS. Learning Management System

LOB. Line of Business

Mbs. Million bits per second

MCU. Multipoint control unit

MS. Microsoft

NFPA. National Fire Protection Association

OCS. Office Communications Server

OOS. Out of Service

OSHA. Occupational Safety and Health Administration

PC. Personal computer

P-t-P. Point to Point

SCCESA. St. Charles County Emergency Services Association

SCFD. St. Charles Fire Department

SME. Subject Matter Expert

SWAT. Special Weapons and Tactics

T-t-T. Train the Trainer

UC. Unified Communications

USAR. Urban Search and Rescue

VPN. Virtual Private Network

VTC. Video teleconferencing

WMD. Weapons of Mass Destruction

# Chapter 1: Identifying the Problem

This dissertation details the story of my research from June 2006 through December 2009 in the selection and implementation of a video teleconferencing (VTC) system at the St. Charles Fire Department (SCFD) in St. Charles, Missouri. The transition to a completely different method of delivering training arose as a solution to combat increasing emergency response times. In the fourth century B.C. Plato wrote in *The Republic, Necessity, the mother of invention.* This study is born of necessity. The transition in training delivery systems extends beyond the technological pieces of equipment and network needs to conduct VTC training. The culture and the act of trying to effect change on the culture of the fire department is discussed and reflected on throughout the paper.

## *Assumptions*

The assumption of this paper was that the fire service is essentially the same nationwide. The SCFD had the same types of training delivery problems as the rest of the industry in the United States. The conditions that affected training delivery existed here as they existed in the rest of fire service training communities throughout the country. Even though the similarity assumptions existed, the study interviews and surveys were conducted to verify the similarities. It was also assumed that emergency response vocabulary was essentially similar throughout the nation.

## *Background of the Study*

City records from 1853 indicated that each of the city wards in the City of St. Charles, Missouri was required to maintain two extension ladders and two roof ladders for the purpose of fire suppression (City of St. Charles, 2010). One hundred and fifty-

three years later in 2009, the budget for the SCFD was $10,281,705 and funded a staff of 84 personnel (City of St. Charles, Fire Department Operational Budget 2009).

The operations division made up the majority of employees for the SCFD. The SCFD responded to over 9,000 calls for assistance in 2008. The operations division was responsible for fire suppression, emergency medical services (EMS) and special operations activities. The operations division was divided into three platoons; A, B, and C shifts, who worked a revolving 24-hour schedule. Each shift was supervised by a battalion chief who reported to the deputy chief. The division employed 75 full-time personnel.

The department operated out of five fire stations that were located in a manner that provided the best possible geographic coverage for the city at the time the stations were built. From these five fire stations the department staffed three advanced life-support engine companies and two advanced life-support ladder companies. For the purposes of this paper an engine company is understood as a company that pumps water for fire suppression, stretches fire hoses and controls or extinguishes the fire. Engine companies were located at firehouses two, four and five. A ladder company is understood to be one that provides ventilation, forcible entry and search/rescue operations. The SCFD had ladder companies located at houses one and three. All five companies were run as advanced life support apparatus and had at least one paramedic with the necessary medical equipment. EMS calls made up 75% of the call volume for the SCFD.

The department staffed two advanced life-support ambulances at stations one and five. The standard staffing on a SCFD ambulance was two paramedics per ambulance.

The primary function of the two paramedics was to provide EMS and transport. The secondary mission for the ambulance staff was fire suppression and rescue on fire scenes.

In addition to fire suppression and EMS calls the SCFD supported other mission-critical responses to protect the community. These responses were considered Special Operations and compromised hazardous materials (Haz-Mat) response, dive rescue/recovery, surface water or swift water and boat rescue operations, Urban Search and Rescue (USAR) activities, and tactical emergency medical support for the local law enforcement special weapons and tactics (SWAT) team. The personnel making up these special units, or teams, were fire department personnel that had volunteered to participate in specialized training and certification testing. These special teams required significant time and work investments from each of the team members above and beyond their normal training load for fire suppression and EMS training.

The SCFD was a member of the St. Charles County Emergency Services Association (SCCESA). The association met monthly, continually looking for options to enhance the level of service provided both as a group and as individual organizations. Examples of SCCESA's progress toward their continuing improvement goal was the establishment of an association website to provide timely information to the public and between departments, improved automatic mutual aid between participating entities and shared training resources. A countywide USAR team, shared public information officers, and standardized public fire safety education programs were additional examples of regional asset sharing.

The SCCESA had a training subcommittee that met monthly to coordinate training for the entire county. This committee was charged with the maintenance and

improvement of county wide training for fire suppression and EMS as well as special operations such as Urban Search and Rescue (USAR) and Haz-Mat.

The primary guiding external force for fire suppression training was the Insurance Services Office (ISO). The ISO required that anyone involved in fire suppression activities receive at least 20 hours of fire suppression training per month. This requirement was solely directed to fire suppression activities and did not include EMS or special operations. In addition to ISO training requirements, the SCCESA also coordinated training for the special teams as well as EMS.

*Statement of the Problem*

The SCFD and the SCCESA found themselves with nearly impossible training delivery requirements under the increasing financial and service needs of their communities. Compliance training had to be improved so that it would be possible to achieve 100% coverage of all employees and volunteers. In the physically focused profession of emergency services, training for skill set improvement could never be eliminated. The ISO required that fire service providers actively train with their emergency service partners on a quarterly basis for fire suppression. Training requirements based on a post-9/11, Office of Domestic Preparedness - Homeland Security world were increasing rapidly. The 2009 economic crisis in the United States drove local emergency responder budgets to the lowest levels seen in years.

The problem of providing adequate and appropriate training could be divided into four key components: budgetary shortfalls, difficulty in maintaining response times, increased call volume, and increased training requirements—all making the delivery of training more difficult within the SCCESA. Training was still ongoing, but it was my

desire as the researcher of this project to identify a way to increase the frequency and adequacy of training scenarios and reduce the need to be out of district. Training was of vital importance to the safety of the emergency responders and the general public. These obstacles needed to be overcome and every effort made to continuously improve the very proud profession.

Budget shortfalls meant that SCFD and SCCESA could not add additional personnel or additional companies to address increasing call volumes. The call volume was directly related to the increasing population as people moved into one of the 2008 best places in America to live ("Best Places to Live," 2008). Keeping response times low was a constant battle for all emergency responders. Under the 2009 call volume and staffing levels, the SCFD had to stop letting on-duty crews attend training that was out of the City of St. Charles. The risk to the community was too great. Call volume was much too high to have a 30-minute delay for one or more of the companies to return to the city. Without additional staffing the department did not have the ability to maintain coverage for their citizens.

The primary goal of  the SCFD was to protect the life safety of their citizens. The second goal remained incident stabilization and the third goal was property conservation. All of these goals were adversely affected by department trucks and responders being out of place for training. It was a volatile political situation of which the organization had to remain aware. It was difficult for the SCFD Fire Chief, Ernie Rhodes, to explain to the City Council why on-duty crews were sent 30 minutes away for training when he knew the department was significantly understaffed. At the same time the chief knew the importance of maintaining training levels and certifications for suppression and EMS

personnel as it related to public safety. But, the chief decided that if he was going to err it needed to be on the side of public safety and so out-of-district trainings were cancelled.

The problem faced by the department was that they had to do *more* training, not less. It was not just an increase in fire suppression training but an increase in: EMS, Urban Search and Rescue (USAR), Weapons of Mass Destruction (WMD)/ Hazardous Materials (Haz Mat), Health Information Protection and Poratility Act (HIPPA), Equal Employment Opportunity Commission (EEOC), Occupational Safety and Health Administration (OSHA) compliance and other miscellaneous human resource and personnel training that also needed to be addressed. The training delivery problem was twofold. How did the emergency services community deliver training to the out-reaches of the county without physically being there? In addition, how did each organization follow-up that training with a pre-designed class that allowed personnel to participate in a physical, hands on training evolution?

The SCFD and the SCCESA could not provide training to 100% of its employees. This was due to many factors but the most prevalent was call volume. While attending training in the City of St. Charles engines, ladders, and ambulances were called out of training to answer calls for assistance. This meant that they left training and might not ever return, or might return only after the majority of information had been delivered. It was nearly impossible to make up this training because the department had other training or activities scheduled once that training was over.

Vacation time, sick time, funeral leave, short and long term disability were additional factors that affected the completeness of training. It was impossible to make sure that everyone got through every single training class. The training divisions of the

SCFD and the SCCESA were far too understaffed to deal with makeup dates for one or two employees when they had to prepare for the next training session.

*Budgetary issues.* The lack of funding necessary to support training operations in their traditional forms was another reason that training levels remained low. Member organizations did not have the budgets to support sending all of their employees to offsite training on a regular basis. Overtime budgets were also insufficient to cover the overtime necessary to replace the employees who had left for training.

Budget shortfalls further affected the delivery of training by reducing the number of trainers available to deliver the necessary classes for all three shifts in all locations within the organization. The SCCESA did have the money to bring in nationally renowned industry professionals to present training to the member organizations. They did not have the money, however, to make sure that everyone could go to the class on-duty or pay the overtime to backfill for the on-duty personnel.

*Delayed response - out of service (OOS).* Emergency crews were regularly required to leave their still alarm areas to attend training out of their area or out of their department's area (district or city). This absence of coverage caused delays in response times and increased the risk to the public. Great effort was put into selecting the locations for firehouses and EMS bases to ensure proper coverage of response areas. The engine houses or base locations were selected to ensure the best coverage for the call load that came in to 911 call centers. When a fire truck or ambulance was moved to another location to train there was a resulting gap in the coverage because that unit was gone. When a call came in for the open area, another unit from somewhere else had to cover for the missing unit. This replacement unit took longer to arrive than if the original unit had

been in its place. This hole in emergency coverage was called a response gap.

Response gaps calculated into longer responses to the scene of an emergency. There was no way to make up for distance when responding to a call. Distance equaled time. In the event of a cardiac arrest the American Heart Association (AHA) had a motto on emergency response that said, “Distance is Time - Time is Muscle.” The muscle they were referring to was the heart muscle. According to the AHA clinical death begins the minute the heart stops, and biological death, deemed irreversible, begins at four minutes. Time was precious and distance was difficult to overcome.

*Increased call volume.* St. Charles County had also experienced a significant population boom since 1990. The increase in population came with a direct correlation to the number of requests for assistance from the emergency services. The increase in call volume was not necessarily evenly matched to tax revenue or personnel staffing increases. The end result was that the existing fire and EMS companies had to absorb the additional call volume, making them very busy.

*Increased training requirements.* Emergency services personnel have answered America’s call whenever a new service area has been identified by the public. In the 1970s and 1980s, the task absorbed by the fire service was EMS. In the 1990s, the task was hazardous materials (Haz-Mat) response, and since 2000 the task of Urban Search and Rescue. In 2005 the task embraced by the emergency services was Emergency Management and Incident Support Teams (IST's).

After 2001, the Department of Homeland Security provided the necessary money for the initial equipment and training for many of the new initiatives. However, the money for sustaining the new service initiatives and the ongoing training fell on the

individual departments to support. Those new training initiatives were forced into an already busy departmental training schedule. This training was also more complicated to set up and required additional training officer involvement to ensure that the national standards were being met.

*Purpose of the Study*

The primary purpose of this project was to perform a needs assessment of emergency services training delivery in the St. Charles Metropolitan area. The needs assessment identified common problems with training delivery and identified the goals for a better delivery system. The gap between the identified common problems in training delivery and the identified goals directed the second half of the research. Once the needs assessment was complete the purpose of the research was to identify national best practices models that would fill in the gaps identified by the first half of the research project.

*Importance of the Study*

The purpose of this study was to identify a way to deal with the four key components of the problems listed in the previous paragraph. It was my intention to look at solutions that leveraged technology to address training delivery shortfalls. I wanted to evaluate what could be done to maintain the existing training levels and improve the training delivery system to address the needs of the citizens of the City of St. Charles. I believed the monthly classroom training could be improved with video teleconferencing and then followed up with a plan for practical training that maximized the amount of time that individual companies were allowed to remain in their service area and be available for emergencies.

*Research Question*

The research question was, How can fire department training be constructed to enhance the frequency and adequacy of training and reduce the need for companies to be out of district?

*Definitions of Terms*

*Advanced life support (ALS).* A structured and algorithm-driven method of life support for use in the severest of medical emergencies, especially cardiac arrest. Personnel involved in ALS receive special training in the use of equipment (e.g., defibrillators and appropriate drugs) ("Advanced Life Support," 2008).

*American Heart Association (AHA).* Formed in 1924, the AHA strategic driving force was providing credible heart disease and stroke information for effective prevention and treatment. Their mission is "to build healthier lives, free of cardiovascular diseases and stroke. That single purpose drives all we do" (American Heart Association, 2009, Our Mission section).

*Analog video signal.* A continuous stream of information at 90 Mbs or 45 Mbs in a compressed fashion (Wilcox, 2000).

*Bandwidth.* The capacity for data transfer of an electronic communications system.

*Codec.* A codec is the heart of the VTC system. The Codec compresses and decompresses the signal and codes and decodes the signal. A codec converts an analog signal into a continuous stream of zeros and ones as binary code (Wilcox, 2000).

*Emergency response provider.* Includes Federal, State, local, and tribal emergency public safety, law enforcement, emergency response, emergency medical (including hospital emergency facilities), and related personnel, agencies, and authorities. See Section 2 (6), Homeland Security Act of 2002, Pub. L. 107-296, 116 Stat. 2135 (2002). Also known as Emergency Responder. ("Emergency Response Provider," 2006).

*Firefighters.* Firefighters shall mean employees who work for the fire department. These include firefighters, firefighter paramedics, engineers and company officers. Duties include advanced life support medical care, fire suppression, Hazardous Materials (Haz-Mat) response and technical rescue.

*FIREHOUSE software.* A records management system that manages critical information for Fire and EMS agencies (Affiliated Computer Services, Inc., 2009).

*Firewall.* "The primary method for keeping a computer secure from intruders" (Ziff Davis Publishing Holdings Inc., n.d.a, para. 1).

*Insurance Services Office (ISO).* Since 1971, ISO has supplied information about risk to many industries to include the fire service and insurance industries (ISO, 2009).

*National Fire Protection Association (NFPA).* The NFPA is an "international nonprofit…[that was] established in 1896…to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training, and education." They develop and publish over 300 consensus codes ([NFPA], 2009, para. 1).

*Occupational Safety & Health Administration (OSHA).* Under the Occupational Safety and Health Act of 1970, OSHA's role was to assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards

developed under the Act; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; by providing for research, information, education, and training in the field of occupational safety and health. ([OSHA], 2008)

*Personal computer (PC).* "A computer built around a microprocessor for use by an individual, as in an office or at home or school" ("PC," n.d.).

*Proof of concept.* "The evidence that a product, technology or an information system is viable and capable of solving an organization's particular problem. A proof of concept is often developed for new products that have not yet come to market" (Ziff Davis Publishing Holdings Inc., n.d.b, para. 1).

*Training coordinator*. For the purposes of this paper, the position of training coordinator for the St. Charles City Fire Department is responsible for planning, developing and delivering training to the entire department. Responsibilities include training schedule development, department schedule coordination, and records management.

*Unified communications (UC).* Control of communications in real time that directs voice, video, data, text IM or e-mail to the device most near the intended recipient (Ziff Davis Publishing Holdings Inc., n.d.c).

*Video compression.* Digital video was compressed because it takes up a large amount of room in its original form. Compressing the video makes it easier to store. Digital video can be compressed without impacting the perceived quality of the final product because it affects only the parts of the video that humans can't really detect. (Dunn, 2002).

*Video teleconferencing (VTC).* The National Security Agency defines VTC as a communication technology that allows users at more than one location to have a face-to-face meeting environment. The system was bi-directional audio, video and data streams during the session (National Security Agency, n.d.).

*Summary*

In this Chapter, I have identified the four main problems in delivering training to emergency responders: budgetary shortfalls, maintaining response times, increased call volume and increased training requirements. These realities made the delivery of training to on-duty personnel more difficult. The purpose of this study was to identify a way to increase the frequency and adequacy of training evolutions and reduce the need to be out-of-district.

This paper will look at solutions that attempt to leverage technology to address training shortfalls. The use of video teleconferencing could help the SCCESA increase the emergency responder coverage in its districts by allowing them to remain in their engine houses while they attend training. Increased training could also increase the amount of training response personnel were getting. Finally, a technology based system would allow the creation of a common operating picture based off of common standard operating guidelines and a unified training program.

*Paper Outline*

Chapter 2 provides the literary research on video teleconferencing. The history of VTC will be outlined and reasons provided for why this type of system has not been fully implemented in emergency services training prior to this study. The history of bandwidth and processer development is vital to understanding the technology development in VTC.

Some of the key points to the application of VTC are the different teaching models and synchronous communication between adults in a professional setting. The reasons for choosing Microsoft Live Meeting are discussed to provide background and explanations for using a software-based VTC system.

Chapter 3 provides a discussion of the methods used for this study. This research was an effort to identify and confirm regional and national problems with emergency service training delivery to on-duty personnel. An extensive data collection effort was undertaken to ensure that the study accurately relayed the common operating picture of training on-duty crews in both the regional and national scope. Internal data was collected from within the SCFD to evaluate what the on duty personnel felt about training delivery technology and how they preferred to learn. Data was also collected from regional training officers in the St. Louis metropolitan area to assure that the regional departments were experiencing similar difficulties, delivering training, as the SCFD was.

Data was further collected from two national fire departments utilizing video teleconferencing (VTC) to deliver training. The fire departments interviewed used VTC in its true bi-directional and synchronous sense. The final data collection location was a large global agricultural company that used VTC, synchronized video, and an asynchronous learning management system (LMS) in a blended learning system. The blended system was used to ensure that trainings were delivered in a timely manner to all of their employees. The study lasted from June 1 to October 31, 2009.

Chapter 4 provides a reconnaissance of training delivery in the industry. Local and national training officers were interviewed to provide the data. After completing the surveys and interviews a combined list of common problems was developed. This list

established a basis for what I believed the true training delivery problems were in the United States fire service.

Chapter 5 provides a proposed solution to the common problems identified in chapter 4. The solution was derived by means of the interview questions I asked the fire fighters who were using a VTC solution to describe what was working and what was not. I combined the information gathered from the VTC users with the experiences at the SCFD to create a best practices model.

During the implementation of the synchronous video teleconferencing system I kept careful field notes and reflections to ensure that others could learn from the implementation cycle in Chapter 6. Doctoral committee members also attended training sessions to provide additional viewpoints and reflections for verification of educational happenings.

Chapter 7 is a description of what did and what did not work and what other studies are needed in terms of training delivery in the St. Louis metropolitan area. A description of the learning management system (LMS) is given and additional study areas are specified. The implications of a blended system of synchronous VTC and an asynchronous LMS have local regional and national implications and will require leaders to innovate to solve seemingly unsolvable problems.

# Chapter 2: Literature Review

Chapter 2 is a review of the literature on video teleconferencing (VTC). It was important for me to understand where VTC came from and the technological developments that allowed VTC to transition from a hardware-based system that required enormous bandwidth to a software and internet-based system that was possible with a residential grade broadband connection. The issues of signal compression (codecs) and the simultaneous emergence of available broadband Internet connections were vital to understanding the functional abilities of the new systems that had only been available since 2007.

In going beyond codecs and broadband, it was also important to understand the functional capabilities of the software based system that was chosen by the SCFD. The functions that were important were identified and helped frame the justification and reasoning to choose a VTC platform that was not being used by any other fire department in the United States. Many fire departments were using hardware-based systems but struggling with interconnect-ability. The Microsoft case studies used in this literature review identified how large global companies were using the Microsoft Live Meeting system to overcome interconnect ability issues. Necessity was the mother of invention and when the cost savings could be calculated in the tens of millions of dollars global corporate trainers were motivated to make leaps of faith in technology for synchronous training. The emergency services could learn from this bold leap of faith and use it to their advantage.

*History*

The history of VTC can be traced back to Alexander Graham Bell's experiments in early 1872. Bell was trying to identify a way to send multiple telegraph messages over a single wire simultaneously. Tracing VTC's roots back to Bell's first experiments was a logical starting point for discussing the evolution of voice communication into an electronic format. It was very appropriate that Bell was looking for a way to communicate with the deaf. What he identified was a way to turn sound into an electronic format. VTC technology was a digital signal and constructed of lines of code and protocols but it was at its core an electronic format (Spielman & Winfield, 2003).

The phone system in the United States was comprised of several different technologies that took a voice signal and converted it into an electronic signal that allowed point-to-point conversations. The evolution of audio conferencing, connecting more than two people in a phone conversation, required the use of tones, switches, and bridges. Tones, more commonly called touch tones, were electronic impulses that were measured in hertz cycles between 400 and 3,400 hertz. The tones could be heard as the dial tone and the tones that could be heard when a number was dialed. These tones allowed the switches and bridges to connect a number of phone lines to the same number. Audio conferencing was based on tone technology and allowed businesses to start communication in a meeting format without everyone being present in the same room. Business men and women were able to phone into a meeting from anywhere in the world. The audio conference meetings had been a huge success and significantly increased the efficiency and productivity of the business community. Everyone in the meeting got the same voice message but the communication circle was not complete without visual input.

Meeting participants were still unable to see their meeting counterparts. The primary problem with audio conferencing was that it only carried the voice signal (Spielman & Winfield, 2003).

For the remaining duration of this paper I rely heavily on James Wilcox's book, *Video Conferencing the Whole Picture*, due to the lack of additional research available on the history of video teleconferencing. Video teleconferencing (VTC) was defined by Wilcox, (2000), as a collection of technologies that formed the foundation for a wide variety of applications. The term videoconferencing could be traced to two Latin words: videre, meaning, "I see," and confere, meaning, "to bring together." Video teleconferencing was the set of technologies that allowed people to meet interactively and actually see and hear each other during their interaction from separate sites. This meeting could be point to point between two sites or multi point between any number of sites and was determined by the type of system the customer had set up (Wilcox, 2000).

In the 1970s Nippon Electrical Corporation (NEC) became the first corporation in the world to produce a group-oriented teleconferencing system. These early attempts at VTC used analog television signal in its raw form. Video teleconferencing progress was further delayed due to the inability of networks at the time to supply sufficient bandwidth. Progress was delayed until the advent of large-scale solid state memory became widely available in the 1980s (Wilcox, 2000).

In the 1980s, a corporate VTC system cost $250,000. The system only came with one codec. A codec was the heart of the VTC system and it performed four jobs with the VTC system. The codec compressed and decompressed the signal and coded and decoded the signal. A codec converted an analog signal into a continuous stream of zeros and ones

or binary code called coding and digitizing and then selected only the necessary parts to send meaningful audio and video signal called compression (Wilcox, 2000).

The codec was the workhorse of the VTC system. Uncompressed video signal required a bandwidth of 90 Mbs and even if the vertical and horizontal synchronization required for analog TV were discarded the bandwidth required was still 45Mbs. It had been common practice for people using VTC systems to have dedicated phone lines connecting their conferencing sites. These lines were called Integrated Services Digital Network (ISDN's) and carried 64 thousand/kilo bits per second or (Kbs). Even when two ISDN lines were in place the bandwidth was only 128Kbs. Two ISDN lines running 128Kbs would never be able to handle 45Mbs signals. The codec needed to compress the signal and reduce it by 99.99% to fit through the 64 or 128Kbs lines (Wilcox, 2000).

Video compression and the bandwidth to handle those transmissions were the two primary obstacles for video teleconferencing and prevented its use from traditional phone lines. In September 1982, Dr. Wen-hsiung of Compressed Labs, Inc. (CLI) launched a low bit rate compression system for commercial use. The compression protocol allowed a T-1 line (a terrestrial phone service or land based data communication as opposed to satellite based data communication) connection to feed VTC systems. A T-1 line was the equivalent of 24 individual channel phone lines bundled together to transmit a data stream and was the basis for the North American digital hierarchy. This advancement to a terrestrial phone line based system significantly lowered the cost of conducting VTCs (Wilcox, 2000).

A team from Massachusetts Institute of Technology (MIT) began to challenge CLI in 1984 when they developed a low bandwidth digital video signal processing

system. The team from MIT formed a company called PictureTel and they developed a way to compress the signal to an amazing 224Kbs, which allowed the signal to be carried by four phone lines. This development may be one of the single most important factors that allowed multi-point VTC's to occur (Wilcox, 2000).

While CLI and PictureTel locked themselves in battle for market share a third company, Video Telecom Corporation (VTEL), challenged them both. Founded in 1985, VTEL was the first company to offer a VTC product that ran on a DOS based PC. For the first time customers could update their software-based VTC systems by downloading new sets of programs provided to them by the manufacturer on floppy disks. During the early 1980s manufacturers were producing codecs at a rate of 100 per year. In the 1980s a codec cabinet used to be the size of a refrigerator, but by 2009, the codec would be completely software-based. The software-based codecs were based on common standards that allowed any system-to-any system communication (Wilcox, 2000).

VTC systems began with the development of the Picturephone in 1964 by Bell Labs. The Picturephone was a true personal VTC product. VTC then moved onto group oriented systems that were extremely costly and transmitted over satellite feeds. The cost of those systems usually reserved them for the corporate boardroom. As the technology for video compression and transmission bandwidth improved, systems evolved to a land-based phone line transmission and onto multi-point PCs. Competition and the deregulation of the communications market drove digital transmission costs down to the point that even residential internet connections were affordable enough for the common user but still capable of having sufficient bandwidth to support VTC meetings. The cheap bandwidth combined with faster processors, widely available affordable solid state

memory and simplicity of operation meant that the VTC market was poised for an explosion.

Wilcox (2000) identified that collaboration and interoperability standards were the key to the prosperity and survival of VTC. In 1990, the United Nations subcommittee on International Telecommunication Standards voted to accept a VTC interoperability standard. This agreement made it possible for CLI, PictureTel and VTEL to allow their codecs to negotiate technically compatible sessions over variable bandwidth channels. The standards voted on in 1990 were directed at group point-to-point video, and the 1996 standards were more inclusive, and included PC based codecs for multi-point VTC (Wilcox, 2000).

Video teleconferencing could be divided into two basic types of meetings, personal point-to-point and multi-point. There were a number of vendors that provided free or reasonably priced software products to connect two people or sets of people in a VTC meeting. In 1990, the technology was still out of reach of the common user. The systems were still complicated and required the use of proprietary expensive systems that had dedicated phone lines (ISDN) and limited mobility. In 1994, Intel introduced its line of Windows-based VTC products and immediately the VTC market expanded. From 1994 forward, the technology was available to use as bundled software that frequently came with a new PC to conduct VTC meetings.

A multi-point meeting, joining more than two sites, was generally controlled by a multi-point control unit (MCU) and required all participants to use the same manufacturer's equipment, and connected on a compatible network. However, 1996 adoptions of VTC protocol standards launched a new era in compatibility. It was possible

to have a multi-point meeting with everyone being on separate systems or from individual PC's anywhere in the world. The ability to attend a meeting via video and audio presence would change the socio-demographics of the workplace (Wilcox, 2000).

*Why the St. Charles Fire Department Chose Microsoft LiveMeeting*

In 2007, the City of St. Charles, Missouri was running a Microsoft Exchange Server on its network. The entire city was on one domain and the network had redundant servers. The city servers and data were backed up in four different geographical locations. The network was linked by local cable provider, Charter Business, who provided gigabit interconnection within the network to the servers. The servers were located in a secure and electrically backed up server room at one of the city buildings. All five of the fire stations had an 8Mb down by 2Mb up connection to the network. The fire department's administration offices had a 100Mb fiber connection that supplied access to the network and the internet. The network was a 2008 upgrade to the city's IT infrastructure that was funded out of the city's capital improvement project (CIP) budget. The entire city used Microsoft Office 2003 and the city had purchased Office 2007. Office 2007 was ready to be deployed pending further network adjustments.

*IT System as of 2008*

The SCFD was searching for a VTC solution to deal with communication and training delivery problems. They approached vendors on both the hardware and software side of the VTC industry. They viewed hardware based product demonstrations from Tandberg and Polycom, two nationally recognized leaders in hardware based VTC. The department also received website demonstrations from WebEx, e-POP, MegaMeeting, and Microsoft Live Meeting. Additionally, the department had seen a demonstration of

MS Office Communications Server (OCS) and MS Sharepoint from local vendors who were Microsoft Certified Partners.

None of these products fit every single perceived need of the fire department. Most of the systems had extremely valuable tools and solid business applications. Each of the web-based applications was used for a period of two weeks to see if the systems would function within the city network and to determine if the system features meet the needs of the organization. The department used the products for morning shift meetings, departmental fire call critiques and department wide meetings such as yearly vacation picks. The web based systems were also used for fire and EMS training sessions and were well received by all personnel involved.

*Hardware Versus Software*

Based on the proof of concept testing done during the trial periods, the department decided on the right product for them, based on what they could afford. The debate came down to a software versus hardware solution for VTC. In a video from the July 2008 International Faculty Summit at Microsoft Research, Zhang Zhengyou presented on his new research in personal telepresence. In his presentation, he identified the cost of hardware based systems ranging from $250,000 to $1,000,000 to be one of the leading factors pushing a cheaper software based solution for VTC. Zhengyou stated that the costs of network bandwidth and affordability of software programs pointed towards software solutions leading the market share into the future (Zhengyou, 2008).

The benefits of a software-based VTC system came with the added bonus of being able to fit into a series of other software applications that were focused on increasing business communications. Technologies such as presence, being able to know

when someone was sitting at his or her computer, and instant messaging (IM) also bundled well with VTC. When these programs were used together it was possible to see if someone was at their computer, send them an IM and begin communicating with them in a video meeting. The combination of these software technologies was called Unified Communications or UC.

The University of Kentucky was looking at similar solutions to its VTC needs but they also saw the need to integrate their VTC with their entire network and daily operations. Looking at all of the options Doyle Frinskey, Chief Technology Officer at the University of Kentucky-Lexington, said that a hardware based solution like "Cisco would have required additional hardware….They think 'hardware' and that wasn't good for us….Microsoft has a software-based solution. I think that is the way to go with unified communications" (Microsoft, 2008, Voice section, para. 3).

*Why the St. Charles Fire Department Chose a Software Based VTC*

The SCFD chose to go with Microsoft Live Meeting because of its flexibility and ease of integration with their existing systems. They also had the network and bandwidth capable of supporting multipoint VTC without impinging on the organizational bandwidth resources. Brian Singer was the Senior Manager of Worldwide Partner Training at Autodesk, a world leading digital design company. Singer stated that he loved Live Meeting and it made total sense for Autodesk because they had the internal hardware, software, and bandwidth to support Live Meeting's function. Singer further explained that Live Meeting made his company more efficient and effective when communicating (Microsoft, 2004).

The law firm Thompson Coburn, LLP was headquartered in St. Louis, Missouri. The firm had 340 attorneys who needed to communicate more effectively. Phillip Rightler was the Chief Information Officer for the firm and was directed by the Chairman of the Board to use technology in very simple terms: better, faster and cheaper. Rightler evaluated the UC functions of the Microsoft Office Communications (OCS) package to make instant messaging, text, e-mail and video possible from any desktop in the organization. Each employee could ask, "What is the best method to contact this person right now?" The enhanced video functions of OCS and Live Meeting provided new communication opportunities to Thompson Coburn. "The video strategy is important to us, said Rightler. Although we have video conference centers to provide video conferencing between our offices and external parties we want to get more casual video going" (Microsoft, 2008, Enhanced Video Conferencing section, para. 1).

The SCFD evaluated numerous communication options and identified a solution package that they felt met the majority of their needs. They chose to use their existing MS Office deployment in conjunction with Live Meeting. Additionally, the department planned to implement a package called E-Sponder for emergency response mitigation. The E-Sponder System used an MS SharePoint, MS Info Path, MS OCS servers to communicate and worked well with Live Meeting and MS Office. E-Sponder was a system for incident management and communication that was bundled with another product called Twisted Pair. The Twisted Pair software made it possible to communicate with field units from a PC or cell phone via a PBX and new wave technologies. This project was being used in large metro regions like Tampa, FL and the St. Louis Metropolitan Incident Support Team (E-Sponder, 2009). The combined use of all

Microsoft products, the ability to be hosted off site and software that was meant to support the emergency response industry made the Live Meting and E-Sponder solution the most logical for the SCFD

Outside of E-Sponder's joint partnership with Twisted Pair, my research had been unable to locate any fire service or emergency management agency's using MS technologies to expand their communication abilities in the United States. I turned my research efforts towards the private sector business community to find Microsoft research and deployment histories. I found a wealth of information on private sector deployment of MS Live Meeting and its uses to improve global training and communication. Avanade was a Seattle-based IT consulting firm that had partnered with Accenture, a Bermuda-based firm having 158,000 employees, to deploy MS Unified Communications based off of a MS Office 2007 Communications Server. Bob Hersch, Global Executive Director of Workplace Technology and Collaboration for Accenture stated, "The Office Communication Server 2007 was a transformational technology, and when applied within the context of the larger business strategy, it can help companies move to the next level of performance" (Microsoft, 2007, Enhanced Competitiveness section, para. 1).

Accenture, Avanade and Microsoft joined forces to help customers create the next generational workplace, where co-workers would be able to collaborate seamlessly regardless of location or device. Corporate America was providing a model for the public sector to demonstrate the future of communications and training delivery at an affordable price. The SCFD could no longer support the traditional face-to-face training delivery model. They needed to turn to the private sector to find a model to follow that would leverage technology. The private sector model showed how to make the technology leap

and use the “transformational technology” that was available and proven (Microsoft, 2007, Enhanced Competitiveness section, para. 1).

*Moving Beyond Point-to-Point (p-t-p)*

Based on my research it was clear that the fire service needed to be more mobile than a traditional p-t-p hardware-based VTC system would allow. Being locked to a specific monitor or VTC room severely limited the flexibility of the organization. Engine companies moved from station to station throughout their duty day. A system was needed that traveled with the organization and its employees. Architecture firm BSA Life Structures had a similar problem when they purchased a p-t-p VTC system that was based on VTC rooms. They stated that the systems were less than ideal because they had to put people into specific rooms to have a VTC. When their employees traveled out of the office or to customer locations, the VTC services were not available because they did not have similar hardware-based VTC facilities in the field. The Board of Directors for BSA directed their IT department to find a solution that was cost effective, flexible and available from all over the globe (Microsoft, 2008).

The fire service as a whole would have a difficult time affording the expense of p-t-p VTC. St. Charles County Emergency Services association received a bid from Tandberg for $1.7 Million to equip all of their engine houses with cameras, codec boxes, and the hardware for servers and teaching stations. To add an additional receiving point would cost $17,000 per site. The cost was prohibitive not only for initial instillation and usage but also for adding additional sites to the system. A cheaper solution was needed that had expanded flexibility and could move beyond point-to-point. The hardware-based

system would need to be replaced every three years to assure the system remained in warranty (Netelligent Tandberg Bid, Aug 2008).

*Customizable and Scalable*

The fire service had not been completely in the dark about using technology for the betterment of the organization. Most of the fire departments in the nation had a computer records system for data management. Firehouse Software had a primary market share in the United States fire service citing a current user base of 10,000 fire departments and additional clients in the US Military (Welsh, 2005). The parent company of Firehouse software was Dallas, TX based ACS whose primary business sector was the outsourcing of business processing. ACS had recently partnered with Microsoft to deliver the future versions of Firehouse on Microsoft's .Net platform. This pending collaboration was just one more reason that I felt the future of fire service communication and organizational information management would be better suited on a Microsoft OCS platform (Welsh, 2005).

Avanade and Accenture believed that the real power and functionality of Unified Communications would be realized when the technology was seen as a method to achieve business objectives and integrate into the organizations line of business (LOB) applications. Firehouse software was one of the primary LOB applications for the fire service. With MS Live Meeting, an instructor could be working in Firehouse software and sharing his desktop with the entire organization over a VTC meeting that allowed the entire department to watch. With Live Meeting everyone could see the subject matter expert (SME) use the program to its full extent and learn from him or her. This could be

done for all of the outlying engine houses over VTC without lessening the service they were providing to the public (Microsoft, 2009).

*Ease of Use*

It could be difficult to train a group of people who did not have a lengthy IT background to use new IT products. The implementation of Live Meeting would allow organizational trainers to train employees how to use the new software within the shell of the meeting space. Having the MS Office 2003 product line in place for the organization allowed for an immediate recognizable application when using Live Meeting. Office 2003 or 2007 products worked seamlessly within Live Meeting and its sharing functions. This made it possible for people who had some exposure to the MS Office work suite to use the Live Meeting system without excessive amounts of additional training time.

In a Microsoft case study, Fieldglass's Manager of Supplier Relations, Deanna Freise noted that Live Meeting was highly interoperable with other Microsoft products. She identified MS PowerPoint, Outlook and Windows Messenger as key programs that improved communication. She stated "Live Meeting is very easy to work with. I especially like to have a PowerPoint slideshow running when the employees and clients log on" (Microsoft, 2004, p. 3). The ability to use a single set of programs reduced confusion and increased interoperability.

*Mobile and Flexible with Remote Access – Telecommuting*

Access to the network had always been an issue for the SCFD. In the City of St. Charles remote fire stations had used virtual private network (VPN) connections for five years prior to the implementation of the new network. The installation of a new city-wide network in 2008 eliminated the need for outlying stations to rely on VPN connections.

The stations were in the network once they had been placed on the domain and therefore permanently linked to the network. The establishment of an internal network did not address the needs of the organization once the officers and fire department vehicles went mobile. The department's line personnel worked 24-hour shifts in three platoons. This meant that at all times two-thirds of the employees were not at work. Two-thirds of the employees did not have access to the network while they were at home. They did have website access to their email but not important documents and network drives. In addition, line personnel did not have their own extensions for voice mail or a way to retrieve any messages.

Giant Eagle was one of the nation's largest food retailers. They had 36,000 employees in over 366 locations spread out over the east coast region. In 2007 Giant Eagle instituted a cost cutting move to transition 700 of its employees to home based offices. This required that all of their employees had access to all of the communication tools necessary for business. Roger Black was Giant Eagle's Senior System Administrator and he agreed that the "anywhere access" capabilities of their new OCS were of great value to the organization (Microsoft, 2007, More Efficient, More Powerful Communications section, para. 3). He stated that the organization can find him anywhere, from their home locations, to deal with any issue they may have in real time (Microsoft, 2007). Black also adds that OCS had improved his team's collaboration after hours (Microsoft, 2007). External access to the system was a key factor for maintaining their organizational efficiencies.

*Security*

Network security was the utmost concern of every network administrator and especially true when Microsoft Unified Communications was used for all forms of communication. All manner of communications passed through the system and much of it involved sensitive items. Items included, but were not limited to, banking information, personnel records and medical information. Concern for security spanned all industries and organizations. Colorado State University (CSU) was no exception when it came to concerns about the needs of security for their network and VTC needs. Nick Smith was the Exchange Administrator for CSU. In a Microsoft case study, he identified his organizations concerns for the security of other forms of communication such as instant messaging. Noting that the other forms of IM and communication had more risk than benefit for organizational and network security, he pointed to Microsoft OCS encryption and the ability to encrypt all communications as a big security win for the University (Microsoft, 2007).

"Del Monte Foods, based in San Francisco, California, was a leading provider of premium-quality branded food and pet products throughout the United States" (Microsoft, 2007, Situation section, para. 1). Jonathan Wynn, Manager of Advanced Technology and Collaborative Services for Del Monte was quoted in a 2007 Microsoft case study.

> With the new integrated security in Office Live Meeting (2007), Del Monte IT administrators will be able to take advantage of the company's existing security infrastructure, which includes Microsoft Forefront Security for Exchange Server and Forefront Security for SharePoint. "If one of our company's brokers was

> presenting a Live Meeting, and he has uploaded a presentation with a bunch of documents, the material was out of my hands at that point," says Wynn. "Now, with the enhanced security of the solution, I can better protect documents that are being uploaded through SharePoint. It gives me the insurance I need as an IT manager" (Microsoft, 2007, Increased Security section, para. 1).

*Zero Touch Deployment*

Live Meeting was also available as a hosted service. As a hosted service (hosted by Microsoft at their facilities) the service accommodates up to 1,250 attendees. When Live Meeting was used as a locally installed service it allowed 250 connections. Autodesk, based in San Rafael, California, uses the hosted Live Meeting service. They like Live Meeting because it had a log on service that did not require participants to down load plug-ins or players. They referred to the service as a zero touch deployment. All their employees and customers could connect to the meetings by clicking on a link that was sent to them via e-mail. The meeting set up was easy and used their contacts and e-mail service to make quick connections (Microsoft, 2006).

Zero touch technology would be very important when inviting neighboring or regional departments to participate in training. All that was needed was their e-mail address and they could be sent an invitation to the VTC training or meeting. A metro-wide meeting or training could be hosted with a Live Meeting service and have up to 1,250 attendees. That would include every fire department and EMS engine house in the St. Louis metropolitan area on one VTC event. MS Live Meeting made it possible to hold trainings that were synchronous or multi-directional on a large scale. All on-duty personnel could communicate and share in the training and never have to leave their

engine house. The hosted version of the Live Meeting service also eliminated any issues with incompatible firewalls. Incompatible firewalls and IT directors prohibiting external access were the primary reasons that hardware based VTC systems were not regionally functional.

*Field Communications*

The emergency services community required a mobile application to ensure they remained connected to their organizations. The only emergency services community that could be found employing this technology was Tayside Fire and Rescue in Scotland. Tayside provided service to 400,000 people in Scotland and had 750 employees with and operating budget of $53 million per year. Tayside senior officers were issued Treo™ Smartphones to help facilitate remote access through Microsoft Office Communicator. It is claimed that the Treos have delivered intuitive and seamless communication capabilities that enhanced collaboration by streamlining how people communicated. Their Smartphones delivered access to wireless voice, e-mail, the web and Microsoft Mobil Applications–while minimizing total cost of ownership (Microsoft, 2009).

Using E-Sponder and Twisted Pair as a joint field communications tool allowed the emergency services to communicate at a level that previously was only fantasy. Leveraging electronic communications streamlined communications of incident status updates, VTC transmissions and real time radio communications with field personnel. Field commanders had the ability to communicate with Emergency Operations Centers (EOC's) or Multi Area/Area Command's (MAC's). Field intelligence and input could be funneled to the command staff to ensure that sound operational and tactical decisions were made in a timely manner.

*Software Updates with Assurance*

The Microsoft Software Assurance (SA) program allowed companies to use benefits in volume licensing to give software to their employees for free or at a much reduced cost for their home use. The program benefits were that employees could become more familiar with the software and thus use it more effectively at work. This also allowed the employees to use the software at home for their work assignments. The architecture firm HOK, based in St. Louis, Missouri, used the Home Use SA program and supplied their employees with an Enterprise version of Office 2007 for the price of $19.95 for home use. Dermot Delaney was the Software Assurance Program Administrator for HOK. Delaney stated,

> The transition from Office 2003 release to Office 2007 was major, so it was helpful for our employees to have the latest programs on their home computers….In addition, these individuals can use the instillation to do some of their work from home and avoid spending extra hours in the office. (Microsoft, 2009, p. 2)

*Training and Education*

The pre-2006 model of training for the SCFD was to deliver training in a traditional classroom setting where employees were brought together and where the training was facilitated face-to-face in the classroom. Learning was taking place in this model, but it was taking place in a manner that kept the workforce isolated from its customers. Like the private sector, this model removed employees from their original work place. When employees are away from their office they cannot attend to their customers' needs as well as they can if they are present. For the emergency services

industry this meant slower responses to emergency calls. The price of this absence was measured in valuable seconds. The true cost was time due to distance. The department tried to maintain the national standard of a four-minute response to all calls. This response goal was based on the American Heart Association's (AHA) recommendation time line for cardiac arrest victims in order to maximize patients' survivability. The time line called for being at the patient's side in four minutes. The National Fire Protection Association's (NFPA) 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments also recommended a four-minute response time (Ludwig, 2008).

*Lost Productivity*

Autodesk's Brian Singer relayed that with the implementation of Live Meeting his company did not have to worry any more about the lost productivity from pulling people out of the field for meetings or classes. They simply attended their meeting or training session while at their workstations and remained available to their customer base. Remaining in quarters while receiving training was exactly what the emergency services in the SCFD needed to ensure that they had the lowest possible response times. Remaining in quarters would ensure they were as productive as possible with their limited resources. The production of emergency services was saving lives and property and they wanted to be as efficient and effective as possible while doing their job (Microsoft, 2006).

The value of efficiency is addressed in Carr-Chellman, 2005 who stated that online education provides the opportunity to streamline education and lower the costs

associated with the traditional training delivery model. The lower cost model that meets the needs of the learner through btter efficiency is not only attractive but seductive. She cautions that "computers [and the Internet] are not neutral tools, they express values at the expense of others, and one of their primary values is efficiency" (Carr-Chellman, 2005, pp. 147).

*Broadcast Trainings*

> Gary Bellfield, Tayside Fire and Rescue's Manager of Information and Communications Technology, was working to maximize time spent at the fire stations. With Office Communications Server 2007 we can broadcast training sessions to multiple stations….As a result we are able to provide more training which will raise the competency level of our firefighters. Firefighters can also remain in their quarters while they receive training. This means that the firefighters and training officers do not have to travel and waste valuable time on the road away from their main work environment. (Microsoft, 2009, Raising the Competency of Firefighters section, para. 1)

*Recordable Trainings*

Tayside also recorded their training sessions and kept them on a Share Point Server. "We hope to use Office Communications Server 2007 to create a catalog of training videos," continues Bellfield. "If certain firefighters have not yet responded to a specific kind of incident, they can review a training session about that type of situation when it is convenient" (Microsoft, 2009, Raising the Competency of Firefighters section, para. 2). Tayside also planned to share its server based videos with other organizations

This kind of sharing was where economies of scale could be seen in training delivery. Each department and its training division could establish a Microsoft Federated Sharing Group that would allow each organization access to the other organizations' servers and files. This configuration required that the organizations establish a trust relationship between their servers which was an electronic server sharing agreement to share information openly with another organization. Once a trust had been established then everyone who was in the trust group could access the recorded video training files that the originator had allowed to be shared. The implications of this were enormous for the training officers. This had in effect rolled the different organizational training programs together as a single training officer was not responsible for producing all of the training for the group. The training workload could be shared. Working as a larger group also had implications for response as well as training. If the training programs were the same then the standard operating guidelines could also be the same and fire departments could respond in the same way. In my opinion, regional response policies are similar now but more collaboration is possible and that would improve firefighter safety.

Digital design giant Autodesk also utilized the recording feature of Live Meeting. The organization recorded their training sessions and posted the sessions on their servers. Autodesk allowed their resellers and partners to download and view the trainings as often as they liked. The ability to record the training sessions meant that even if employees could not attend the training session they could watch the training at a convenient time for them. Employees could also view the presentations or trainings as often as they liked. This review on demand feature was an advancement beyond the previous learning models the company had been using. Autodesk also produced customer showcases that

demonstrated how other clients had benefited from using the Autodesk products. This showcase allowed new or perspective clients to learn from their peers and query them about how they created their solutions. It can be argued that best practices peer learning could be one of the most powerful tools in business (Microsoft, 2004).

EMC Corporation was a leading provider of information infrastructure technology and solutions that helped organizations manage and safeguard their information. EMC was working with its customers to help them deal with the increasing volume of information that needed to be archived and made available to employees. With the rapid expansion of IM, Audio and VTC, clients were looking for a way to store all of these recordings and audit logs to assure regulatory compliance. John Hollinger, VP and General Manager of EMC Microsoft Practice said, "Our customers want to be able to get their information, from any place, any time, on a variety of hardware platforms, and be able to share and store it easily" (Microsoft, 2007, Situation section, para 3).

*Breaking the Train the Trainer (T-t-T) Mode*

Traditional training environments for both Corporate America and the public sector emergency services involved a classroom setting where the participant was expected to return to his or her organization and share the information learned. Live Meeting reduced the burden on employees who attended the training by not forcing them to be trainers when they returned to the parent organization. Brian Singer of Autodesk explained,

> Traditionally one or two individuals from a region would come and attend an event, try to absorb as much as they could, travel back to their home region and redeliver that training. It was always a 'train the trainer' type of

> delivery process. But with that scenario, the accuracy and completeness of the knowledge transfer is always a huge risk. You just don't know how much somebody is going to absorb … Live Meeting removes this problem. (Microsoft, 2004, Benefits section, papa 5)

Holding a central training VTC ensured that the entire organization received the same single message. The potential existed that the training message being delivered in the traditional T-t-T method might be received incorrectly by the student or new trainer. This meant then the student or new trainer might relay the incorrect information to fellow employees in the post training session back at the home organization. The use of Live Meeting ensured that everyone would get the same message and get it from the subject matter expert (SME). In an interactive environment, the SME was the best person to lead the training and ensured all questions were answered correctly. "We've been able to use some of the best talent from within the company as well as bring in expertise from outside on a contract basis," says David Sanchez, Solutions Architect for Autodesk (Microsoft, 2004, Ability to fine tune presentations on the spot section, para. 2).

*Just-In-Time (JIT) Training*

Live Meeting also allowed for instant training sessions that could be initiated on an as-needed basis. Fieldglass used Live Meeting to accomplish JIT training so that their customers could get the training they needed without wrangling over scheduling issues. They also used the polling feature within the program to make on-the-fly adjustments to their training presentation. Using this feature the presenters asked multiple-choice questions that the customers answered in real time. Real time responses made it possible to modify the presentation quickly and speak to the greatest areas of concern. Mary

Moran, the Director of Client Support Services for Fieldglass, reported, “The polling features in Live Meeting are beneficial for us in tracking who attends or benefits in the training or meeting” (Microsoft, 2004, pg. 2). Managers were able to collect feedback almost instantly on their personnel and their customer’s questions.

This technology could be transformational to the emergency services in the City of St. Charles, St. Charles County and St. Louis metropolitan region. If an emergent issue came up the command staff could hold a web meeting that could have 1,250 attendees. Every Emergency Operations Center (EOC), engine house and police cruiser in the St. Louis Metropolitan area could be on one VTC at one time. Regional Commanders could disseminate emergent and evolving information via a secure form of mass communication. Responders could even attend this meeting from a vehicle-mounted PC with an air card connection. The commanders could receive information, video, and audio from the field using the same process. This technology could revolutionize the entire emergency response community by providing access to field information that had not been possible before.

*Follow-up Classes*

Live Meeting’s capabilities allowed for immediate follow-up training and interaction. In the traditional method, once training was complete everyone went back to work or went home. When issues or questions emerged over the training they had received there was not an easy way to follow up with the instructor. Students were able to identify if their instructor was in and available using the presence features of UC and then communicate via an IM or VTC meeting request. Instantly the student could be connected back to the instructor for further clarification on the issue at hand. This kind of

follow-up was unheard of in the emergency response training community. The instructor could also record the meeting and make it available to others. Brian Singer of Autodesk asserts,

> Live Meeting has allowed us to greatly expand our training offerings. We can now follow up our major new product trainings with additional training that provide tips or tricks on product updates. We can also do on-going in depth trainings for anyone who wants to become more specialized in using one of our products. Autodesk also values the ability to respond quickly to their customers needs in the field. After a product is released, we may determine that our people in the field may benefit from additional training. Under the old system we would have to determine if the new information would justify mounting another road show. Now we can simply deliver the information to a much larger audience with Live Meeting. (Microsoft, 2004, 150 Additional Training Classes section, para. 3)

*Summary*

The SCFD chose Live Meeting in 2009 to assist in keeping its response times low. The important functional aspects of VTC for the department were to have a system that allowed significant end point connections in excess of several hundred at one time, recording capacity, and external access to the recorded sessions. All of these features were needed to facilitate on-duty personnel training from their stations and to minimize response time gaps by keeping everyone in quarters. Microsoft LiveMeeting allowed the department to have all of the features it required at the lowest possible cost and impact on internal IT resources.

The City of St. Charles completely replaced its entire network and improved broadband access to all of its remote locations to facilitate the transition to a software-based VTC system. Important features were the affordability and ease of use that would allow the department to extend training delivery beyond point-to-point. The field communications possibilities were perhaps the most exciting aspect of the new VTC system when used in conjunction with E-Sponder and Twisted Pair.

The private sector provided many examples of training possibilities for the Live Meeting system. The public sector just needed to follow the lead set by Corporate America. The private sector was trying to save money, time and resources by leveraging technology. The emergency response community also needed to save money, time and valuable resources to assure the best possible protection for their citizens. The careful allocation of resources was even more important in an environment where resources were scarce. In Chapter 3, I will outline the methods that were used to collect the data for this study.

# Chapter 3: Collecting the Data

This study was a multifaceted qualitative study including surveys and interviews that evaluated the VTC implementation process. The research question was, How can fire department training be constructed to enhance the frequency and adequacy of training and reduce the need for companies to be out of district? The primary purpose of this proposed project was to do needs assessment of emergency services training delivery in the St. Charles Metropolitan area. The needs assessment identified common problems with training delivery and identified the goals for a better delivery system. I felt that it was important to disaggregate the emotions and feelings of local training officers and identify their key areas of frustration in delivering training. I needed a list of what was wrong, so that I could propose a possible solution to a specific problem set.

The first three data collection methods discussed here focused on developing the list of local training delivery problems that were outlined in Chapter 4. I used two surveys to get a sense of what the on-duty personnel believed important with regards to learning environment and delivery methods. The SCFD needed to change its training delivery methods and identify what its internal stakeholders valued in the way of training delivery. Assessing the internal stakeholders seemed like a logical starting point. The second survey was designed to get an idea of how the on-duty personnel at the department felt about using electronic media as a learning strategy in the work environment. I used the survey results (see Chapter 4) to help determine the local training delivery problems.

I conducted the first series of interviews with local training officers to confirm my suspicion that the SCFD was experiencing the same difficulties as their neighbors. I wanted to make sure that the department was not a training anomaly and was similar to

other fire departments in the area. I also wanted to assure that by the time I interviewed departments from around the country and they reported their training difficulties, I had a sense of what the training delivery problems were perceived to be in the St. Louis region.

The second and third series of interviews conducted had a dual focus. My first focus was to compare national training delivery problems with the problems in the St. Louis metro area. The methods would focus on what the interviewee claimed was working in their video teleconferencing and using that list to build the Best Practices Model that is discussed in both Chapters 4 and 5. The final data collection method involved taking the best practices model and implementing the process at the SCFD. This method was a re-evaluation of the best practices model using field notes and reflections that were included from the study and implementation phase. The question asked by this method was, Did the best practices model work? A narrative was written from the field notes, reflections, and student evaluations.

*Survey 1*

The purpose of Survey 1 was to identify the culture and climate of the SCFD. My intention was to assess how the personnel felt about the training delivery system being used prior to the study. The primary question asked by the survey was, What does the fire service need now to increase training and reduce response time delays caused by training? In addition, the survey was intended to help identify line personnel concerns over transitioning to a video teleconferencing-based training system. The survey was identified as Survey 1 and is attached as Appendix A.

The survey sample was comprised of on-duty personnel at the SCFD. These personnel were all paid professional fire suppression and EMS personnel. All on-duty

personnel were offered the opportunity to participate in the study on a voluntary basis. This did not mean that everyone in the organization took the survey, but they were offered the opportunity to give input via the two surveys. The shift personnel were told up front that participation in the survey process was completely voluntary and not required. The survey was completely anonymous. Participants were provided with an informational pamphlet that explained their rights of refusal. If they chose to fill out the survey, it was then placed in a securely locked box where it remained until tabulated. The informational pamphlet is attached as Appendix B. The survey was tabulated (see Appendix C). Out of 84 members of the organization, 54 agreed to take part in the survey process. I used the results from Survey 1 to help identify the training culture of the SCFD (see Chapter 4).

*Survey 2*

The purpose of Survey 2 was to further evaluate the culture and climate of the SCFD. The survey asked, Do firefighters have pre-conceived ideas about technology and technological change and what kinds of technology are firefighters the most comfortable with or already know? The survey was completely anonymous and participation was voluntary. The survey is attached as Appendix D.

The sample population and procedures were the same as for Survey 1. All shift personnel were provided with an informational pamphlet prior to the survey that explained their rights of refusal. When the surveys were completed they were deposited in a securely locked box until they were tabulated (see Appendix E). The results of the survey are included in Chapter 4 in the reconnaissance of the industry.

*Interview Set 1*

The purpose of Interview Set 1 was to gauge the issues other fire departments in the surrounding area claimed to be having with training delivery to their on-duty personnel. The primary question asked by the survey was, What are your problems with training delivery in your organization and how do we fix these issues within the St. Louis metro area? Thirteen emergency service training officers were chosen from the areas immediately surrounding the City of St. Charles, Missouri. I solicited input from organizations that would be called for a 5 alarm fire in the City of St. Charles. I felt it was important to compare the areas immediately surrounding the city because simple geographic proximity might provide the highest chance of similar demographics and call volume. Of the thirteen chosen, three training officers were from volunteer organizations because of their importance to the regional response equation.

The interviews were requested and the subjects were advised that their participation in the process was completely voluntary. The questionnaire is attached as Appendix F. I gave the participants an informational sheet prior to the interview that informed them of their rights as participants. I asked for permission to record the interview and then provided them with a sheet to sign giving their approval. The interview was recorded via a Livescribe pen in an audio file. A transcriber took the audio file and turned it into a text file for review. Once completed, the text file was sent to the person who was interviewed to provide an opportunity to verify the correctness of the transcribed interview. This process was referred to as member checking. A copy of the permission sheet is attached as Appendix G. Once verified, the interview was recorded under a pseudonym to ensure the interviewee's identity remained anonymous. The

transcribed interviews were to be kept in a locked file drawer for three years after the completion of the study. I used the results of the interviews as a basis for regional reconnaissance (see Chapter 4).

*Interview Set 2*

The purpose of Interview Set 2 was twofold. The first was to see if the list of training difficulties, developed from the St. Louis metropolitan area, was representative of the same problem set identified nationally. The second purpose of this series of interviews was to identify what were considered successful strategies for implementing video teleconferencing in fire service training delivery nationally. I conducted phone interviews with selected professionals in the national fire service, who were randomly chosen from articles in national trade journals, where they were listed as leaders in using video teleconferencing, to address their departments training delivery problems. The main question asked by this interview was, How has a VTC system enhanced your organization's training and communications? Two fire department training officers were interviewed in an effort to identify best practices for a VTC system (see Appendix H).

I asked the two participants for permission to record the interview and then provided them with a sheet to sign giving their approval. The same permission sheet was used for the second set of interviews as was used for the first (see Appendix G). The interview was recorded via a Livescribe pen in an audio file. A transcriber took the audio file and turned it into a text file for review. Once completed the text file was sent to the person who was interviewed to provide them an opportunity to verify the accuracy of their interview. Once verified the survey was recorded under a pseudonym to keep the individual's identity anonymous. The transcribed interviews were to be kept in a locked

file drawer for three years after the completion of the study. The results of the phone interviews were used for industry reconnaissance (see Chapter 4) and for the Best Practices Model (see Chapter 5).

*Interview Set 3*

Private sector organizations were studied because they had more experience with web- based VTC. A private sector training professional was interviewed whose organization was using Microsoft Live Meeting or a similar product to improve communication and training delivery. The interview subject was chosen from the Microsoft case studies on the Microsoft web site. I chose a global organization that had its corporate offices based in St. Louis, Missouri and did extensive amounts of global VTC training and education. This interview assisted me in building a Best Practices model for the VTC project (see Appendix I).

I asked the interviewee for permission to record the interview and then provided him with a sheet to sign giving approval (see Appendix G). Once completed the interview was transcribed and then sent to the interviewee to verify the accuracy of the interview. Once verified the survey was recorded under a pseudonym to keep the identity anonymous. The transcribed interview was to be kept in a locked file drawer for three years after the completion of the study. I used the final two sets of interviews to create a picture of what training delivery difficulties national training officers were facing. I also used the interview set to determine what professionals felt was working in the national and global training delivery systems and used that information to create a new model or Best Practices model for local deployment.

*Implementation Field Notes and Reflections*

With the best practices model in hand, I used it as delivery to model for on-duty video teleconferencing. The training was delivered to the on-duty members of the SCFD. This process was monitored from August 31, 2009 through October 31, 2009. Weeks one and six were monitored for three sessions each for a total of six sessions. The monitoring consisted of field notes and reflections that were kept to identify which instructional strategies were deemed successful and which not. I re-evaluated the best practices model for my organization post implementation. Changes and revisions to the application of the training method were offered in a narrative of reflections and field notes kept through the process. Two of my doctoral committee members, Dr. van den Berg and Dr. Weir each observed one of the training classes. Each of them provided a written reflection of the event. My field notes, reflections and the reflections of committee members are discussed in Chapter 6.

*Summary*

I used the data collection methods described above to classify and categorize the training delivery problems on-duty personnel said that they faced in the United States fire service. I considered it necessary to prioritize the list of identified training delivery problems. From the prioritized list I built a true picture of the overlapping regional and national training delivery troubles.

After I had developed and verified the list of issues nationally, the next logical step was to talk to others who were using a VTC system successfully and ask them what was working and what was not. From the interviews and the literature review I developed a Best Practices model and offered it to the emergency services industry as a new model

for on-duty training delivery. Finally, I implemented the model at the SCFD and documented the successes and struggles in my field notes on the implementation. Reflections on the educational sessions were also placed in narrative form.

In the next chapter, I will discuss my reconnaissance of training delivery needs in the City of St. Charles Missouri, the St. Louis metropolitan region and the United States. I compile the information from the surveys given at St. Charles Fire City Fire Department with the information I collected from the Regional and National interviews. I looked at the information collected and identified common themes to draw a realistic picture of the most frequently occurring problems with training delivery.

# Chapter 4: External and Internal Industry Reconnaissance:

## *What Is the State of the Industry?*

My goal in Chapter 4 is to categorize and discuss the perceived problems of local, regional, and national emergency services training delivery. The tools I used to acquire this information were surveys and interviews outlined in Chapter 3. I surveyed the on-duty personnel at the SCFD and identified how they felt about technology and using technology in the delivery of training (Surveys 1 and 2). I also interviewed local training officers (Interview set 1) to determine if they were experiencing the same types of problems with training delivery as the SCFD. Then finally, I interviewed national training officers (Interview sets 2 and 3) who had extensive experience using video teleconferencing (VTC) in training delivery.

## *Departmental Surveys*

All of the personnel in the SCFD were provided with two surveys in August of 2009. The Survey 1 was used to identify how the fire department employees said they preferred to learn, and the second was designed to assess how they felt about information technology. I tabulated the results of the surveys for the purpose of evaluation. I looked for themes and trends and compared them to the results I expected. The first survey evaluated was the learning preference and it had for me the most unexpected results upon review.

*Classroom setting delivery model.* The first question on the survey was a question that asked the participant if the traditional classroom setting was the only way firefighters felt they could learn. The majority, or 49 of 57 (86%), were neutral or disagreed that the traditional classroom setting was the only way they could learn. I had expected that with

years of traditional classroom sessions in their past, the SCFD personnel would have been committed to the traditional classroom model. I found this not to be the case. In fact, the survey supported quite the opposite. SCFD personnel were ready to embrace different training delivery mediums. They said they felt comfortable with technology-based learning and were also able to learn while stationed in their engine houses in non-traditional classroom settings.

The technology survey also asked the participants if they felt they could learn complicated procedures from a video teleconferencing environment. Most agreed, 44 of 57 (77%), indicating that they could learn from this method if it involved a demonstration and was followed by a discussion. Three-quarters of the participants (43 of 57) believed that they could learn from an interactive video discussion with their peers and 77% claimed that they were comfortable with computer and technology as a learning medium.

This finding is consistent with the research of Knowles (1980) who stated that the new delivery systems being used to educate adults are evolving to a "nontraditional study" (p. 19) delivery. This evidence points to a philosophical departure from brick and mortar traditional education models and is "a new direction in our thinking about how and where learning takes place" (Knowles, p. 20).

I did not expect the members of the SCFD to be as flexible as they said they were and as willing to embrace other or non-traditional classroom settings. I also did not expect the department to claim to feel as comfortable as it did with electronic based media and training delivery.

*Physical hands-on training.* Those surveyed overwhelmingly believed (56 of 57 [98%]) that the department needed to continue physical hands-on training as part of the

base training model. It was clear that a combination of training models was required to meet the demands of departmental personnel and the requirements of the emergency response industry. Knowles (1980) offered various techniques for managing the learning experience and varying the adult education model. Techniques such as role playing, case method and participative cases fit the needs of the emergency services industry perfectly. Skills practices exercises and drills are also methods and teaching models that can be rolled into the learning process to enhance and improve the training model for the department.

The video teleconference delivery method needed to be sold to departmental personnel as an alternative option to lecture-and-demonstration-based training that would be followed up by some form of hands-on training. The teaching models had to be flexible enough to ensure that kinesthetic as well as audio and visual learners' needs were addressed. VTC is not intended to replace hands-on training but rather offered as an alternative to discussion or classroom based teaching.

*Staffing and coverage.* The survey revealed that personnel did not believe the department had sufficient crew coverage and staffing to continue training in the traditional model. They further believed that being out of place and training in the traditional model was putting the public at risk. When the fire truck or ambulance was not at the station or at least in the still alarm area then the response times back to the area in question would be greater based on distance, travel speed and traffic conditions.

Going out of service or out of the still alarm area to train was also a concern for departmental personnel. When presented with the statement, "We should be able to go out of district for training while on duty without coverage," 72% (41 of 57) disagreed,

with the majority (23 of those 57) being in the *strongly disagree* category. Similar sentiment was seen in response to the survey statement, "We should be able to go out of service (OOS) for training without coverage," where 74% (42 of 57) disagreed.

When the survey statements were changed so that they included "advanced life support (ALS) coverage while the company was OOS for training or out of venue," the respondents changed their opinion. For the purposes of this survey, ALS coverage was defined as an engine, ladder or ambulance is standing by with paramedics and ALS equipment such as cardiac monitors, medications and diagnostic equipment. When the participants were asked to respond to the statement "We should be able to go OOS for training with ALS coverage," the responses change, to 66% (38 of 57) agreeing that the statement was acceptable. When those surveyed were asked to address the statement, "We should get Advanced Life Support (ALS) coverage so that we can go out of district for training," the responses changed accordingly, with 35 of 57 (61%) in agreement.

*Response times.* One of the primary reasons for this survey was to gauge the respondents' opinion of the importance of low response times. When asked to respond to the statement "Response time of four minutes for the first arriving unit is unreasonable," 74% (42 of 57) of the participants disagreed or strongly disagreed. Clearly, the respondents felt that having response times four minutes or less was reasonable. The next question asked concerned "Being out of place for training does not affect response times." Respondents disagreed with this statement, 91% (52 of 57) believing the statement false. The firefighters felt that being out of place for training did effect response times. Inversely, 65% (37 of 57) agreed that response times would improve if crews spent more time in quarters. The survey revealed that the personnel from the SCFD

wanted to train and they wanted to be the best at what they did. The respondents were also realists in that they truly understood that if they were out of their still alarm area when they got a call that there would be a delay in response or an increase in response times.

*Local Training Officer Interviews*

Training officers from the St. Louis Metro Region were surveyed (Interview set 1) to get their view of the status of training delivery to fire and EMS personnel. I interviewed the training officers from 13 surrounding agencies and from those interviews I identified common themes that they said affected training delivery. All of the names were changed for the sake of anonymity.

*Training delivery model.* When I asked Training Officer G what his biggest problems were in delivering training to his personnel, he stated that his district was over 60 square miles and that trying to get them all together for continuity's sake was difficult. He also identified that as a union shop their contract identified training hours from 8:00 a.m. to 12:00 p.m. This was only a four hour training window and so he had to split the department in half and do two hours of training with the first few crews and then send them back to quarters and repeat the session with the rest of the department. This splitting of the crews and reduction of training time caused less training to be delivered.

Training Officer D's biggest problem was dealing with on-duty shift training. Like Training Officer G, Training Officer D had to provide the training six times per session. He had three shifts and had to have a morning and an afternoon session on each shift to accommodate the minimum engine house staffing requirements of his district. He believed that when a training officer was in the classroom that much, he or she did not

have the necessary time for curriculum development, not to mention the other duties that were usually assigned to the training officer. The district had six stations and they had three stations train in the morning, then the other three in the afternoon. This had the effect of cutting the coverage in their district by 50%, because they had to bring everyone together to train.

*Training support staff.* Another common theme noted in the interview process was the lack of staffing in the training divisions of the organizations interviewed. The lack of staffing required the training officers to put in more time just to meet the minimums of the industry. Training Officer D said, "I am in the training division by myself. There is no real support staff and the organization does not see a need to assign any additional staff." All of his training support staff was voluntary and there was no funding in the budget for more assistance. He had to rely on employees, who were on their days off to help out, but the positions were voluntary and therefore he could not be sure they would show up all the time.

*Budget.* Training Officer E's district was a combination department, meaning that it had both volunteer and paid staff. They had a roster of 70 personnel. Their 2009 annual training budget was $6,000, which had dropped $1,000 every year for the previous seven years. With the yearly reduction in his budget, he was having a difficult time sending his personnel to outside training opportunities. The University of Missouri Fire and Rescue Training Institute had a weekend fire school in the summer and winter of every year. Training Officer E's district used to send anyone who wanted to go to the schools, however with budgetary cutbacks he could only send four people to summer fire school and only if they turned in a request and agreed to come back and do two classes on what

they had learned. Many of the training officers that I interviewed had similar budgetary issues that affected training delivery.

Training Officer A had been the training officer for his department for the previous five years. His greatest problem with the delivery of training was the lack of resources he had available. He simply did not have the money to deliver the kind and amount of training that the industry required. He also felt the need for additional training support staff. Training Officer A would have liked to have three personnel, one for each shift, to assist with shift training.

*Organizational support.* What surprised me most in the interviews was that many training officers did not have the support of certain sectors of their organizations. Training Officer F said that his biggest problem with training delivery was that he had two chiefs in his organization who believed their organization was too busy to do any training. The lack of support from other upper level managers made the delivery of training very difficult.

Training Officer I's main concern over training delivery was his ability to maintain a high interest level among his employees. He felt that there was such a wide variety of experience levels in the fire service that creating engaging training for everyone could be very difficult. He said that the interest in 100% of the topics was not high in 100% of the people. If one group was really excited then another group could not care less. He believed that it was very difficult to balance the subjects and keep the interest level up.

Training Officer H was the training officer in a single station, all-volunteer fire department. He said his biggest problems related to the wide variety of training levels and

years of experience that his personnel had. Being a volunteer department made it harder, trying to make trainings interesting so everyone could learn. He needed them to train and if the trainings were not interesting they would stop coming. His department's volunteers were not being paid, thus his greatest issues were engaging the volunteers and increasing or insuring personnel retention.

Volunteer fire departments were not the only type of organizations that needed engaging training. Training Officer F worked for a combination department (part paid and part volunteer) and believed that lack of interest was one of his greatest obstacles. He had to fight against the people who did not want to train. He stated, "No matter how hard you try people don't take training seriously; No matter how good you set something up somebody says - it's just training" Training Officer F (personal communication, June 25, 2009). In many organizations, the commitment to training was a cultural behavior pattern that had been declining for decades. Training officers have to assure that training programs are current, relevant and interesting to overcome this cultural stumbling block.

One of the training officers interviewed, Training Officer J, believed that the largest obstacle faced by his organization was that of a lack of work ethic and the people coming onto the job thinking they did not have to do anything. He said, "Basically they come in and sit around, they don't have the drive they need, a sense of entitlement, they come out of the academy thinking they know everything" Training Officer J (personal communication June 26, 2010).

"The commitment to being a lifelong learner also seems to be missing from our organizations as a whole," Training Officer J noted Training Officer J (personal communication June 26, 2010). He said he was horribly worried about the cultural

resistance to change. He said he met resistance to change at the company level, mid-chief (battalion level) and upper chief levels. He also stated that they were resisting any technology because it represented change:

> We consistently put people in leadership positions with no outside education and that causes problems when you need to bring in technology. The concept of a lifelong learner is not prevalent in this profession and changing that attitude is my biggest challenge and the biggest road block is to get people to be lifelong learners while they are a career firefighter. Training Officer J (personal communication, June 26, 2009)

Training Officer C had a different issue regarding support for using technology resources for training. He identified his organization as a volunteer organization with a very rural mindset. He did not believe that the rural mindset was the issue but the mindset he was referencing did not have any experience with technology in terms of broadband internet connections and video teleconferencing. His Board of Directors did not see the benefit of having high-speed internet connections and or computer programs for electronic reporting. He stressed that they had been working trying to convince the board to purchase a connection for the fire district's office. He had continued to battle for selling the concept of increased information flow and increased efficiency. Training Officer C stated, "Our board is combined of farmers and the consensus is - if we don't have it at home why have it here" Training Officer C (personal communication, June 24, 2010) Training Officer C's departmental budget was $100,000 per year.

Other volunteer departments had the same issues convincing their organizations to move towards using technology as a solution to efficiency. Training Officer H stated that

they had an “old school” board that was just now considering utilizing technological resources. He and the command staff were working to show them how to utilize things like internet and computers to make the organization run better. They had only had the internet connection for about a year prior to the interview. He commented that his board would be more inclined to use the technology if they were able to make the connection between training and technology.

Training Officer B did not have an issue in her organization with having sufficient resources to deliver training. She had used e-learning processes in the past to deliver training content. Her observations of the training revealed the primary problem with this form of training delivery was that it did not train their people how to use the technology well enough. She said that they had provided some training, but that the amount they had provided on how to use the system was not sufficient to allow mastery by the employees. This caused a negative feeling towards the delivery system due to issues with not knowing how to properly use the system. She recommend that any new IT rollout be accompanied by significant training and interaction raising the familiarity and confidence level of the end user prior to implementation.

*National Interviews*

The interviews of this study were designed not only to get the pulse of training delivery methods in the local region but also to get a national and global sense as well. I decided to interview two nationally recognized training officers from fire departments who were utilizing video teleconferencing. I also interviewed a training officer from a very large global corporation, to get a sense of what was working and what was not. The

goal of these three interviews was to assist in building a best practices model for video teleconference training delivery for the SCFD.

*Biggest training delivery problems.* One of the many questions I asked of the interviewees was, "What were your biggest problems with training delivery prior to VTC?" The responses were similar to those of the local training officers. Training Officer N was a training officer from the northern United States. He identified his biggest problems as lag time. Their department wasted valuable time getting crews from the station to the training site. The travel time was an issue and usually amounted to 20-30 minutes a day. This was time lost from training delivery every day. The travel time delay was also a huge concern for his department. Distance was directly proportional to time when it came to emergency response. If the crews were across town training and they received a call for a cardiac arrest right next to their engine house, their response time could be in excess of 12 minutes. This was unacceptable to their department as a baseline-training model. They needed a solution and sought out VTC as a partial solution. They still believed in hands-on training but wanted to maximize the amount of time they were spending covering their still alarm areas.

Distance and response times were also a factor in the other national training officer's interview. Training Officer O's department was a northern US fire department. When asked the same question about his biggest training delivery problem he responded, "Being able to pull all of our stations into a central point. Our department covers over 36 square miles with 24 lakes. That could cause long response times. We cover a population of 70,000 and we are a true bedroom community" Training Officer O (personal

communication, May 25, 2009). Due to the geography of their coverage area, centralization for training caused even greater response time delays.

The private sector also had dealt with significant challenges with training delivery. Training Officer P worked as an IT training specialist for a global company in the agricultural and chemical industry. They did most of their training in a blended system. They used VTC and a Learning Management System (LMS) for training delivery. Training Officer P remembered his company's biggest problem with training delivery dealt with scheduling and logistics. Trying to get everyone together in one location really narrowed their audience. This meant that everyone, the students and the instructors, physically had to be in the same classroom. For a global company that could pose some logistical issues.

The primary logistical issue was cost. If the classroom was in India, the instructor in the US and the students from all over the globe, then the expense of bringing them all together could be the limiting factor for training delivery. However, since the implementation of VTC his company trained at their desks and with the combination of VTC, VTC recording and the LMS system the training was available 24 hours a day seven days a week from anywhere in the world.

*Biggest benefits received while using VTC for training delivery.* Training Officer N said they had their hardware based VTC system set up between three sites that included the main fire station, station number two and their training center. The thing they liked the most about their VTC system was the quality of communication between all sites. They also liked the fact that the system kept everyone in their still alarm area. His organization sent out video and power points to be viewed in real time at all of their

locations. They were impressed with the immediate feedback that they received through the VTC system. They got to see the students face and body language not just their voice like you would in a telephone conference. They believed much of human communication is visual.

The use of VTC allowed Training Officer N's organization to deliver more training than they had been delivering before. The change had been the reduction of travel time and the direct correlation to more training time. Neither Training Officer N nor his in-service companies had to drive to a training site. They were instantly connected at the time training was supposed to begin and everyone was in their engine house in full service. This additional training time accounted for nearly 30 minutes a session per day.

The administration at Training Officer O's fire department liked the ability to communicate and interact between all of the officers in the organization at the same time. He believed they could simultaneously get the same message to everyone at the same time. In the previous training delivery model using the Train the Trainer (T-t-T) mode, the message got changed just a little bit because everyone was just a little different. This meant that the message that was getting to the end users could be different. When your business is life safety even subtle differences can be dangerous. The information and communication flow was also bi-directional in that the end users at Officer O's department could also get a hold of administration with pressing issues and maximize communication and eliminate communication errors.

When other fire departments in the area of Training Officer O saw the VTC work as a proof of concept work in action, they were sold. They could see the possibilities that VTC offered the fire and EMS services. Training Officer O's department got together and

submitted a grant application for the American Fire Act Grant (AFG). They got the grant, the largest award of the AFG program to that date. Therefore, 27 departments in his area were able to share training, training resources, and significantly improve their communication. Forming a larger training group would free up the individual training officer for more in-depth curriculum development and spread the training workload out over 27 departments. Participants would also be exposed to a variety of instructors and get to see other faces as trainers.

The association would also be participating in continuing EMS education classes. Training Officer O's group had a trauma center hospital, four or five hours away. The hospital delivered classes to his personnel via VTC while they were on duty. Training while on duty saved the organization travel costs, overtime costs and organizational disruption. At the same time the VTC system delivered training previously unattainable without traveling out of the district to get it.

I asked Training Officer O if he had been able to increase the amount of training that he could deliver. He said "Yes, definitely, because I do not spend the day on the road. I can have multiple training sessions in a single day. This means that training can be done on multiple topics at different times of the day" Training Officer O (personal communication, May 25, 2009. This multiple topics, multiple times a day format was not something they did every day but if something came up and they needed to deliver immediate training on the topic then they had the tools to do so without moving everyone in the department out of their still alarm areas.

Training Officer P's organization saved millions of dollars a year by utilizing VTC. His instructors could meet people on VTC no matter where on the globe they were.

He also believed that document sharing in conjunction with the VTC further cuts costs, improved productivity and leveraged the training budget. The saved financial resources could be put towards material and curriculum development rather then travel costs.

*Biggest unexpected obstacles to the implementation and usage of VTC.* The single most consistent problem that I found in all of my investigations was IT complications with the VTC system and sharing the system with others. I asked Training Officer N what his organization's biggest unexpected obstacles in the deployment and utilization of VTC were. He responded, "The city IT department denies us access to the outside world. They will not let us go beyond the firewall. This limits our ability to participate in training with our neighbors" Training Officer N (personal communication, May 29, 2009). Their IT department would not let them go beyond the city's firewall and so they were only able to deliver training to their own stations. This also meant that if other departments were hosting video training that Training Officer N's department could not attend the sessions.

Training Officer N also pointed to the expense of the point-to-point system. Annual maintenance cost was $1,500 per unit. This took care of the cameras and codecs but did not address the issue of the speed of change and development of new market products in the VTC industry. The life span of their cameras was only three to four years. They could not get parts for their current cameras which were only three years old and had no choice to upgrade to stay fully functional. This was an unforeseen financial need and required additional capital improvement budget outlays of $20,000 - $30,000 per site. They had to cut money from other budgeted areas in order to take care of this unforeseen cost.

*Initial comfort – training.* Training Officer N noted some of his personnel had reservations about having a camera in the engine house. The line personnel had some concerns that the camera would be on constantly or that "the man" was watching. He stated that this fear and concern faded over time and the trainings reassured them that they were not being watched. However, he was confident that in the fire service there would always be some cultural trepidation with new items and especially ones that relate to the IT field.

Training Officer O identified that some of his trainers had some initial difficulties figuring out how to use the system and all of its presentation features. They were also frustrated by IT issues that were beyond their control. He said they quickly got through the IT issues with some fine-tuning of the system and network. He also noted that some of his people who had more exposure to computers caught on quicker than others who had no previous exposure. Employees who were tech savvy could fix their own issues while the non-tech folks struggled with the system.

*Hands-on training.* VTC was not meant to eliminate hands-on training. It was meant to provide a reasonable alternative to lecture-based training. In a vocational and physically focused environment like emergency response employees always will have to do hands-on training. Training Officer O stated that his department still did hands-on training. They averaged two hands-on physical trainings for every distance learning class. However, they still used the VTC system to prep their company level officers for the hands-on training they were going to deliver. They published a PPT on the network so that the training officer could review the PPT with the captain or company officers prior to company level training delivery. Teaching points were reviewed to assure the training

delivery met its objectives. He had also found that in smaller groups the company officers were more likely to ask questions. In larger groups people seemed to remain quiet. They were afraid of identifying to the group that they did not know the answer. He said that the company officers felt as though they were amongst peers in the small group and opened up more.

*Addressing multiple intelligences.* In 1983, Dr. Howard Gardner, a professor of education at Harvard University, developed the theory of multiple intelligences. The theory suggested that the traditional notion of intelligence, based on I.Q. testing, was far too limited. Gardner proposed that eight different intelligences combined to account for a broader range of human potential. These intelligences are: Linguistic intelligence, (word smart), logical-mathematical intelligence, (number/reasoning smart), spatial intelligence, (picture smart), bodily-kinesthetic intelligence, (body smart), musical intelligence, (music smart), interpersonal intelligence, (people smart), intrapersonal intelligence, (self smart), naturalist intelligence, (nature smart). All of these intelligences need to be addressed when designing educational models for emergency services training. Training officers must not over look the multiple intelligences of their organizations in the quest to change training delivery models (Gardner, 1983, p. 73).

Training officers can address many of Gardner's intelligence theories by using the Syntax teaching model outlined by Joyce, Weil and Calhoun (2004). Practical evolutions should include the four phases of the Syntax of Simulation model. Phase One is an orientation that is presented in broad topic coverage of the subject material. Phase One would also include all of the background information to include training goals and objectives. Phase Two would be demonstration of the exact knowledge, skills, and ability

sets that are being taught. This could also be described as delivering the higher level expectations of training evolution and what performance will be expected after the training is complete. Both Phase One and Two can be delivered over the VTC system.

Phase Three of the Syntax model is the actual simulation or training that would be delivered at the individual stations or training location. This is the hands-on portion of the training class and should be accompanied by a practical check-off sheet to ensure that all of the necessary skills are completed successfully by all participants. The final phase, Phase Four, would be a summary debrief of the training session and would be conducted by the local supervisors. The fourth phase includes an instructional summary of all of the *Big Ideas* presented in the training session and would allow the adult learners to summarize all of their difficulties and insights experienced during the training class. The learners would also feel empowered by having an opportunity to provide input on the training class and offer suggestions for improvement of future deliveries (Joyce, Weil, Calhoun, 2004).

*Training officer workload.* One of the resources that departments struggled with was the workload on the training officer. Managing resources was critical, especially when the resources were in limited supply such as in the training officer's time. Training Officer O said the VTC had made his job a lot easier. Now if he had to deliver training on a new piece of equipment he could do it over the systems in about an hour and a half and not the whole day. He did not have to worry about travel time for the instructor or his personnel and noted that VTC had streamlined many things within his organization. They had even placed portable distance-learning cameras on the desk of the administrative staff. Now their crews could talk directly to their administrative staff and vice versa.

Curriculum development time also seemed to be in short supply. Training Officer O could now take as much time as necessary to develop new programs. VTC trainings allowed him to share resources and so freed up more of his time for curriculum development that he did not have before VTC. Most of the local training officers I interviewed who were not using VTC did not have any time for curriculum development. If they utilized VTC, however, and also leveraged other officer training programs, then they would have the time necessary for development.

*Miscellaneous problems and suggestions.* One of the problems identified in Training Officer O's department was the importance of having the proper lighting to project a good VTC picture. He noted that lighting was a problem in their presentation room and it caused a bad washout problem on the white board. In addition, the station end-points had poor lighting on the viewers and were difficult to see. They were forced to go back and have additional work done at some of the stations to fix the lighting issues. Once the lighting had been addressed the picture quality improved immediately.

Training Officer O said that everyone needed to tune the system for their network. Once the VTC system was in place the system also needed to be tuned for each location. When more locations were utilized, there were more IT issues which occurred. A pre-VTC purchase network assessment should be done before making any decisions on the type of system to be utilized.

Training Officer O's organization had a captain who had addressed the speed concerns at the beginning of the planning phase of the VTC project. They addressed their bandwidth problems well in advance of the VTC grant award purchase. Others in the second wave of the VTC grant project in their area had not addressed the broadband

issues prior to VTC installation. Those departments were now suffering because of it. They could not push content like they had hoped because they did not have the network to do so. When the systems did not work some of the personnel started saying, "Yeah, see this system is junk" Training Officer O (personal communication, May 25, 2009). The other departments would have benefited from addressing their network and broadband issues prior to deployment. Training Officer O's organization had fiber optic feeds for its network.

One of the main reasons that Training Officer O cited for their success was that they had an internal person who coordinated their IT. He said that they had a sister department who was running into huge IT issues because they did not have a good working relationship with their IT department. His department was fortunate to have a retired captain who had gone back to school and got his computer programming degree prior to retirement. When he retired they hired him back to run their fire department IT. He was even stationed at the main teaching station. Training Officer O attributed the success of their VTC project to the fact that their retired captain could speak both languages of the IT department and the fire service. "That is huge for us. The IT folks obsess about security and he is able to speak about our needs in their language," stated Training Officer O, Training Officer O (personal communication, May 25, 2009).

Training on how to use the system was often an overlooked item by two of the three national organizations I interviewed. Training Officer O found that his instructors could get very uncomfortable when they saw themselves on camera. They sometimes brought presenters in the day before they were supposed to teach to get them familiar

with the VTC system. They also used pressure mats that allowed the instructor to move around the room and have the video follow them.

Continuous presence was identified by being able to see all participants of the VTC at once. Initially Training Officer O's organization had their system set up so that they would broadcast their VTC content out as a PPT screen only. This meant that the instructors and firefighters video picture on the screen was not visible so the personnel could not see the speaker and the speaker could not see the firefighters. They had to make some internal adjustments to the system and after the adjustments the speaker was able to see everyone at once. This allowed the instructor to be more responsive to the needs of the students' and completed the communication circle.

*Desired system components.* Both of the training officers that I interviewed wished they had the ability to collaborate with the other fire departments in their area. Training Officer O's organization was working on a regional plan but it was not in place yet. Training Officer N believed that a regional application would provide the "big punch" to collaboration and resource sharing in his area. Both of them also saw the need for the involvement of local IT departments early so the system could be specified, deployed, and used exactly as planned. Collaboration on a hardware system required the passage through multiple firewalls and could cause security concerns.

Training Officer O recorded his training sessions with a DVD-R. He was fortunate enough to have his own internal film crew who could film all of the trainings. He then pushed the video out to the stations. He could also place the video on a local server so that his personnel could review the footage anytime they like. Their organization used Tandberg hardware, but they were not able to afford the

communications bridge and recording servers to record the classes on the VTC hardware. Even though the video was stored on a local server they could not share this with their neighbors. For the sake of security their organization could not open their network to the outside world.

Universal regional computer access seemed to be the big obstacle for ultimate collaboration between emergency service providers. None of the fire departments in the association Training Officer O and his organization belonged to could allow their systems to be available to the public. The security risks were too great, they said. The association was working on setting up a server farm so that they could store and share mass amounts of information. They believed that this server farm development would be the next big step to get over their internal IT department struggle. The cost of operating a server farm was, however, proving to be more expensive then the association had first thought. At the time of the interview, they were looking for assistance from the private sector to allow them to rent space and bandwidth in an existing server room.

The capital improvement costs were not the only costs associated establishing and maintaining a server farm. The organization also had to have someone who would update and manage the servers as well as look over the security profile and administer the network. This could be a full-time job and in the long run could be more expensive then the servers and the bandwidth. Training officer P identified server maintenance costs as one of the items his organization had not initially calculated into the system operation. He believed that you needed good dedicated control over what you were doing and someone needed to be coordinating continuous updates on the system. Utilizing a learning management system on a large scale could be a full time job for multiple people.

*Summary*

My goal for Chapter 4 was to identify and compare training delivery problems at the internal organizational, regional, and national levels. I identified what national training officers were doing about their training delivery problems and reviewed their pros and cons of VTC delivery within their organizations. Standards existed to set the national minimum acceptable training requirements for fire suppression, EMS, and special operations response. However, operational realities and identified standards did not always coincide. Politics and budgetary restraints were realities that all departments dealt with and the SCFD was no different. The struggle to meet the training minimums while trying to improve the working relationships with mutual aid partners and still deal with local politics was difficult, but when the priorities were weighed against each other the organization had to remember that taking care of the customer was their ultimate priority.

The mandate to take care of the customer first was what caused the training delivery changes at the SCFD. Call volume, limited staffing, and two key response delays caused the department to completely re-think its on-duty training delivery system. Training out of district, going out of service for training, and getting everyone together at once were eliminated in a desperate attempt to keep coverage at a maximum. The department began training in a split shift format to accommodate better coverage and even mandated that all units would remain in service at all times, even while in training, to ensure that coverage was maximized in a resource poor environment.

Departmental surveys revealed to me that the on-duty personnel of the SCFD did appreciate the value in keeping response times low. They also believed that they could

learn from teaching models that were not traditional face-to-face training. Participants did not want to eliminate physical hands-on training but they realized that some changes in the previous system were needed.

The regional interviews proved that the SCFD was experiencing many of the same pressures as their surrounding counterparts. Using a split shift training delivery model to ensure minimum coverage of the department or district was a universal theme. With the exception of two of the districts interviewed who felt they had sufficient money to train, most believed their training divisions were seriously underfunded and understaffed. The surprising discovery for me in the regional interviews was that many of the trainers felt that they lacked internal organizational support. The fight to stay compliant with national standards was difficult enough in a resource poor environment, but to attempt compliance without the support of the organization was nearly impossible.

In situations where the training officers do not have the support of the organization, the logical step is to assess who the stakeholders are and start building a coalition of support. Bolman and Deal (2008) identified the steps necessary to develop relationships and build a strong coalition. They recommended first figuring out whose help you will need. They suggested the list include both formal and informal leaders and even include your organizations strongest opponents, hold your enemies close. The stakeholder list should include internal and external stakeholders. The next step is to develop relationships with all of these stakeholders so they will be there when they are needed. The new team members can then act as project cheerleaders when they get back to their constituency base. The act of selling the project or process to the rest of the organization cannot be done by just one person. Bolman and Deal believed that selling

may not be enough to secure the support of the organization and that it may be necessary to horse trade with key stakeholders in organization. The project coordinator may be forced to be more flexible with members of the organization who are particularly stubborn (Bolman & Deal, 2008).

The national training officers who were interviewed who had exposure to VTC offered similar stories to those of the regional training officers and the SCFD. The trainers revealed what they liked and did not like about their systems. They offered advice and best practice examples to learn from. They also offered the list of items they wished they had. The private sector interview provided a wealth of information for not only VTC but also the importance of blending a synchronized system with an asynchronous system, and more specifically how the two systems needed to be joined to create a blended learning managements system (LMS).

Jared Carman is the President of Agilant Learning and a consultant to the e-learning industry. In a 2005 VTC white paper titled *Blended Learning Design – Key Ingredients* he identified Live Events, Online Content, Collaboration, Assessment and the needed Reference Materials emerge as the important elements of the blended learning system. All of these key ingredients need to be included in a LMS designed for the fire service (Carman, 2005).

"Learning theories aren't like religion, you don't have to pick just one and shun the others. The goal is to have the right theory for the right situation." Zemke stated that the educational delivery system is dependent upon the people served and the skills they must master. It is important to blend the learning theories into the blended learning system (Rossett as cited by Zemke, 2008).

I used the national fire department training officers and the private sector trainer as a major source of information for the development of the best practices model I discuss in Chapter 5. Chapter 5 constitutes the culmination of the interviews and the literature review and the pre-purchase research done by me within the SCFD. The model offered in Chapter 5 was designed as a solution to the categorized problems in Chapter 4.

# Chapter 5: Proposed Best Practices Model for using Video Teleconferencing for Emergency Services Training Delivery

During the three years preceding this study, the SCFD had researched alternative training delivery options for in-service or on-duty training. During the research process I interviewed 13 training officers from local jurisdictions surrounding St. Charles and two training officers who were recognized as national VTC practitioners. I also interviewed a private sector training officer who delivered all of his training using a VTC and learning management system. In addition, I surveyed 54 of 83 on-duty personnel to get their opinions on training delivery and electronic media in training delivery. The surveys were voluntary and several personnel were on vacation or out on sick leave so 100% compliance was not possible. Additional research was also performed into the video teleconferencing market segment. I found delivery platform options such as hardware, software, and web based to deliver the training. Each platform was evaluated within the City of St. Charles network to see if it would be compatible with the city's system.

A Tandberg hardware based system was evaluated and found to be bandwidth intensive and extremely expensive. Software based platforms were evaluated and the city IT department advised the fire department that city IT did not have the resources to administer an internally hosted software based VTC platform. The fire department was guided towards on offsite web based solution for VTC by the city's IT department because it would cause less of an impact on an already busy IT department. After the exhaustive research that included on-site proof of concept demonstrations was conducted, the department chose a vendor and a web based product.

This chapter reviews the pre-purchase, implementation, and operational practices that I offer as a Best Practices model for the emergency services industry. The model is presented as a preferred alternative to bringing the entire organization together for a lecture-based class. The model is designed to keep fire companies in home quarters and ensure lower response times and maximize public safety. The model is not intended to offer a solution or substitute to physical hands on training which remained a major focus on the SCFD for both fire suppression and EMS training evolutions. The department's administration and Local 757 have agreed that hands on training will still account for 50% of the training calendar for the SCFD in 2010 fiscal year.

*Propose a Solution*

The fire department needed to identify their major training delivery issues. In 2006 it had experienced some political and public controversy for having a delayed response to two separate fires. The delay was due to the delivery of on-duty training where several key companies were out of place for training. The fire department had been told by the City of St. Charles that there was simply no additional money in the budget for additional personnel to ease the staffing issues and better facilitate training sessions.

*Gathering Support*

The SCFD was under pressure to change its training delivery design. The most important element to getting the large scale project moving in a successful direction was gathering support from all of the people who could have a positive or negative impact on the initiative. Stakeholders from internal and external areas needed to be considered.

*Internal support.* At the direction of Chief Ernie Rhodes, the department started to search for possible solutions to the training dilemma posed by the lack of staffing and the

need to keep everyone in quarters to ensure the lowest possible response times. The fire department administration was in agreement that a new solution needed to be found for training delivery. The SCFD was a unionized shop and a member of the International Association of Firefighters (IAFF) local 757. The executive team (E-board) from the local was comprised of the local president, vice president, secretary and three shift shop stewards. The members of the e-board and the fire department administration together formed a group called the Relationship by Objective (RBO) committee. The RBO committee was presented with the training statistics for the previous ten years. All agreed that a new delivery method needed to be found.

The organization was in complete support of evaluating all available training delivery options. Getting organizational support early was a key to the project's success. Regional interviews revealed that many emergency services training officers did not enjoy the same type of internal support that the St. Charles City Fire Department had. Once the team at St. Charles was unified and everyone agreed on the specific need, the stage was set to review the options with an open thought process.

*City-wide support.* The SCFD requested permission from the Director of Administration to conduct proof of concept testing in the stations to ensure that no matter what product the department chose it had already been tested on the city's network. The request for permission also kept the city's administration in the loop with the research initiative. The fire department is one of many departments in the City of St. Charles and operated within a strong mayor setting. The department received permission to proceed with the study and identify the best product for use in the SCFD.

*IT department.* The interviews I conducted with organizations using the video teleconferencing (VTC) delivery process also echoed the sentiment of how important it was to have the support of the entire organization before jumping off into a project. Oddly enough, the local IT departments were the biggest stumbling blocks to implementing a fully functional VTC system for most of the organizations studied, according to the interviews. The organizations that already had a functional VTC system said their relationship with their internal IT department was the most important aspect of the systems' success or failure. Most of the fire departments I interviewed had a city, village, or township based IT department. The majority of those fire departments did not include the IT department in the initial design and research phase of their project. One fire department I interviewed that included their village IT department in all aspects of their planning and research reported having a richer working relationship and overall project success than those who did not embrace their IT departments. Fire districts were found to be independent governmental entities and did not have to report to an IT oversight group and thus set their own policies and procedures.

*Surrounding agencies.* The surrounding agencies were considered stakeholders from the start. The SCFD considered and consulted with the St. Charles County Emergency Services Association (SCCESA) Training Officer's subgroup in every aspect of its VTC initiative. The SCCESA was not considered as a funding stream but the agencies were informed of the research initiative and findings. It was the intent of the department to operate the VTC system as a regional asset to improve collaboration, training, and response.

When the SCFD convinced multiple organizations in the metro area to participate in the VTC program the economies of scale become more apparent and departments began leveraging internal instructional talent. Training officers from the surrounding agencies could use the system to supplement each other's training program so that each individual organization did not have to produce 100% of its own training program. Each organization in the group would have the responsibility to produce some training for the region from time to time. Having the support of surrounding mutual aid and educational partners was important for the project's success and regional collaboration.

*Let Educators Have Input From the Start*

When planning and researching the VTC system, the instructional staff of the SCFD was included from the initial phases. The instructional staff was empowered to provide guidance and direction from the beginning of the project which resulted in increased organizational buy in. The St. Charles Fire Department understood that all organizations need to be cognizant of their employees need to feel as though they are part of a creative and productive team. VTC gave a functional capability that the trainers of the emergency services in the St. Charles Metropolitan area had not had before. Getting the program off the ground took confident and passionate people who were not afraid to lead their organizations into new territory. The trainers and chief officers of the participating organizations needed to buy in from the beginning. If the instructional staff were empowered from the beginning they would be more inclined to use their own interpersonal skills to help build the project to its full potential.

*Due Diligence Research*

The fire department considered it their duty to protect the public interest by doing many months of research to identify the best programs, hardware, and network infrastructure for their VTC project.

*What is out there in the market?* A rapid market evaluation of the VTC market revealed that there were many different methods for the delivery of video and audio signal. There were systems based on a hardware solution such as Tandberg, Sony, and Polycom. These systems offered excellent video quality, superior security, and more storage and retrieval options than need to be described here. Research revealed that the main issue with hardware-based systems was that the hardware would be obsolete in three years and the equipment was very expensive. The hardware-based systems still required substantial bandwidth but provided the best quality of picture, audio signal, and end point deliverables. The hardware systems could be intranet or internet based.

The software-based systems could be hosted internally or hosted off-site by the vendor or a third party servicer. Software based systems were more affordable but did not provide all of the functional features that the hardware based systems did. These systems required the use of the internet and worked as long as the internet and internet connection stayed functional.

*Evaluate the customer base of the chosen system.* The SCFD evaluated each of the VTC systems and asked the vendors to speak with their current customers who were using their system. I made phone calls to the vendor's customer base and identified what the system users liked and did not like about the programs and system. When the vendor field had been narrowed the top contenders in the list I asked them to provide an onsite

demonstration. These demonstrations led to free trial periods where each system was used extensively through the organization and regional supporters were asked to stop by the stations and do an evaluation for themselves.

*Evaluate the system on the network prior to purchase.* The purpose of the evaluation cycle was to evaluate each of the different VTC systems on the city's network and try to identify any performance issues before writing the final specifications for the project. When the hardware-based system was evaluated the system and network were checked for network slowdowns, packet collisions, and packet loss. Several major packet loss issues were identified and had to be dealt with immediately if a hardware-based VTC system was going to be used. The identification of network problems prior to purchase and implementation was important information for the department decision makers. The positive working relationship with the city IT department was very helpful in diagnosing and dealing with packet loss issues. Having IT professionals available and in-place to make network adjustments was crucial especially for the hardware based system review.

*Develop a Wish List*

The organization needed to develop a list of needed items and specifications for its new VTC system. In evaluating the market the department was able to develop a list of preferred features and functions and was able to produce a specification based on the market analysis.

*Identify system design features.* System design features played a major role in making the VTC system function exactly as the department had planned. The system design also significantly impacted the capital improvement projects (CIP) and operational budgets. The adage that "anything is possible if you have enough money" may be

applicable in this instance. The SCFD simply did not have enough money to fund a hardware-based system. The department had to estimate what functions that they needed and then cross-reference that list with what features they could afford. System features determined costs and there were some features the organization had to have and some they could do without. The "had to have" features are listed here.

*Web-based or externally hosted.* Due to costs of hosting and supporting an internal solution it was determined by the SCFD that the new system would need to use the internet and be hosted off-site. Using the off-site option gave the department the flexibility to make structural system changes and create the system they needed while at the same time not endangering the organization's internal security. My research indicated that most of the organizational IT departments did not want to allow external access to their internal system thus necessitating a web-based-only solution. The goal of this project was regional collaboration and all parties involved in the region would need access to the system. Having the system located on the internet at a hosting facility eliminated the security issues for any department or organization.

*Security.* The VTC system sought by the department needed to be secure and free from intrusion by uninvited guests. Hosting the system off-site at a professional server farm (a server farm is a large warehouse-like complex that had server banks, large amounts of redundant or multi-directional bandwidth and emergency power) meant that the secure servers and encryption issues would be handled by the vendor, which would relieve the sponsoring agency from having to worry about security, hardware or software maintenance and updates. Internally hosted hardware systems offered a slightly higher level of security but then the owner of the system would have to maintain the security

updates and be fluent in security issues. The SCFD did not have the resources to hire additional IT personnel to do system support. The system needed to be hosted off-site.

*Customizable and scalable.* The SCFD was looking for a system that was based on user licenses. Live Meeting costs are calculated proportionately to the number of presenters and proved to be the most flexible way to address the department's scalability needs. The department identified the number of licenses they wished to fund on a monthly basis. If the system administrator wanted to add additional presenters they could add the users from the web site interface and pay for the user license on a monthly basis. If the fire department operated in a time of community crisis and the city's Emergency Operations Center (EOC) was activated, the EOC could use the Live Meeting system to communicate with all city employees. The externally hosted option allowed 1,250 participants so that in a time of crisis the VTC system could act as a means of mass communication.

The SCFD issued 24 Microsoft LiveMeeting licenses to each captain (15), battalion chief (3), assistant chief (1), deputy chief (1), EMS officer (1), training officer (1) fire chief (1) and the medical director (1). The LiveMeeting licenses were issued to these employees with the expectation that they would be used for meetings and trainings. The fire department requested the captains and administrative officers to become proficient using the system and to be able to present to their shift as part of the normal training schedule.

*Field communication.* The fire department was insistent on improving field communications from the fire scene using an air card and laptop in the battalion chief's duty-vehicle. The fire department needed better battlefield communications for the

purposes of emergency management or large-scale scene operations. The system needed to be able to function over an air card from a duty vehicle or a wireless network set up off a satellite trailer. The field needed to be able to access the system with an internet connection and send out e-mail based VTC meeting invitations.

*Recordable.* The teaching model used by the SCFD in 2008 was a face-to-face model. Each time training was delivered it was "lost" after the session was over. The department was searching for a method of training delivery that allowed trainers to capture trainings, store them, and replay them on demand. The interviews I conducted with the public sector training officers identified the recordable and re-playable feature of VTC meetings as the lynchpin to their system. Their people accessed the internal Learning Management System (LMS) and retrieved training anytime they needed to. The SCFD imported the training sessions into a windows media video file (.wmv). The .wmv files were stored on the city's internal network so that fire department personnel could access them at any time from the stations.

*Server storage and access.* My research revealed that VTC practitioners believed universal regional server access was needed as the next stage of regional training development. Interviews and site visits identified that most organizations had internal networks that allowed some form of file sharing. The organizational concern for network security was the predominant factor motivating IT administrators to prevent outside organizations from accessing internal file storage. Having a re-playable training cache was a major goal of the SCFD. They wanted to expand their training catalog and move towards a regional application and supply server access for 3,000 emergency responders.

Regional server access needed to be for training recordings as well as for bulk file storage.

*Whiteboard capable.* The VTC design needed to include a fully functional whiteboard system. The system features needed to include highlighters, multi-color pen usage, and the ability to annotate. Text box features needed to be included with the whiteboard functions. The organization also had a Smart Board and wanted to be able to use the existing board to communicate with the meeting participants. Wall-based Smart Boards seemed to produce a more traditional teaching surface because it was easier to write on then using a mouse to draw on a computer screen.

*Share desktop and programs.* The VTC system also benefitted from the ability to share the desktop of the presenter. For the SCFD, desktop and program sharing allowed instructional personnel to display Firehouse software over the VTC system and provide real time training for end users from a subject matter expert. Program sharing offered nearly endless training options for trainers who could be at their desk using all of the electronic resources available to them and be able to share those resources with the end user. This sharing needed to include web pages and the ability to share a YouTube video to all of the classroom sites at the same time.

*Document sharing and collaboration.* Document sharing was another important feature needed in the VTC system sought by the City of St. Charles. The department needed to be able to upload documents to the system or share documents from Microsoft Word. The documents needed to be available as printable handouts for the meeting participants as well as a view only format from the main sharing screen. The documents needed to be in a sharable format that allowed everyone to view the document at the same

time. The system needed to be able to share document control to any of the participants so that whomever the presenter chose could make changes on the original document just by receiving control from the presenter.

*Identify the Number of End Points*

St. Charles calculated the number of end points where the VTC system would be delivered inside their organization. It was more critical to calculate end points for the hardware-based solution due to the difference in cost calculation. The cost calculation the department used for an end user site for the hardware-based system was $17,000 per site. The cost calculation used for software-based systems was $100 per site unless a new PC was needed, in which case the cost was $700. The lower cost of the software-based sites allowed the fire department to increase the number of end point (receiver) sites to allow each station to have two sites, one for training and one for captains' meetings. The training sites needed bigger monitors to facilitate a better picture for larger audiences. The department installed large (50-inch) flat panel monitors in the day rooms of the fire stations and connected them to PC's and web cams. When the large monitors were included, the total package for monitor, PC, and web cams was still only $1,400 per site.

*Lighting*

During the interview process I found that lighting was an issue that most practitioners forgot to evaluate prior to their purchase. The lighting needed for a good webcam picture for a meeting or training was different then what was needed for a traditional face-to-face training format. VTC practitioners noted that they had to go back and spend up to $5,000 per location to make lighting corrections. Having the opportunity to do an onsite proof of concept review gave the department the opportunity to check

what kind of lighting and picture quality they had before they purchased any products. The importance of good lighting and picture quality should not be underestimated.

*Audio*

During the initial testing phase of the VTC system it became clear that acoustics would play a major factor in determining meeting quality. The instructors and the students needed to be able to communicate in a clear and concise manner. This required testing and evaluation of microphones and speakers for each type of system. All of the emergency services groups that participated in our trainings experienced some interference with speaker and background noise. Almost all of the participants had in-house speaker systems that carried the local emergency radio channels and were audible throughout the station. The sound often overpowered the VTC audio when the microphones were open at the station.

A key performance behavior that led to a high quality meeting was muting any microphone that did not have an active speaker. The sound quality of the meeting dramatically improved when all of the non-speaking microphones were muted. Background noise could disrupt the meeting and would hold the video away from other speakers. In Microsoft LiveMeeting the last person who spoke triggered the video. Therefore, the un-muted microphone with the loudest background noise captured the video away from everyone else. The video for the entire meeting could be ruined due to background noise and failure to mute the microphone. St. Charles found this out on more than one occasion when a station would leave for a call and leave their microphone un-muted. Live Meeting gave the presenter the ability to mute any attendee's microphone

and even remove them from the meeting if the microphone etiquette became too disruptive to the meeting or training environment as to effect the learning environment.

In most of the station locations where St. Charles personnel were attending training, they found that they had the ability to put their radios on *night mode*. This meant that the speakers were off until a dispatch agency set off their station alert tones and opened the speakers in the station to monitor all radio traffic on the emergency channel. Sound and audio quality was greatly improved when all of the participants were in night mode. I found that in some of the locations when the only place that the participants could attend the meeting was the captain's office it was not possible to go into night mode. In those instances the department found that reinforcing how important it was for each location to be muted, unless speaking, proved to be the most effective behavior modifier.

*Camera Types and Angles*

The SCFD chose to use USB Logitech and USB Microsoft brand web cams. The average price for the cameras was $40. These web cams worked well for meetings and training for the end point users at the stations. The small web cams did not work well for the teaching location at station two. After researching cameras, the department decided to purchase a Poly Com Round Table camera. This camera improved picture quality and tracked the speakers as they moved around the room. The camera cost $3,200 but the department felt it was well worth the expenditure.

*Continuous Presence*

In testing the different VTC systems, St. Charles identified continuous presence as a feature they would like to have. Continuous presence means having all of the

participants on the video screen at one time so the entire audience could be viewed. Vendors were evaluated and a wide variety of continuous presence options were found. The number of screens that could be viewed at one time varied. The system chosen by St. Charles did not have a continuous presence option but would have it in the software rollout in early 2010. It was important to note that the participants in the training evolutions and the meetings had voiced their concerns over the absence of continuous presence and had identified their desire to have it back.

*Estimated Budget*

The budget was the determining factor for choosing the software based VTC system at the SCFD. The bid for the hardware-based system was $1,400,000 and well out of the budget range of the department. The research conducted by the department found video teleconferencing systems that ranged from $1,400,000 to systems that were $275 per-month or $3,300 per year. The $1,400,000 system needed to be completely replaced every three to five years. The web based system that was $275 a month required no additional expenditure outside of simple web cams, speakers and some large monitors at all of the stations.

*Budget – CIP.* The department had both a Capital Improvement Projects (CIP) budget and a yearly operational budget. The CIP budget was utilized to provide initial equipment that the department did not already possess. Items purchased under the city's CIP budget were new computers for the fire department. The money for this came from the IT department's CIP, a project planned years in advance of the VTC project but the timing was perfect. A complete city-wide network upgrade was also funded by the IT departments CIP budget in 2007 and 2008. These upgrades included high-speed

connections at all city locations. The minimum network transmission was now 8 Mb down by 2 Mb up. Server facilities were installed with fiber optic connections and all servers had at least 1,000 Mb or 1 Gb of bandwidth. The computer and network upgrade were the key CIP items that made the fire department's VTC project possible.

The department also installed flat screen TV's as large monitors to facilitate a larger VTC audience attendance. Small computer monitors were sufficient for a single person interface in an environment like a meeting but not acceptable for training. The TV's were funded from the fire department's station equipment replacement CIP project line item. Stations with larger audiences and working spaces requested projectors. Two projectors were purchased for these locations to facilitate better viewing for a crowd of ten personnel. A single Round Table camera was purchased to ensure that instructors could teach from station 2's training room as if they were delivering training to a live audience. The projectors and Round Table cameras came out of the fire department's training CIP budget line item. The total CIP investment for the transition of the fire department to the new high-speed network and complete computer replacement was $45,650.33.

*Budget – operational.* Operational expenses were calculated in terms of network, bandwidth usage, and internet access fees. The department had six MPLS modems, one for each firehouse and one for the mechanics garage, priced at $346.99 per month per site. The residential modems were significantly less expensive at $49.80 per site with the five fire stations being the only sites. The fiber optic connection at the administrative offices of the fire department cost $1,400 per month and the internet access fees for the department were priced at $765 per month. The operational cost per month for the fire

department to operate as part of the city's network was $4,997.12. The yearly expense was $53,965.44. A complete breakdown is attached as Appendix F.

*Implementation*

*The importance of morning shift meetings.* I chronicled the implementation process of the VTC project at the SCFD. The first recommendation I want to communicate was the importance of starting small. Once the system had been installed, the department personnel started to familiarize themselves with the system by having daily morning shift meetings. St. Charles began by having morning shift meetings with the battalion chief and all five station captains. The meetings immediately began to improve departmental communication and operational awareness. The meetings chief, assistant chief, EMS officer and the training officer also attended the meetings.

The meetings improved communication by outlining the department's daily operational plan. Each captain now knew what the other captains were doing with their companies. The whole organization now understood the daily plan and who was going where and when. This allowed everyone to keep a mental picture of when and where they might have to cover other still-alarm areas because the neighboring companies might be out of place for a PR event, physicals or an errand.

*Become familiar with the system.* Additionally, the daily meeting allowed the shift personnel to become familiar with the VTC system. Comfort of use and familiarity were important to long-term successful operation of the system, particularly in an environment that had traditionally not been supportive of change initiatives. The improved communication and the power of information were motivators that forced reluctant company level officers into using the system. It was the power of information that

required the officers become functional users of the system and were increasingly comfortable with its operation.

*Captain-to-captain communication.* The implementation of the VTC system and morning shift meetings allowed the shift commander to clarify all of the day's assignments. This put everyone on the same page of what needed to be done department wide. The SCFD saw some of its captains help out other captains when one crew had multiple assignments. The assisting captain would offer to take PR assignments or inspections from a busier company. This allowed a balance of the workload and an opportunity for team work to develop.

*Organizational communication.* The improved communication had some added benefits like the control of the rumor mill. The meeting allowed immediate access to all levels of administration and was a tool that could be used to address organization concerns on a daily basis. For the first time the on-duty personnel had access to the fire chief and all of the administrative personnel on a daily basis. The morning meeting was planned for on every shift every morning. Communication was planned and became commonplace and expected. It was difficult for the line personnel to claim that their concerns had not been heard or allowed to be aired when there was a departmental meeting every morning. Frequently, Chief Rhodes would even ask, "Are there any organizational issues that I can address?" or "What's on the rumor mill today?" When the organization's administration had the opportunity to deal with rumors, controversy or issues early then they could be handled before misunderstandings became a crisis.

*Meeting location.* Company officers usually attended the morning meetings from the captain's office in each of the stations. The battalion chief and the rest of the

administrative staff also attended the meetings from their offices. Being in their respective offices allowed everyone to have access to all of the normal tools they did business with. The files and documentation were kept near where everyone's computers were. With their computer and access to the network and file servers participants had access to all manner of electronic storage and documentation. While the access to station and departmental files were a bonus for the meeting, the small size of the captain's office was problematic for a larger audience at the station. When the entire company had to attend a meeting at a station, they had to cram themselves into the captain's office to view the meeting. It was clear from the first couple of meetings that the stations needed to be redesigned to accommodate locations for training and large meetings.

*Consistent meeting format.* The St. Charles battalion chiefs developed a meeting format and template to assure that they covered everything that needed to be covered in the morning meeting sessions (see Appendix J). The document was shared on the morning VTC meeting and any issues that came up during the meeting with each station, apparatus, or event would be noted on the document. Each attendee viewed the document as the items were added and discussed. After the meeting was concluded, the document was faxed or e-mailed to the stations so that the station captains could keep the document in hand as a daily planner.

*Initial Training*

Although the Microsoft LiveMeeting system that the SCFD chose was considered very user-friendly there was still some end-user and presenter training that needed to be done in order to make all users fully functional. It was important to note that training the officers and command staff on how to use the system, before they were required to use

the system in front of the entire shift or department, was very important. User confidence would ordinarily be much higher if the presenters were properly trained on how to use the system. Two training sessions for each shift were needed for the personnel to feel comfortable in using the system.

*Transition from a Meeting to a Training Environment*

After the initial morning meeting phase had been started and all of the bugs worked out of the system, the next step was to begin using the system for training delivery. In previous chapters I have discussed the need for a training delivery system that kept all of the companies in the organization in quarters. Some of the logistical issues identified during the meeting phase of the VTC instillation were that a larger monitor and meeting venues were needed. It became immediately apparent that a larger room and a larger monitor would be needed for an audience of four to ten people. Station's 2, 3, and 4 would have four people attending training, station 5 would have six people, and station 1 would have seven or more people attending.

*Station 1*

A station-by-station assessment was done with the assistance of the City of St. Charles IT department. It was determined that station one should get a projector and use the dayroom as the classroom. This required replacing two of the station's computers and relocating one of the computers to the day room. The computer relocation required a new network drop and the positioning of a projector and screen on a day room wall. A web cam was placed on top of the new computer location next to the screen. The department also purchased a wireless keyboard and mouse for the station to allow separation from the computer and let training participants sit at a main classroom table. With a wireless

keyboard and mouse the students could control the computer and interact with the VTC training from a distance up to 15 feet. The network cable modem utilized the Multiprotocol Label Switching (MPLS) protocol and provided the station with 8 Mb of download capability and 2 Mb of upload speed.

Due to the excessive dropped packets in the transmission of data from the station, the entire station had to be re-wired with new coax cable. The cable company did this for free because the contract they had with the City of St. Charles required them to fix anything with coax wiring. The main data-receiving area at the station was rebuilt with wire rack shelving to facilitate better cooling for the new routers, cable modems, and battery backups. The department decided to place second modems in all of the fire stations. These modems were not part of the city network and were of residential quality.

The residential modems were paired with wireless access points to allow station personnel to use their personal laptops to access personal e-mails and banking information while on duty. The five residential cable modems cost the department $249 per month or $2,988 per year for all of the stations. The benefit of the second modems in the stations was that network security was increased and threats from viruses from personnel e-mails and personal web surfing were eliminated. The second modems also protected valuable bandwidth on the departmental network.

*Station 2*

Station 2 housed the department's normal training classroom where most of the classes had been hosted in the past. The station had a training room computer that fed through a projector to a SmartBoard set up for onsite training. A Poly Com Round Table camera was also installed in the training room for optimal tracking of the instructor. The

camera provided a 360º panoramic view of the classroom in addition to tracking the instructor on a separate video screen. With the speaker tracking enabled, the instructor was able to walk around the room and teach as he or she normally would. This gave the end user a much more realistic and normal classroom viewing experience.

The department replaced three separate computers at station 2 and set up a web cam on the computer in the captain's office. The other two computers were replacements used for self-contained breathing apparatus (SCBA) maintenance and testing in the SCBA room. A MPLS modem and a residential modem were installed with wireless capability to ensure access for the apparatus computer aided dispatch (CAD) consoles and personal computing for on-duty personnel. Three network drops had to be run to make the network connections for the computers in the station. Training in the station occurred in the training room and the captains usually used their office for meetings.

*Station 3*

Station 3 had two computers replaced and two network drops run. The first computer was placed in the captain's office and was used for morning meetings and administrative duties such as fire and EMS reports and city e-mail access. The second computer was placed in the day room and hooked to a large monitor, via a HDMI connection, to facilitate participation in VTC training. A wireless keyboard and mouse was purchased to allow separation from the PC and personnel to sit in chairs that were more comfortable. A MPLS modem and a residential modem were installed in the stations and both were hooked to wireless routers for secure access.

*Station 4*

Station 4 was the only station with only one computer located in the captain's office. The computer was replaced when the department switched to the new network. Multiple requests were made for a second computer but this was not granted by the city's IT department. Meetings and trainings took place in the captain's office. The departments CIP budget for 2010 reflected a second computer for station 4. A MPLS and a residential modem were installed to ensure network access and security for personal communications.

*Station 5*

Station 5 had three computers replaced, three network drops run and the captain's office hooked up to two monitors. The second monitor on the captain's office computer used an HDMI connection to the day room to allow multiple attendees to view the screen. A wireless keyboard and mouse was purchased to allow separation from the PC and comfortable seating for all personnel. The network communicated through an MPLS modem and all of the personal computing at the stations was conducted on the residential modem, wireless router and personal laptops.

*Operational Best Practices – Training*

The VTC practitioners that the department interviewed recommended several key practices that led to many of their successful training sessions and were keys to creating a better learning environment for their firefighters.

*Pre-schedule and pre-load meetings and trainings.* Training classes were planned months in advance at the SCFD. When the trainers knew they had a class coming up, they were able to pre-schedule and pre-load training events well before the class was

scheduled. Loading the meeting before the training session allowed for a richer presentation. The presenter could focus his or her energies on making the scheduled meeting address the objectives set forth prior to the meeting. When the meetings were pre-scheduled, the presenter had the ability to pre-load all of the teaching materials into the meeting space. The presenter could share documents, power point presentations, YouTube videos, web sites, use a white board and even pre-build polls or quizzes for the students to take. The ability to share important teaching tools made the presentation platform a powerful teaching tool. Documents could be uploaded to allow the participants to print off handouts, evaluations and quizzes. The evaluations and quizzes could also be done using the polling feature of the software. The polls could be immediately tabulated and displayed or they could be tabulated and not displayed.

For the purposes of simplicity, the SCFD published a monthly training schedule and the video training sessions were pre-planned a month in advance. The attendees were sent e-mail invitations several days in advance based on the proposed roster for that day. One of the battalion chiefs at St. Charles preferred to pre-schedule his morning meetings a month in advance. He even sent out e-mail invitations a month in advance to ensure that the entire shift knew what time the morning meeting would be every day. He had also worked to ensure that he knew the software well and had good control over his meeting and technical usage issues.

*Practice teaching on-line and then have it reviewed.* The study and the research performed prior to the study revealed the importance of the instructors practicing their presentation and using the VTC system prior to the scheduled delivery. One of the VTC practitioners I interviewed made it a policy that all of his new instructors completed a

practice run prior to delivering for the first time. The session was recorded so that the instructor could view the session. Instructors who had seen themselves in a recording indicated that they noticed themselves doing things that they were not aware of when they were instructing. Watching a VTC recording proved to be a very good learning tool and an opportunity to get evaluated by instructional peers and improve teaching.

*Instructors must be prepared to teach the system as well as the subject.* Many of the first VTC training sessions done at the SCFD required the instructional staff to have two primary teaching assignments. The first was the topic and the second was the VTC system itself. Students had many questions on how to use the system and the instructor was the problem-solving resource. The instructor needed to be able to solve the students' technical issues on the fly and ensure that the instructional lesson went without a hitch. If the lesson or training session was ruined for the student because of a technical issue then the training was not being delivered as intended. The instructors needed to become operationally and technically proficient using the VTC system to ensure the quality of the learning experience for students.

*Have more than one instructor.* Initial testing in class delivery showed that having more than one instructor allowed for a better presentation because it provided more than one point of view for each topic. Having at least two instructors also broke up a potentially monotonous learning environment. Two instructors made it possible for the non-instructing member of the team to set up for the next lesson or topic. The non-instructing team member could also take care of other personal needs to ensure the session was not interrupted. The instructional team needed to get together prior to the

instructional delivery to rehearse the presentation and plan out who would teach the different sections of the presentation.

Team teaching was a good way to learn and mentor other less senior instructors and build instructional experience. The non-teaching member could also evaluate the teaching instructor and provide him or her with valuable feedback for continuous instructional improvement. The importance of peer evaluation of instructors in the emergency services field is often under-estimated. It is essential for instructional staff to be evaluated, so that adjustments can be made to the lessons. Even the most senior of instructional staff needed to be evaluated on a regular basis to ensure everything was being done to assist students and deliver the best class possible.

*Keep training sessions to one and a half hours or less.* Training sessions that lasted one and a half hours or less seemed to be the best length for the VTC training initiative. This time limit ensured that the students' attention span was not exceeded on a single topic. The SCFD tried to give a ten-minute break every hour of training. Keeping the training sessions short also helped ensure that the esprit de corps remained high and the organizational opinion about the VTC system remained positive. Care was taken to assure morale towards the system remained positive because morale was very important for the successful implementation of the project.

*Summary*

The best practices model proposed by the SCFD was broken down into functional areas experienced during the establishment of the VTC system. The first area emphasized gathering support for the system itself from both internal and external players. Market research and identification of necessary features dominated the second phase of system

development. Market research was a major undertaking and involved months of research and proof of concept testing. All available makes and models of VTC systems were tested. At the same time, the City of St. Charles was replacing its entire network and server system. The replacement of the network and the implementation of high-speed network at the stations significantly influenced the decision to choose a web based VoIP system that was only $275 a month.

Preferred system functions were discussed and then a brief review of the budget showed the CIP and operational expenses for the network costs. VTC costs remained at $275 a month for the 17 licenses purchased. The operational budget was $50,000 a year and that was for the network only. The network costs were part of the budget regardless of the VTC system usage. The network upgrade was scheduled for the city because a new network was desperately needed. The reason the network costs were discussed in this paper was because it provided an example of what a real network could cost to operate. An important point to note is that the entire city-wide network replacement and yearly operational costs were still less than the implementation of a Tandberg hardware-based VTC system. The bid received by the SCFD for a VTC system just for the fire department was $1,400,000. The city replaced its entire network and server farm and operated a network for much less then the bid for a single department VTC system. If a strong network existed then it would be difficult to justify the significant expense of a hardware-based system for fire department training.

Implementation of the software-based system was discussed as the next step. Best practices lessons were identified and discussed at length. Lessons learned and the importance of starting small were emphasized as best practices behaviors. The transition

to training delivery was mapped and the model was explained that would allow the organizations repeating the St. Charles VTC project to avoid some of the pitfalls found by St. Charles.

The SCFD did not want to submit this model as the only model for VTC training delivery. The organization simply wished to offer the model as an example of affordable and functional VTC capability that was available to everyone who had a broadband connection and a computer. Technology was a tool that could be harnessed to make training better and make our communities safer. Fire departments could increase training hours and work towards keeping their crews in quarters. Having the crews in quarters lowers response times and improves public safety. Life safety was the highest priority of the emergency services industry and its greatest calling.

# Chapter 6: Reflections and Field Notes on the Implementation and Study of Video Teleconferencing – July to October 2009

In this chapter I look back at my first efforts to deliver training using the Microsoft LiveMeeting video teleconferencing system (VTC). I discuss the lessons I learned and how deviations from the initial Best Practices model were necessary for various reasons. I discuss the technical preparation and project status three weeks prior to the study implementation, station by station for all five stations.

The video teleconferencing (VTC) project at the SCFD began as a research initiative in 2006 and was born out of training delivery frustrations. The department based its research off market trends and used private sector training delivery as a guide to achieve the best return on investment (ROI). The project was the first of its kind in the St. Louis Metropolitan region that combined technological advances in training delivery and a project focus on minimal financial impact.

The study officially began August 31, 2009. I begin by discussing field notes and project status three weeks prior to the study start date. I also include my personal reflections from the study and those of my doctoral dissertation committee. Dr. Owen van den Berg, committee co-chairman, attended week one of the study and gave his reflections. Those reflections are captured in this chapter as well. I also discuss reflections from week five when Dr. Graham Weir, dissertation committee member, attended week five and his reflections were discussed. The study lasted six weeks but due to instructor illness and activation of the City of St. Charles EOC for H1N1 operations only weeks one and five are studied. It should be noted that each session in week one and week five was delivered three times for a total of six deliveries. I kept field notes

throughout the study. In three of the sessions I asked participants to fill out evaluations for their class and those evaluations were discussed.

*Prior to the Study*

My field notes indicated that three weeks prior to the start of the study I struggled to get the stations ready for video teleconferencing (VTC). The IT department helped but they had an entire city to worry about while I focused on just one department. I had a vision for how I wanted the VTC system set up to best utilize the new network for training. I struggled to communicate my vision to all of the concerned parties and convince them to utilize the same timetable that I had set up to have their part of the project complete.

The IT department completed the replacement of the network and the installation of new computers at all of the stations in 2008. Prior to 2008, the City of St. Charles had not used an IT work order system. In 2008, they began utilizing a work order system that proved to be quite effective and decreased the time it took to get problems fixed. It was unusual for the fire department to get a work order in the city IT system and have to wait more than two days for the issue to get fixed or resolved. The work order system proved to be a good way to track requests and review what had been done so far. Three years prior, the city did not have a professional network but one that utilized normal residential grade internet connections that connected through the World Wide Web to outdated and unstable city servers in a closet at city hall. The city had come a long way in a very short time. The network in 2009 was stable and the e-mail system was very reliable and network uptimes were in excess of 99.99%. Three years earlier the city's network was a

source of great internal strife and frustration for all of its employees and in 2009 the system was robust and backed up.

The project was aimed at getting the fire stations ready to function as web meeting and training centers. The technical preparations were discussed because the Best Practices model dictated that all stations be set up a specific way to ensure the best learning environment. Due to circumstances beyond my control the stations were not all set up in the manner that the model suggested. I was forced to adapt and overcome the lack of technical preparation. The lack of technology completeness did not prevent me from trying to maintain an instructional strategy that ensured the best learning environments were achieved with the resources available at the stations. Although I offered a best practices model for teaching and training, the SCFD was not able to create this model at all stations due to limited resources and lack of control over operational and capital improvement projects (CIP) budgets.

*Station 1.* The captains and crews at station 1 voted to have a projector and screen installed to allow for a larger viewing area for departmental meetings and classes. This required the installation of a new computer, new network drops, a new switch to accommodate additional connections, a complete rebuild of the IT rack in the station to accommodate better cooling, complete re-wiring of the entire station for cable coax to accommodate the signal strength requirements and overcome years of firefighters installing splitters wherever they wanted a TV. I asked the IT department for design assistance with the wire rack system and all they could do was confirm that yes the fire department needed a new rack system but did not have time to assist us with the project.

I purchased wire storage racks at a local hardware store and mounted them at station one with the assistance of Captain Lewis. Captain Lewis and I moved all of the IT equipment and ran all of the wires and connections. The IT supervisor was instrumental in convincing the local cable company to completely re-wire the station to meet signal strength needs and packet loss requirements. A city IT technician had to come to the station and prove to the cable company that there was a major packet loss issue between the cable company lines outside the station and the cable modem inside. The cable company re-wired the entire station the same day. All of the coax runs in the station were changed to *home runs* and there were only a few splitters. The home runs were connected to the back of the network cable modem and the splitters for cable TV were connected were after the cable modem connection. Signal strength was greatly improved and the station was not losing any more packets. This resulted in maximizing the station up time and transmission speeds and meeting the guaranteed 8 Mg down and 2 Mg up.

Due to the number of participants attending meetings and trainings for the station, the organization decided to put in a projector at station one. The projector was mounted to the ceiling and focused on a nearby wall. The on-duty shifts ran the wiring harness lines for the projector and the city electrician put in a new electrical circuit in the ceiling to accommodate the projector power supply. A private company was brought in to run a new network drop that allowed the placement of a third station computer next to the projector wall plate. A web cam was then installed on the new computer with a set of accompanying speakers. A large projection screen was installed to allow the larger group to watch the trainings or meetings in a higher visual clarity then just projecting on a

painted wall. The initial tests were very successful. Bids were collected for the projector and harness before the purchase due to the cost.

I did not anticipate the importance of having the wireless keyboards and mice to facilitate interaction in a large VTC classroom. It was necessary for the users not to be tied or tethered to a computer and beneficial to the classroom environment to have a Bluetooth or wireless keyboard and mouse. A wireless keyboard and mouse were purchased and installed at every station. Wireless keyboards and mice were not part of the best practices model but rather an important lesson learned after implementation of the system.

The organization also installed second residential cable modems in the stations to keep all non-departmental traffic off the city system. The stations had large bandwidth requirements and the organization needed to keep bandwidth available for the network usage. Each station had a separate residential modem available for the personnel to use for checking their personal e-mail and to use the internet. On-duty station personnel access the modems wirelessly from their personal laptops. The five residential modems at the stations only cost the department $249 per month and are well worth the additional expense. The second cable modems were not part of the best practices model but have been an invaluable resource for the organizations and another lesson learned after implementation of the system.

*Station 2.* Station 2 was already set up as a classroom but it only had a basic web cam and needed a Microsoft Round Table that would track the speaker around the room. This important feature allowed the speaker to walk away from the podium and around the room. Having the instructor tied to the podium just to stay in front of a web cam was a

divergence from the true lecture hall platform that the department was seeking. I ordered a Round Table camera and installed it as soon as it arrived. The camera was $3,200.00 and the department could only afford one. I hoped to purchase a second Round Table camera later in the 2009 budget year.

Station 2 also needed some modifications to the lecture podium to allow guest lecturers to utilize their laptops and the projection system. This required additional splitter cables to make the entire system work. The department is hoping to utilize an AV switching system like the ones used at major universities in their lecture hall classrooms. The switching systems allow guest lecturers to bring in their personal laptops and present through the projector and speaker system.

Station 2 also needed to be completely rewired with coax. Captain Hagedorn and Private Huffmann did all of the rewiring at station 2. The cable company dropped off a box of new coax. Station 2 personnel ran the wire through the entire building and called the cable company. The cable company came back and cut the wires to length, made the connections on the end and then made all of the network connections.

*Station 3.* At station 3 a second computer was installed and a new network drop was placed to allow personnel to use the TV in the day room as a computer monitor. This allowed a larger audience to attend meetings and trainings. Again, a wireless mouse and keyboard were required for the system to be operational. After viewing a recent VTC meeting at station three over the flat screen TV, I noticed that it is was difficult to read the documents that were posted on the web meetings. This need will be addressed in future budgetary consideration for the training division in the capital improvement projects (CIP) budget.

*Station 4.* Station 4 was the only station that the department could not get to meet the preferred VTC training layout. The preferred layout had a second computer connected to a large-scale monitor. Station 4 did not have a second computer so the station personnel had to attend the VTC classes or meetings from the captain's office. This deviation from the normal training model was primarily due to the department's inability to convince the city that the station needed an additional computer installed. The first class of the study was scheduled for August 31, 2009, and I did not believe the computer would get installed in time for the launch of VTC training. I found myself frustrated because I was not in control of the IT budget or the necessary people to make this simple instillation happen. The station personnel simply had to crowd into the captain's office and view the trainings.

*Station 5.* Station 5 had a very small day room and thus was able to view their big screen in a manner that allowed them to read documents on the VTC system. I attached the captain's computer to the TV in the day room. Station personnel had to breach a wall to do it but they made it work. The crew had to move a Bluetooth sensor and the camera but it was functional. They needed a wall plate with a Bluetooth sensor and a second camera to ensure the video and audio could be seen and heard during trainings and meetings.

*The Night Before*

As I sat down to write my thoughts the night before I began my study, August 30, 2009, I was more than a little nervous. I had spent the previous three years evaluating, designing and selecting a video teleconferencing option for my fire department. I had spent many long hours working with the IT department to upgrade the city-wide network

infrastructure and improve the department's computer system. The inventory alone had taken three months to complete. The IT department had immediately begun replacing out-dated computer equipment and servers. After the network installation, the city had a solid network, capital improvement plan and budgeting process. The city was just now coming on line with current IT business practices. The city and the fire department wanted use their new network to solve organizational meeting and training needs. However, once the initial CIP purchase had been made the feeling from the city administration was that the project was done, and thus there were to be no more CIP expenditures. My notes from the night before reflect my frustrations and concerns.

> Unfortunately, the fire department VTC project was not complete. The set up at the stations was only 75% complete and I had encountered resistance trying to get the last few items (25%) purchased and installed. Some of the last few items were the key to the function of the system in some of the locations in the department. I was still trying to get additional computers, TVs and projectors put into the stations to best utilize the station space and function better as a learning environment for departmental personnel. Getting the city to understand why the department needed additional IT resources was difficult. The IT department understood the network upgrade project to be complete. (Personal Journal, August 31, 2009)

The internal cultural issue that I was the most concerned with was that if the system did not work flawlessly the first time the fire fighters would use the glitches as a rallying cry. "See I told you this IT stuff would never work." That was the reaction I was prepared for. That is what I expected. The stations had not been set up as I intended them

to be. The presentations had been prepared and the handouts were done but the system was not in the state of readiness that I wanted it to be in. But, the project had reached the point of no return. It was time to begin the study. The system had to go live on the test date, ready or not! I prepared for the IT glitches and the imminent complaining that I was sure would ensue. I accepted the fact that the system was not perfect and that I was going to have to live with it and do the best I could.

I believe some of this concern came from my own ego issues on wanting my project to be perfect. I also wanted everyone to see the same possibilities that I saw with the system. However, everyone did not have my background and experiences so they could not see the issues as I did. The study began the following morning on August 31st, 2009, and I was astounded about how wrong my pre-conceptions of the departmental reactions were. Examples of problems included delays in getting PowerPoint presentations up and working and delays in transmitting videos at a quality and speed viewers were used to seeing, but everyone tolerated the minor IT issues with ease.

*Study – Week 1 (August 31 – October 2, 2009)*

The first week of the study was the first of its kind for the SCFD. The department had used video teleconferencing to conduct interactive meetings but not to deliver trainings before. I envisioned significant problems with the way the classrooms were arranged. I had grand plans for classrooms at each station but because the fire department did not control the city IT department or the city budget, they were not able to fund the design as it was planned. This meant that, to start with, four of the fire stations would have to cram all of their people into the captain's office in order to view the first training session.

The training itself started without incident. I asked the participants for their understanding, before the class began, by explaining that the department was launching VTC training before all of the creature comforts had been completed. All of the class participants were very patient with the training session and there were not any issues or complaints about discomfort or being inconvenienced. This was a complete surprise to me and I had wasted all of that time worrying about their reaction and it was unfounded.

The class itself and the VTC system functioned as expected. I was able to switch between my PowerPoint and the desktop sharing with ease. I was also able to navigate the network while everyone watched and was able to show them where critical learning documents were. I was excited about the network sharing because for the first time I could show someone where the files were on the network server tree. The participants could see the network tree for themselves. For the visual learners I believed that this would be very beneficial.

After the session, the biggest revelation I had was that this system actually had worked! Everyone was in quarters and was participating in a joint training session. I could communicate both verbally and visually and share instructional media. The concept seemed sound and for the first time I proved that this technology could and should be used for training. It worked, it really worked! However, as with every rollout of a technology-based system, there were some issues that need to be worked out.

I was concerned about the lack of effective student interaction. One of the unusual things I experienced was that as an instructor I could not see the majority of my audience. I could see them when they commented but that was the only time. The VTC system video selector was set up to display the last person who spoke. This meant that the video

would toggle from speaker to speaker during pauses in conversation but not any other time. So the stations that did not offer any comments without prompting were also visually absent from the screen.

My research with VTC identified that if a person wanted the stations to comment the instructor needed to direct questions to the students by name. “Station 4 – Firefighter Joe, what do you think is the answer?” In this way I required student interaction. I prompted the participants to comment on the system.

I noticed that side bar discussions seemed to be going on in the stations. I was not too worried about them during the study because a steady stream of questions from me forced the students and stations to refocus. I encouraged these side bar discussions within reason and I believed this was part of the adult learning process. I saw it as an effort to verify what they were being told with their peers. Instructional design for future classes would include specific scheduled times to allow for group discussion to further encourage this behavior. I did not want to underestimate the importance of group learning as an important aspect of adult learning in the fire service.

I was concerned about placing the students in an environment where they felt threatened. It seemed ironic to be concerned about threatening a group that risked their lives for a living. Firefighters who were in front of their peers, in a non-emergent setting and especially when they were singled out in a learning environment, could feel very threatened. This was especially true when they were put on the spot in front of the entire fire department. Within the confines of their own engine companies they felt safe and were able to communicate without fear and that was a teaching and learning group that I intended to use as a tool to achieve a higher level of learning and thinking. From the

safety of the engine house the adult learners could comment without fear of reprisal from "the man." The companies could also learn from each other's experiences and discuss what had and had not worked for them in the past.

Dr. van den Berg attended the training on the first day of the study at SCFD Station 5. While attending the training session he noted the importance of side bar discussions at the station while the VTC training was going on. He brought up two points that I agreed with.

> 1. The anonymity of the different stations allows personnel in a site to "opt out" and discuss something – a real strength, because they couldn't do that in a face-to-face training venue.
> 2. Unfortunately, this input gets denied to the rest of the trainees, while those having the valuable discussion miss part of the training. (van den Berg Reflection 08/31/2009)

Dr. van den Berg also saw the need for a feedback loop of some type that would harness these side bar discussions to ensure these important points were not lost as valuable discussion points for the rest of the group.

The companies performed as a unit when they were in the field so I felt they should learn as a group when they were in the classroom. Each company had a captain who was their supervisor and whose job it was to direct the company's activities and provide leadership and direction. The company officer should be responsible for the majority of the questions and answers. In the typical engine or ladder company there was a specific division of labor. Each member had a specific task at each incident and was not expected to go beyond their scope of performance. I struggled with the question of How

far beyond their normal scope of operations should each firefighter be trained? I believed that it was good for them to learn as a group and answer as a group. For example if I was asking a question about a cardiac arrhythmia on the monitor I should try to focus on the paramedics in the group to get the answer. It is unfair to ask those with no previous training in the subject area to answer the question. However, by attending the training, those without previous training learn information that will be useful to them in the field even though the topic exceeds their base training levels.

This is learning by osmosis or from simply being in the environment. The lesson I learned was that I needed to steer from forcing my students to answer questions that were not part of their normal job scope. Following the team or company learning method the least senior members could learn from the answers of the more experienced members. A type of differentiation was possible in the team format because each member of the company learned at a different rate and had different experience levels. The most senior members became mentors in this setting and provided the answers the younger members could learn from.

A time slot that facilitated group discussion was an excellent suggestion. The instructional strategy would be to assign a discussion topic or learning objective and allow the individual companies five or ten minutes to discuss it and report back on their discussions. Companies should then be allowed to take several minutes and discuss how they could best implement the training topic into their own operations. I liked the approach because it allowed the companies to figure out a solution on their own and did not seem as though the administration were forcing an implementation issue down their throat. Empowering the on-duty companies to identify and implement their own solutions

to training issues was the most positive solution for the organization. Administratively, the department got what they wanted and the line suppression personnel got direct control over their own destiny and how they implemented the process or procedure.

Dr. Van den Berg commented on the direct instructional interaction with the stations. I was pleased that he also saw the importance of directing questions at specific stations in order to elicit a response from them. I felt that if I did not require them to communicate they would not. I needed these sessions to be truly interactive which necessitated direct questioning. What I did not do was direct the questions to specific personnel outside the captain or acting captain. I should have had a duty roster in front of me and made check marks on it when I had directly communicated with someone to make sure that I spread the communication around and involved virtually everyone.

I was also pleased at the way the training was able to transition between speakers during the first training session. I gave part of the lecture and Captain Hammann gave part of the lecture. The transition went smoothly and even incorporated a ten-minute break. The break was timed and seemed to give the participants the ability to further discuss some of the learning points. Not all of the break discussions at the teaching station focused on these points, but many did.

I was not satisfied with the web camera picture that the station 2 training room was transmitting, nor did I like the lighting environment at the station. My research from the other departments using VTC was that they also had lighting issues at first. I needed to redesign the lighting at station two to better facilitate web camera usage. I was also concerned with the camera angle. I needed to place a monitor on the podium that would show the presentation screen. I had to keep turning around to view the slide on the Smart

Board and those who were attending by VTC had to continuously look at the back of my head when I turned to look at the board. Placement of a monitor in front of the instructor would facilitate a better angle on the instructor's face.

I did like the practical evolution or review that was done in front of the camera. The review of the Rapid Intervention Team (RIT) bag was done in close proximity to the camera. My field notes from August 31, 2009 reflect that I should move the training prop even closer to the camera for future trainings to ensure a better picture. This training session was the first time the department had ever detailed the usage of a practical skill on a video training session. I definitely needed a different camera in the training room than the existing web cam on the speaker's podium. I believed that a new camera that was specifically designed to perform as a classroom camera was necessary for the lecture room. The $45 web cam that was being used gave a good video but there were issues with its depth perception focus and fixed position.

I assigned the stations to view a few of the videos on the network file that I directed them to. I was surprised that all of the stations followed up and actually watched the videos off the network server just like I asked them to do. They also did the quizzes and the evaluations as they were requested. The only reason I was surprised is that in my mind they had previously done these things because I had been in the room. However, as adult learners they assumed responsibility and did what was requested of them even though they were at remote locations without administrative oversight.

In reading Dr. van den Berg's comments on my first class delivery using the VTC system I was inclined to agree with most of his observations. It was reaffirming to get an outside assessment of my teaching technique. A professional external peer evaluation was

an excellent way to identify behaviors and environmental issues that I could not see for myself. Dr. van den Berg observed that when I made the assignment to watch the supporting videos I did not make the assignment specific enough. I should have told the attendees what specific videos I wanted them to watch and I needed to provide the firefighters more direction and identify my expectations more clearly. Dr. van den Berg identified the oversight and I made these changes to the VTC program format for future classes.

I was excited about the statement at the end of Dr. Van den Berg's reflection "to create a rich interactive environment that allows for both private talk (in each station) and public conference, across the settings." When the project is complete, if I felt that I had been able to make the same statement about the VTC project, then I would consider the initiative a huge success and the departments training delivery system will have changed for the better.

*Study - Week 4 (October2, 2009)*

Week 4 was presented by the St. Charles Fire Marshal – Assistant Chief Rich Oney. Chief Oney was a veteran instructor who had been teaching for several decades. I facilitated the system set-up for this lesson but I did not do any instruction. After the class was over I interviewed Chief Oney to get his thoughts on presenting with the new system. Chief Oney presented from his desktop in his office and this was the first class delivery that had not been transmitted from the station 2 training room.

Chief Oney seemed very excited about the new system and the possibilities it provided to the department. He liked being at his computer so that he had access to all of his files and teaching aids. Chief Oney indicated that he believed he had all of his tools at

his disposal. He stated that being at his computer gave him a sense of empowerment that he did not have when he was teaching from a mobile platform elsewhere in the department. When questions arose on the use of Firehouse software he was able to share his desktop and simply show all of the participants how to properly use the software, specifically what boxes to check, where and why.

Chief Oney was pleased with not having a travel time disruption because he was able to work from his desk. He was also happy with the reduced instructional time requirements placed on him because he only had to deliver the class once a day instead of the split format face-to-face training. I was impressed with how the onetime per day delivery freed up the department to operate in the afternoon. The department was able to accomplish more by condensing the delivery time of training to a single session instead of the traditional split shift format.

Having the training flexibility of half-day training also meant that training could be moved to the afternoon, to free up the morning for other operational issues. The training sessions were only scheduled for one and a half hours and this allowed the department to choose the time slot that best suited the organization and improved efficiency. The three shift battalion chiefs were pleased with the flexibility the morning or afternoon option provided them to schedule the operational day. The scheduled training was easier on the department because the battalion chief did not have to move companies around to cover for the companies who were out of position for training. When everyone was in quarters for training the disruption to normal departmental operations were minimized significantly. The ability to shelter in the engine house during inclement weather conditions, such as extreme heat or cold, was another aspect of video

teleconferencing that Chief Oney believed beneficial. He stated, “Now we do not have to worry about the trucks freezing up outside while we are in training, because everyone is in quarters” Assistant Chief Oney (personal communication, October 20, 2009).

In discussing the VTC initiative benefits with Chief Oney he mentioned that having the entire organization participate in the training sessions was an advantage. He noted that the chief and other administrative staff could now participate in training from their desks and still tend to their necessary administrative duties. This ensured that the line staff and the administrative staff were on the same page when it came to departmental training initiatives. He also believed that having the administrative staff take part in the training permitted administrative quality control and oversight of training classes. Senior officers viewed and evaluated instructor performance in a manner that was non-threatening to the instructors.

Another positive feature noted by Chief Oney was that if someone did have to go on a call there was limited disruption to the presentation. The presentation was also recorded and could be played back to allow the disrupted crews to catch up on their own time. Likewise, if personnel were out sick, on vacation, or unable to attend for any other reason they could make up the training so the department could ensure they had 100% training participation and attendance. The department stored the recordings on the LiveMeeting web site so everyone in the organization could view the recording once it was posted (Interview Chief Oney October 2009).

Dr. Weir attended the week four meeting at station 3. He monitored the class that Chief Oney gave and reflected on the instructional and learning experience afterwards. Dr. Weir noted a few issues at the beginning of training that were related to the system

set up. The first issue of concern he raised was the television at station 3 was at maximum volume and yet it was hard to hear the instructor.

Upon reading Dr. Weir's evaluation I went to station three to investigate. I had run a video cable to the TV but not an audio cable. The only sound being produced was from the small speaker in the computer itself and was insufficient for the larger day room at the station. I ran a cable from the headphone speaker jack on the computer to the component jack on the back of the TV and the sound and volume issue was resolved.

The next technical point Dr. Weir identified was that station 3 was unable to view the PowerPoint presentation. Dr. Weir noted that after an hour of class delivery Captain R. figured out how to solve the situation. I did hear a few complaints from the other stations that all they could see was the video and not the PowerPoint presentation. A few of the stations had the video screens maximized so it filled the entire screen and this caused them not to be able to see anything but the video. Once the video screens were downsized to the normal proportion they could see both the video and the PowerPoint presentation. Again, end-user training and improved communication from line personnel would resolve this operational problem.

I felt Dr. Weir's reflection was accurate and to the point for the use of the system. I needed to have additional training with the staff and line personnel on the proper use of the VTC. The system was fairly user friendly but not everyone was comfortable with the brand new system and some personnel required more training then others. Future training for the presenters and end users would be planned into the training schedule. Microsoft offered training through its website using the LiveMeeting system. Interacting within the LiveMeeting system during training allowed users to become more familiar with the

program. I found that MS LiveMeeting training presentations were exceptional and the student was able to use all of the system features during the training evolution.

The final technical issue noted by Dr. Weir was that the PowerPoint was not aligned with Instructor R's content. Again, after some time, Captain R. was able to use the scrolling feature to catch up with the PowerPoint presentation. The issue was related to a lack of training on the end user functions of the system and I should have done more end user training on system use. The department, as a whole, was getting better at using the system every day. The morning meetings were a really good way to keep everyone using the system. The more they used the system the more comfortable they became with it. I had also distributed presenter licenses to all of the captains to get them using the system and improving the experience levels and user confidence.

Outside of the technical issues, Dr. Weir commented,

> The delivery system offered solid advances in the prior instruction which required firefighters to leave their stations to meet in mass at alternating sites. The format of the instruction was traditional in nature with a pre-test, input and post test model. Instructor R. demonstrated an excellent foundation of knowledge regarding the topics being addressed. He incorporated humor and offered examples for each of the areas. The interaction between stations gave the students an opportunity to ask questions and get clarification. Often when this happened, station three participants would break out internally and have their own conversations. When Instructor R. began again with the lesson, the firemen would redirect their attention to the instruction….The system worked very well overall. As each fire station becomes more versed in the use of equipment, the minor

> glitches will take care of themselves. The safety of the community is greatly enhanced by keeping all the firefighters in their home stations. (Weir reflection, October 2009)

Dr. Weir saw the importance of the back-and-forth dialog in this teaching model. The interaction that was possible with this system was something that had been missing with audio conferences and one-way web casts. As an adult learning community, the SCFD needed to be able to communicate synchronously while remaining in quarters and VTC was the missing link. VTC was never going to replace physical training, but it could replace face-to-face lecture-based training at a single site.

*Student Evaluations*

The evaluations are the last reflection item I want to discuss in this chapter. The evaluations I had from the study sessions all spoke very highly of the VTC process and the importance of being in quarters. Almost 100% of the respondents saw the importance of being in quarters and having lower response times to calls for assistance from the public. All but two of the evaluations reflected positively on remaining in quarters to do training. Even after all of the other surprises in this study, I did not expect the line personnel to like staying in quarters.

The two negative comments that I received on the evaluations were about how everyone was going to miss the socialization aspect of getting together. The fire service is considered a true brotherhood and now the fraternity was having its meetings in a different fashion. The administrative staff of the fire department reassured the line personnel that they were still going to have trainings where the entire department was

physically there, on split shifts. It would just be less often than before. The SCFD wanted to reduce the number of face-to-face trainings, not eliminate them altogether.

I had five comments expressing concern that hands-on physical training was going to be eliminated. The administrative staff reassured the line personnel that hands-on training was not being eliminated. The goal of the VTC initiative was to provide an alternative to some of the department's lecture-based trainings only. The department made mobile physical hands-on props so they could be moved from station to station and keep individual companies in quarters.

*Summary*

The reflection and field notes from this study identified some key technical and operational issues that needed immediate attention. Most of the issues were quickly dealt with and the product being created at the end of the study was a high quality training environment that was being produced at very minimal cost to tax payers. This project redefined return on investment (ROI) in training delivery to the emergency services at $275 per month. Personnel were training from their still alarm areas and receiving quality training at the same time. That training was also recordable, storable and available 24 hours a day.

The more the department used the system the better it functioned. Most of the technical glitches were repaired and the department now looked to a regional audience and application. The organization realized that they were cutting a new path and they expected to find new and unforeseen obstacles. I remain reassured that as long as the organization moves forward as a team they will not find any obstacles they cannot

overcome. I am encouraged and excited about the possibilities the system offers the organization and the region. I look forward to the next series of challenges.

# Chapter 7: What Did and Did Not Work

In this concluding chapter I will review the data collection methodology that I used during the study and the results that followed. The discussion of the data collection will be broken down into what worked, what did not work and what I would do differently if the study was repeated. The second item addressed is, How did we build the team, project and resources and what might others learn from this project? Finally, I address how I might change or vary the instructional model that was used during the process.

## *Data Collection Methodology*

I used two surveys to get a sense of what the on-duty personnel believed was important with regarding the learning environment and delivery methods. I found that the SCFD needed to change its training delivery methods and identify what its internal stakeholders valued in the way of training delivery. Assessing the internal stakeholders seemed like a logical starting point. The second survey was designed to get an idea of how the on-duty personnel at the department felt about using electronic media as a learning strategy in the work environment. I used the survey results (see chapter 4), to help determine the local training delivery problems.

*What worked.* I believe that the internal surveys worked well. I was able to get responses from the employees that I do not think they would have felt comfortable enough to give in an interview process or roundtable discussion. The surveys were anonymous and I do not believe that anyone felt threatened during the process. I thus considered the responses to be genuine and reflected how the firefighters truly felt about training delivery and information technology trends in training delivery. The surveys

were done in conjunction with scheduled training and so were completed over three shift days. The short duration of survey data collection assisted with keeping the surveys secure and limited departmental discussion about the surveys themselves. I believe that short delivery duration and tight control methods after the survey assisted in validating the information collected with the surveys.

I conducted the first series of interviews with local training officers to confirm my suspicion that the SCFD was experiencing the same training delivery difficulties as their neighbors were. The interviews worked well and once the interviews were scheduled I went to their location and performed the interview. The Livescribe system I used to record the interviews worked very well. The electronic file was easily shipped to the transcriber and quickly turned into a text document chronicling the interview. The member checking system also worked well via e-mail and three of the participants changed their responses during the process. Having the interviewee's review what they said also increased the accuracy of statements and ensured that I did not misinterpret what was said. I feel the information collected in the interview process was accurate and truly reflected the training delivery issues in the region.

The same recording process was used for the national interviews. The goals for the national interviews were to identify if the participants were experiencing the same training delivery problems as the St. Louis region. The second goal of the national interviews was to learn how they were overcoming those problems. The interviews were conducted by phone. The interviews were also recorded, transcribed and member checked. The entire process worked very well. I was able to learn tremendous amounts from their experiences with VTC and what they did and did not like about their systems.

The data collection from these sources went very well and I believed that data collected was as free from contamination as could be reasonably expected.

The final method of data collection was from my own field notes, personal reflections and the reflections of two of my committee members. The field notes from my journals proved to be invaluable when I began to build the best practices model and when I reflected on the implementation of that model. I would have never remembered all of the facts and difficulties I experienced if I had not chronicled them in my journals. I also found that recording my reflections during the training presentations or immediately afterwards allowed for a better and more accurate collection of data and facts.

The reflections of my committee members may have been the most valuable information that I collected during the process. I considered the information so valuable because it was from a perspective outside of my own. The reflections they offered were those of educators. They were not firemen; they were not emergency responders; they were lifelong educational professionals. If I would make recommendations for further studies in this area I would strongly recommend the input from multiple educational professionals who have terminal degrees in education.

*What did not work.* When I asked myself what did not work with the surveys, I would have to say that the questions on the survey were very important and should be clear and all focus on the main questions that were being asked in the study. The questions in my surveys could have been clearer. Several of the questions had double negative connotations and could have been more confusing than they should have been.

Future studies should pay very close attention to survey questions and run the surveys past multiple professors prior to the implementation of the study or IRB

application. I should have rewritten the surveys with the assistance of my new committee members and given another survey to the same group. I believe the survey I gave was a good one but I also believe that with additional effort and guidance it could have been sharper and more focused on my specific research topic or at least less generalized then it was. Keeping the same committee together from start to finish would have been ideal; however, in my case it was not possible due to retirements.

I would also have liked to give the survey initially to a completely unrelated group of firefighters as a pilot study. This effort would have been an opportunity to assure the questions were being received as I had intended them to be. After the initial control group test I could have made modifications if necessary and refocused the questions.

The interviews went well, but after completion of the interviews I would have liked to have framed several different questions and re-interviewed all of the participants. Once the interviews were complete and the data compiled, it was clear that there were trends in the data from all sectors that I interviewed. I would have liked the opportunity to follow up with the participants and disaggregate the trends that were identified. I wanted to determine the root causes of each of those trends. I think that information would have been very telling, to go organization by organization and identify root causes of their training difficulties. However, the time necessary for that kind of research was prohibitive for me but is one that needs to be undertaken in a future study.

I received good advice from one of my professors, early in my program that I needed to keep a journal of my experiences as the project was underway. I got good advice but I would have liked to have kept a journal from day one of the project. I had all

of the research materials, documents and bids, but I did not have notes on what I was thinking during those times or have records of why certain decisions were made. From the point I started the journal I have excellent records. I wish I would have started project journaling earlier.

I am also sorry that I did not get more outside reflections on more classes. I would have liked to get additional reflections from my dissertation committee members. If each of my committee members could have attended three classes and given a reflection on each class, I believe my research would have benefited. This may have been an additional hardship on the committee members but the value and richness it would have brought to the study would have been significant. Their input would have been especially valuable to me in providing thoughts and ideas on improving and varying the instructional model to fit my specific environment.

*What I Would Do Differently Next Time*

The VTC project has been a training and communication success for the SCFD. Looking back, the project would have benefited from a better presentation of overall system design from the start. I did not make a presentation to the necessary people in the city that detailed every piece of hardware and software that was needed to complete the project to the level of the Best Practices model. I should have outlined the project on a spreadsheet and included every aspect of equipment with its price and a justification. The project suffered because the department was engaged in a learn as you go process. Because of my lack of experience in setting up web-based VTC systems, I could not accurately predict all of the required project equipment needs. An outside consultant would have been an asset.

The VTC project as of January 2010 was at 90% funding level. The project would have had a better chance of 100% funding if it was presented as a complete package instead of the piece meal purchasing process that I used. The system was functional and only two stations remained slightly deviated from the best practices model that was identified. Funding at 90% is very close to the fire department's best practices goal but a different approach to the initial presentation may have led to complete project funding.

Given the opportunity to repeat the study, I would have kept a journal from day one. The journal would have provided key dates and reasoning for early decision making. I have kept all of the e-mails sent and received but I needed to file them in a more organized manner. They are in a file simply titled VTC and that is inefficient and cumbersome. The master file needs many categorized sub-files under it because I am unable to find several e-mails in the large unorganized file system.

I also did not keep meeting minutes in a manner that allowed easy and orderly review. I did not have agendas and I did not follow up the early meetings with published minutes for meeting attendees to verify understanding of meeting happenings. The lack of meeting minutes and records has proven to be a detriment to the project on more than one occasion. I needed verification of times and dates on many occasions and did not have them because I was just using my memory of past events. My memory and the memory of the other meeting participants were not always the same. Better record keeping would have provided the data necessary to validate positions on historical events.

I would have also had someone from the IT department attend every project committee meeting. During the time of the study, the city's IT department was completing the installation of a new city-wide network and replacement of all of the

city's computers. Having a representative from IT at every meeting would have been burdensome, but I could have taken the meeting to their office and done more to make the meeting less of an imposition on them. Everyone's time was precious but on a project of this type, continuous IT department involvement was a key to ensuring success. I did not have continuous IT involvement and because of that the project suffered slightly. The suffering was related to time delays and project completeness. The fire department is catching up on the to-do list with the remaining items in the IT work order system. The success of the VTC initiative will eventually lead the project to completion. Early IT involvement would have decreased the time frame for project completion.

*How We Built the Team, Project and Resources and What Others Might Learn From This Project.*

*Identification of need by staff and line personnel.* The need for a different method of training delivery was obvious to the entire organization. Both the staff and line personnel realized the need and the pressure of increasing response times forced a change for the SCFD in 2006. The increasing industry training requirements and the increasing political pressures on the department meant they would need to find a solution to their training delivery dilemma as quickly as possible. Adversity can tear many organizations apart, but, when the organization has a clear vision and mission statement, adversity can be a unifying pressure. In 2006, the SCFD was in complete agreement that something needed to be done to improve training delivery above and beyond the face-to-face model.

A clear vision and strategy needs to be the starting block for any change initiative or new project. Hesselbein, Goldsmith and Summerville (2001) outlined the importance of having a clear vision and strategy that is communicated throughout the organization

from the top down. It is not sufficient to have clarity only at the upper management levels. The front line personnel need to know, understand and believe in the vision and mission of the organization in order for the vision to have power. Leaders and managers also need to support the strategy with the necessary resources to support the organization and ensure the success of innovation. If the entire organization shares the same vision, mission and values, then the amount of internal conflict will be significantly reduced (Hesselbein et al.).

*Support from department director.* Chief Ernie Rhodes offered encouragement to the staff of the SCFD to find a solution that was innovative and met all of the departments needs. I believe the courage to innovate comes from the department's mission statement: "Service Without Boundaries, Compassion and Integrity in all that we do, Courage to move forward." The department had the courage to try something new. In fact, Microsoft is not aware of any other fire departments utilizing this solution in the continental United States. The "Courage to move forward" is what made the entire project possible.

*Research.* The organization did enormous amounts of research to identify what types of systems were available and what would work best for them. In the end, the project's driving force was value, getting the most functional system they could for the least amount of money. The St. Charles municipal budget was tight and unplanned capital improvement plan (CIP) budget items were not allowed. The total CIP outlay needed to fit into existing CIP project amounts. The operations budget was even tighter than the CIP budget, so that operational costs needed to be minimal. Research drove the organization to a web-based solution. Four different vendors were evaluated and brought

in for proof of concept testing. On-duty personnel assisted in evaluating the different vendors and supplied input on what product they thought best fit the needs of the department. In the end, the organization chose Microsoft LiveMeeting.

*Piecemeal hardware.* One of the most difficult tasks getting the LiveMeeting system ready for use was the fact that it did not come pre-packaged with equipment. I had to determine what equipment was needed at each station for both meetings and training sessions. This was a trial and error process that seemed to take forever. When I would set something up at a station and it did not work, I would have to figure out why and then replace or repair it. In the stations that had larger numbers of people, I did not even consider the need for larger monitors. At those stations we had to reevaluate the learning environment and bring in flat panel monitors to allow for a larger viewing audience. When the flat panel was not big enough, a projector was placed in the station. Each station was different and I had concerns that the firefighters would complain about the inequity of the presentation screen, but they did not have any issues with the process. I found that maintaining a high level of communication between the firefighters and myself, about the status of the VTC project, assisted in keeping the complaints to a minimum.

*Employee patience, flexibility and understanding.* Again, I believe that the combination of the department's mission statement and the firefighters' patience, flexibility and understanding made the VTC project a complete success. I was overwhelmed by the lack of resistance from within the organization. Even during computer glitches or when I accidently kicked everyone out of a web meeting and had to start the entire session over, all I received was good natured ribbing. The department was

very fortunate to have a group of people who had the level of professionalism that the SCFD did. The esprit de corps was a major contributing factor to the success of the VTC initiative.

I credit the positive attitudes the line personnel maintained throughout the innovation process to the level of involvement everyone shared. From the inception of the research project the line personnel were regularly updated on the project progress and were asked for their input. The management of the SCFD paid close attention to the personnel's opinions and made changes according to their suggestions. The management listened and made changes accordingly. Adair (2009) wrote,

> Interest leads to ideas. In turn, the recognition of ideas from management leads to more job interest, greater involvement and deeper commitment. Even if – for good reasons that are explained to them – a team member's proposal is not acceptable, or if acceptable cannot be implemented, there is no loss in motivation. The important thing from the motivational perspective is the feeling of being really part of the enterprise, with a full share of responsibility in developing the quality of product or service. Identification matters more than the fate of any particular suggestions. (p. 12)

*Developing the Organizational Team*

Innovation leadership and management needs to begin with the overall belief that the leader or manager can effect change on the system or organization. The fundamental belief of "Yes, I can" is crucial and when times get tough during the change process, this belief may be the only comfort the leader has to reassure them. It truly comes down to this belief, giving the individual confidence and personal reassurance that it can be done.

The belief can also become infectious within the organization. If the leader oozes positive energy and espouses the belief that "yes, we can," he or she can start to build the support for the initiative, simply with a positive attitude and personal energy. Warm, confident effervescent charm and positive energy can ignite even the most lifeless employee.

The leader or manager must also create a sense of urgency. A sense of "we have to do this and we have to do this right now" is the spark that can engage an organization. Everyone wants to believe in a cause and do what he or she can to make a situation better, and if there is a time line or a feeling of immediacy then the organization can be galvanized around a passionate cause and spurred to immediate action. If there is no sense of immediacy, then the employees who are already consumed with their normal everyday jobs will not make any additional effort to address the initiative. They will simply throw it in the in-box and say they will get to it when they can. Everyone needs to come together in an organized fashion and deal with the issue as a team. Creating a sense of urgency is the organizational reveille trumpet call that brings everyone together to start the process.

When addressing the development and change needs of the organization Bolman and Deal (2008) applied their four frames organizational concepts to Koster and Cohen's concepts. They both cited the failure of many change initiatives because they focus more on data gathering, analysis and report writing then on addressing their employee's feelings that truly motivate positive behaviors (Koster & Cohen, as cited in Bolman & Deal, 2008). The fire service needs to begin unifying their organizations behind change initiatives with a sense of urgency to ensure project success.

The leader must assemble a team of trusted advisors who can serve as his or her council, faithful followers and field generals. The team must be above all things unified. This does not mean that they cannot disagree or have different beliefs, but once a decision has been made, then everyone on the team needs to support the decision regardless of their personal beliefs. Surrounding oneself with good people is a business adage that has been around for decades and still holds true today. The leader must be able to rely on the team to do the right things for the organization and for the support of each other. The only way the organization will fail is due to a lack of internal leadership, cohesiveness and teamwork. There is an old Chinese saying, *The castle falls from within.* If the team is unified then the castle will not fall.

The leaders of the organization must perform and act as a unified team by continuously modeling their commitment to the change initiative through both words and actions. There are many examples of executives who were not truly aligned behind the change initiatives their organizations faced and eventually failed to bring about true change. These failures could be predicted because the leaders who were pushing the initiatives were not supporting the movement thru unification and model behaviors (Anderson & Anderson, 2001).

Careful research should be done to identify internal and external stakeholders. Missing a stakeholder could adversely affect the project's success. Internally there are power brokers who may be both formal and informal. Both leaders need to be involved in the process. Pay particular attention to internal politics and organizational history. Why have previous initiatives failed? Who stopped them from the inside? Find those people and begin to build a relationship with them. The leader is going to need them. Externally,

the search needs to encompass the community and the local political scene. Assess who the players are and who is controlling the puppets from behind the scenes. Try to involve both interested and uninterested parties.

Once the team has been assembled, a vision needs to be laid out by the leader of the project. The team can begin developing the mission, goals, and objectives. Developing and articulating the vision to the team is a very important task for the leader. He or she must sell the vision to the team and the organization. Everyone needs to know where they are going. The vision provides the end goal and defines success. The mission provides the How are we going to get there? answers to the team and the organization. Additionally, setting goals and objectives that are reasonable and measurable will allow the team to feel empowered and assure them they are in charge of their destiny.

Establishing a sense of trust is critical to the organization and the project. Although, depending on the situation, establishing trust in some environments can be very difficult, especially in toxic or unhealthy environments. Building trust has to start somewhere, so no matter what the environment is the leader must take the high road and start to act in a manner that builds trust. One of the best ways to do that is to communicate at a high level. Stopping the toxic behavior and the rumor mill before it gets rolling are vital to reversing the organizations effects. The use of the VTC system is an excellent way to communicate at a higher level with all of the organization's employees at once. Deeds and actions also help build trust and the leadership must do what they say they are going to do.

Doing what you say you will do is the mark of credibility (Kouzes & Posner, 2003). Credibility is mostly about having consistency between words and deeds. "People

listen to the words and look at the deeds. Then they measure the congruence. A judgment of credible is handed down when the two are consonant" (Kouzes & Posner, p. 48). Aside from personal credibility, a leader must do what we say we will do and the "we" is the crucial difference. The "we" is the leaders, constituents and what they believe.

> To take people to places they have never been before, leaders and constituents must be on the same path. And to get people to join the voyage of discovery voluntarily requires that the aims and aspirations of leaders and constituents are harmonious. (Kouzes & Posner, p. 48)

Leaders must also give their personnel expectations. People need to know what is expected of them before they can meet the leader's expectations. Most employees want to meet their supervisor's expectations and do a good job. Clear and concise expectations in the form of goals and objectives allow everyone to know what success looks like. The goals and objectives need to be measurable and need to be evaluated and assessed frequently. It is unfair for an employee to go an entire year between evaluations to find out that they are not meeting their supervisor's expectations.

*Improvements or Variation of the Instructional Model*

*Involve instructional staff from the start.* I recommend that the SCFD make additional changes to their instructional model. In making this recommendation, I would look to the educational community for guidance and experience in instructional models. One of the first initiatives would be to get all of the instructional staff together and ask for their participation in the development of the new instructional models. The purpose for a regional application of the VTC system was to ensure that local training officers had additional time to develop instructional models and further develop their curriculums.

These working groups could be formed by veteran training officers who have experience developing curricula. Then their curriculums could be shared regionally further leveraging instructional talent.

Company officers from across the St. Louis region will be sitting with their crews attending VTC classes. They should be used as an asset by the instructor and trusted to lead small group learning sessions. This small group learning session could be a break-out session during a regular class where the instructor calls for a small group discussion. This is a perfect opportunity to differentiate the educational environment for the companies during a VTC session. Let the company officer or a more senior member of the company lead the discussion. The educational emphasis is to increase the level of critical thinking and ensure that the entire company gets involved in the learning process.

Healthy organizations promote continuous learning. McLagan and Nel (1995) stated that participative organizations celebrate and stimulate learning. Employees learn from one another regardless of rank or age and those who share their knowledge are applauded. Those who will not share are considered knowledge thieves.

*Summary*

The SCFD needed an innovative way to deliver training that kept its companies in their individual engine houses. Departmental training hours needed to be increased, but staffing would not allow for companies to be out of their still alarm areas for extended periods of time. The organization committed itself to finding a solution that increased training but also decreased response times. Video teleconferencing was the answer and the web-based Microsoft LiveMeeting platform was chosen to fill the training need.

Research on VTC guided the department to a best practices model for training delivery over a web-based platform.

The department was able to deliver more training and dramatically improve their internal communication while all of their companies remained in quarters. The training hours have increased and the response times have been reduced as a result of this initiative. There is a direct correlation to the use of LiveMeeting and the reduction of response times for emergency calls in the City of St. Charles, Missouri. In this setting, video teleconferencing works and it has made the public safer.

References

*About ISO*. (2009). Retrieved October 6, 2009, from ISO Web site: http://www.iso.com/About-ISO/Overview/About-ISO.html

Adair, J. (2009). *Leadership for innovation; How to organize team creativity and harvest ideas.* Phiadelphia: Kogan Page US

Advanced life support. (2008). In *A dictionary of nursing*. Retrieved October 6, 2009, from Encyclopedia.com: http://www.encyclopedia.com/doc/1O62-advancedlifesupport.html

Affiliated Computer Services, Inc. (2009). Retrieved October 6, 2009, from http://www.firehousesoftware.com/aboutFH.php

American Heart Association. (2009). *About us*. Retrieved October 6, 2009, from http://www.americanheart.org/presenter.jhtml?identifier=1200029

Anderson, L., & Anderson, D. (2001). *The change leader's roadmap*. San Fransisco: Josey-Bass

Barlow, P. J. (2002). *Smart videoconferencing: new habits for virtual meeting.* San Francisco: Barrett-Koehler Publishers, Inc.

*Best places to live*. (2008, August). Retrieved October 6, 2009, from CNNMoney.com Web site: http://money.cnn.com/magazines/moneymag/bplive/2008/states/MO.html

Bolman, L., Deal, T., (2008) *Reframing organizations: artistry, choice, and leadership(4th ed.)*, San Fransisco, Josey-Bass

Carman, J., (2005, August) *Blended learning design: five key ingredients.* Retrieved April 20, 2010 from http://www.agilantlearning.com/pdf/Blended%20Learning%20Design.pdf

Carr-Chellman, A., (2005) *Global perspectives on e-learning, rhetoric and reality.* Thousand Oaks: Sage Publications.

City of St. Charles, Missouri. (2010). *History*. Retrieved May 5, 2010, from http://www.stcharlescitymo.gov/Departments/Fire/History/tabid/692/Default.aspx

City of St. Charles, Missouri. (2009) Fire Department Operational Budget

Dunn, J. R. (2002, November 1). *Digital video compression explained*. Retrieved October 6, 2009, from Microsoft.com Web site: https://www.microsoft.com/windowsxp/using/moviemaker/expert/digitalvideo.mspx

Emergency response provider. (2006). In *NIMS definitions.* Retrieved October 6, 2009, from State of Missouri – State Emergency Management Agency Web site: http://www.sema.dps.mo.gov/Planning/NIMS%20Definitions.doc

E-Sponder. (2009, January 28). *Tampa authorities deploy latest technology for Super Bowl security.* Retrieved April 20, 2009, from http://www.esponder.com/pdf/Tampa_Press_Release.pdf

Gardner, H. (1983). *Frames of mind*. New York: Basic Books.

Gorman, M. E. (2006, June 24). *Videoconferencing over IP: configure secure and troubleshoot*. Retrieved April 5, 2009, from www.virgina.edu: http://www2.iath.virginia.edu/albell/#

Gough, M., & Rosenfeld, J. (2006). *Videoconferencing over IP - configure secure and troubleshoot.* Rockland: Syngress.

Hesselbein, F., Goldsmith, M., & Somerville, I. (2001). *Leading for innovation and organizing for results*. San Fransisco: Josey Bass.

Joyce, B., Weil, M., & Calhoun, E., (2004). *Models of Teaching (7th ed.).* Boston, Pearson.

Knowles, M. (1980). *The modern practice of adult education*. New York, Cambridge

Kouzes, J., & Posner, B. (2003). *Credibility – How leaders gain and lose it why people demand it.* San Fransisco: Jossey-Bass.

Ludwig, G. (2008, July 8). *EMS response time standards*. Retrieved May 9, 2009, from EMS Responder.com Web site: http://publicsafety.com/article/article.jsp?id=2255&siteSection=5

McLagan, P., & Nel, C. (1995). *The age of participation – New governance for the workplace and the world.* San Fransisco: Berrett-Koehler.

Microsoft. (2006, March 29). *Global software company uses web conferencing to save over $650,000 a year.* Retrieved May 24, 2009, from http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?CaseStudyID=48466

Microsoft. (2007, September 26). *University enhances collaboration, productivity with unified communications.* Retrieved April 22, 2009, from http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000000736

Microsoft. (2007, October). *EMC Helps Reduce Complexity for Customers Through Integrated Communications Strategy* . Retrieved April 21, 2009, from: http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000000844

Microsoft. (2007, October 4). *Supermarket retailer enhances telework initiative with unified communications.* Retrieved April 20, 2009, from http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000000790

Microsoft. (2007, October 15). *Food company reduces travel, improves collaboration with web conferencing solution.* Retrieved May 8, 2009, from http://www.microsoft.com/casestudies/casestudy.aspx?casestudyid=4000000857

Microsoft. (2007, October 16). *Unified communications integral to next-generation workplace strategy.* Retrieved April 20, 2009, from http://www.microsoft.com/casestudies/casestudy.aspx?casestudyid=4000000834

Microsoft. (2008, September 8). *GSD&M Idea City - Ad Agency Saves Hundreds of Hours Weekly with Integrated Collaboration Solution* . Retrieved April 21, 2009, from: http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000002631

Microsoft. (2008, October 14). *Firm boosts collaboration, responsiveness to customers with unified communications.* Retrieved April 20, 2009, from http://www.microsoft.com/casestudies/casestudy.aspx?casestudyid=4000002844

Microsoft. (2008, November 18). *Law firm empowers attorneys and reduces costs by using unified communications.* Retrieved April 20, 2009, from http://www.microsoft.com/casestudies/casestudy.aspx?casestudyid=4000003048

Microsoft. (2009, January 26). *University adopts unified communications to improve education, streamline operations.* Retrieved April 20, 2009, from http://www.microsoft.com/casestudies/casestudy.aspx?casestudyid=4000003536

Microsoft. (2009, January 27). *Rescue workers expand communications options to improve operations and reduce costs.* Retrieved April 21, 2009, from http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000003555

Microsoft. (2009, February 10). *Architecture firm enjoys home use, training benefits of software licensing program.* Retrieved April 22, 2009, from http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000003629

National Security Agency. (n.d.). *Systems and network analysis center information assurance directorate: Video teleconferencing*. Retrieved October 6, 2009, from http://www.nsa.gov/ia/_files/factsheets/Video_Teleconferencing.pdf

National Fire Protection Association. (2009). *About NFPA*. Retrieved October 6, 2009, from http://www.nfpa.org/categoryList.asp?categoryID=143&URL=About%20NFPA

Netelligent – Tandberg Bid (2008)

Occupational Safety & Health Administration. (2008, August 29). *OSHA's role.* Retrieved October 6, 2009, from http://www.osha.gov/oshinfo/mission.html

PC. (n.d.). In *The American heritage dictionary of the English language*,( 4th Ed.). Retrieved May 11, 2010, from Dictionary.com website: http://dictionary.reference.com/browse/PC

Rhodes, J. (2001). *Video Conferencing for the Real World. Implementing Effective Visual Communication System.* Boston: Focal Press.

Spielman, S., & Winfield, L. (2003). *The Web Conferencing Book: Understand the Technology, Choose the Right Vendors, Software and Equipment.* New York: Amacom.

*Telephone History*. (2009, Janruary). Retrieved April 25, 2009, from Wikipedia: http://en.wikipedia.org/wiki/Telephone#History

*Unified Communications*. (2009, Janruary). Retrieved April 25, 2009, from Wikipedia: http://en.wikipedia.org/wiki/Unified_communications

Welsh, W. (2005, December 8). *ACS, Microsoft team on fire department software package*. Retrieved May 5, 2009, from Washington Technology Web site: *http://washingtontechnology.com/articles/2005/12/08/ acs-microsoft-team-on*-fire-department-software-package.aspx

Wilcox, J. R. (2000). *Video conferencing the whole picture* (3rd ed.). New York: Telcom Books.

Zemke, R. (2008, September). *Who needs learning theory anyway? Training Magazine, 39* (9), 86-88.

Zhengyou, Z. (2008, July 29). *Continous Presence Presentation.* Retrieved April 20, 2009, from http://research.microsoft.com/en-us/um/redmond/events/fs2008/ Presentations/Zhang_Zhengyou_Faculty_Summit_072908.pptx

Ziff Davis Publishing Holdings Inc. (n.d.b). *Proof of concept*. In *PC magazine encyclopedia*. Retrived Janruary 23, 2010, from

http://www.pcmag.com/encyclopedia_term/0,2542,t=proof+of+concept&i=4985700.asp

Ziff Davis Publishing Holdings Inc. (n.d.a). Firewall. In *PC magazine encyclopedia*. Retrieved October 6, 2009, from http://www.pcmag.com/encyclopedia_term/0,2542,t=firewall&i=43218,00.asp

Ziff Davis Publishing Holdings Inc. (n.d.c). Unified communications. In *PC magazine encyclopedia*. Retrieved October 6, 2009, from http://www.pcmag.com/encyclopedia_term/0,2542,t=unified+communications&i= 53422,00.asp

*Appendix A*

# *Sponsored by the St. Charles Fire Department*

# *2009 St. Louis Metro*

# *Fire Department / Fire Protection District*

# *– SCFD Training Delivery Survey*

We need your help to learn about how the St. Charles Fire Department can deliver training in a way that its employees will receive well. This survey is part of a Dissertation and will drive the Grant and IT projects for the St. Charles Fire Department in an effort to make training more accessible to the St. Louis Metro Region.

This survey is modeled after a National Public Radio (NPR) survey:

http://www.npr.org/programs/specials/poll/technology/technology.adults.html

**Please return this survey to:**

Captain Robb F. Watkins
Training Officer – St. Charles Fire Department
200 North Second St.
St. Charles, MO 63301
Or Email to Robb.Watkins@stcharlescitymo.gov
Or Fax to: 636-410-0330

**Results will be posted on my blog at:**

**http://scfdfiretrainingtech.blogspot.com**

**There are no right or wrong answers to these questions!**

**1.) The traditional classroom setting is the only way I can learn.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**2.) I feel that all shift personnel need to physically be in the room when we train.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**3.) I am comfortable learning as a crew without other crews being involved.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**4.) I can learn complicated procedures by watching a video and then having a demonstration and discussion**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**5.) We need to continue physical/hands on training**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**6.) We need to be 100% compliant with governmental standards.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**7.) We do not need physical / hands on training.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree No Opinion Strongly Agree

**8.) Governmental standards compliance is not an issue for me (Do not care)**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**9.) Response times would improve if we spent a greater amount of time in quarters.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**10.) Being out of place for training does effect response time.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**11.) We have sufficient crews and staffing to continue training with the traditional model.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**12.) Being out of place for training does not effect response times.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**13.) The public is at risk when we are out of place for training.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**14.) Response times of 4 minutes to the first arriving unit is unreasonable.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**15.) I can learn from a interactive video discussion.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**16.) I am comfortable with computers and technology.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**17.) I am concerned that we do not test after each training to assure that learning has taken place.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**18.) I do not like testing.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**19.) I believe that we all put in equal amounts of effort towards training - All companies - all shifts.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**20.) I am ok with some Captains putting more effort into training than others.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**21.) We should not do any fire training.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**22.) We should make every effort to be the best at what we do.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**23.) I like when mobile props are brought to the station for training.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**24.) I prefer when the Station Captain does the training for my crew.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**25.) I want to go back to Engine Company training where the Captains led the training.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**26.) I do not want to go back to Engine Company Training.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**27.) We should be able to out of district for training while on duty without coverage.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**28.) We should get ALS coverage so that we can go out of district for training.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**29.) We should be able to go OOS for training without coverage.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**30.) We should be able to go OOS for training with ALS coverage.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**31.) I am concerned that call volume will disrupt us in training.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**32.) I am concerned that when we get disrupted we miss valuable training.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**33.) I am not concerned about missing training.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**34.) I believe we should have individual training plans for improvement.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**35.) I think we should do yearly skills and training evaluations.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**36.) We should be training with other departments.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

**37.) We should only train with our department.**

1. ○ 2. ○ 3. ○ 4. ○ 5. ○ 6. ○ 7. ○ 8. ○ 9. ○ 10. ○

Strongly Disagree Neutral Strongly Agree

Appendix B

**Lindenwood University**
**St Charles Fire Department**
**Informed Consent to Participate in Human Subject Research**

Captain Robb F Watkins EMT-P, MBA a doctoral student at Lindenwood University, St. Charles Missouri, would appreciate your participation in a research study designed to determine what are the training delivery needs of the St. Charles Fire Department. You are being asked to complete an anonymous survey that should take up no more than 20 minutes of your time.

While this information could be obtained by interviewing you, we feel that the survey is the quickest and easiest method for obtaining this information.

We anticipate no risk to you as a result of your participation in this study other than the inconvenience of the time to complete the survey.

While there may be no immediate benefit to you as a result of your participation in this study, it is hoped that we may gain valuable information about emergency services training delivery that will be of future value to our industry and society.

The information that you give us on the questionnaire will be recorded in anonymous form. We will not release information that could identify you. All completed surveys will be kept in a locked file cabinet in the office of Captain Robb F Watkins of the St. Charles Fire Department and will not be available to anyone not directly involved in this study.

If you want to withdraw from the study at any time you may do so without penalty. The information on you up to that point would be destroyed.

Once the study is completed, we would be glad to give you the results. In the meantime, if you have any questions, please contact:

Captain Robb F Watkins
Training Officer
St. Charles Fire Department
200 North Second St
St. Charles, MO 63301

If you have any complaints about your treatment as participant in this study, please contact:

Dr. Cynthia Bice
Dean - School of Education
Lindenwood University
209 South Kingshighway
Saint Charles, Missouri 63301
Office: 636-949-4618

Although Dr. Bice will ask your name, all complaints are kept in confidence.

**Your completion and submission of the survey to the researchers represents your consent to serve as a subject in this research.**

This research project has been approved by the Lindenwood University Institutional Review Board for the Protection of Human Subjects.

Appendix C

St. Charles Fire Department - Learning Survey - Final 08-24-2009

| | | **Strongly Disagree** | | | | **Disagree** | | **Neutral** | | **Agree** | **Strongly Agree** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | | | |
| 1 | The traditional classroom setting is the only way I can learn. | 13 | 7 | 11 | 7 | 11 | 3 | 3 | | 1 | 1 | 57 | 49 | 0.859649 |
| 2 | I feel that all shift personnel need to physically be in the room when we train. | 10 | 3 | 13 | | 14 | 4 | 4 | 2 | 3 | 4 | 57 | 40 | 0.701754 |
| 3 | I am comfortable learning as a crew without other crews being involved | 2 | 2 | | | 11 | 3 | 8 | 8 | 10 | 13 | 57 | 42 | 0.736842 |
| 4 | I can learn complicated procedures by watching a video and then having a demonstration and discussion? | 2 | 1 | 4 | | 6 | 5 | 12 | 10 | 7 | 10 | 57 | 44 | 0.77193 |
| 5 | We need to continue physical/hands on training | | | | | 1 | | 3 | 3 | 9 | 41 | 57 | 56 | 0.982456 |
| 6 | We need to be 100% compliant with governmental standards. | | | 3 | | 12 | 2 | 12 | 8 | 7 | 13 | 57 | 42 | 0.736842 |
| 7 | We do not need physical / hands on training. | 45 | 5 | 6 | | | | | | | 1 | 57 | 56 | 0.982456 |
| 8 | Governmental standards compliance is not an issue for me (Do not care) | 17 | 2 | 7 | 6 | 14 | 5 | 2 | 1 | | 3 | 57 | 46 | 0.807018 |
| 9 | Response times would improve if we spent a greater amount of time in quarters. | 3 | 2 | 4 | 2 | 9 | 2 | 6 | 16 | 5 | 8 | 57 | 37 | 0.649123 |
| 10 | Being out of place for training **does** effect response time. | 7 | 1 | 2 | 2 | 8 | 4 | 7 | 11 | 3 | 12 | 57 | 37 | 0.649123 |
| | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | We have sufficient crews and staffing to continue training with the traditional model. | 9 | 9 | 10 | 4 | 9 | 3 | 8 | 3 | | 2 | 57 | 41 | 0.719298 |
| 12 | Being out of place for training **does not** affect response times. | 19 | 8 | 10 | 9 | 6 | | 3 | 1 | | 1 | 57 | 52 | 0.912281 |
| 13 | The public is at risk when we are out of place for training. | 2 | 1 | 2 | 2 | 14 | 8 | 8 | 5 | 3 | 12 | 57 | 36 | 0.631579 |
| 14 | Response times of 4 minutes to the first arriving unit is unreasonable | 9 | 3 | 10 | 6 | 14 | 7 | 4 | 3 | | 1 | 57 | 42 | 0.736842 |
| 15 | I can learn from a interavtive video discussion | 2 | 1 | 1 | 3 | 7 | 6 | 9 | 12 | 8 | 8 | 57 | 43 | 0.754386 |
| 16 | I am comfortable with computers and technology | 1 | 5 | 2 | 1 | 4 | 5 | 10 | 14 | 7 | 8 | 57 | 44 | 0.77193 |
| 17 | I am concerned that we **do not** test after each training to assure that learning has taken place. | 3 | 5 | 12 | 5 | 16 | 10 | 3 | 2 | 1 | | 57 | 41 | 0.719298 |
| 18 | I do not like testing | 2 | 2 | 4 | 5 | 21 | 3 | 5 | 8 | 3 | 4 | 57 | 34 | 0.596491 |
| 19 | I believe that we all put in equal amounts of effort towards training - All companies - all shifts | 10 | 10 | 8 | 7 | 11 | 1 | 5 | 1 | | 4 | 57 | 46 | 0.807018 |
| 20 | I am ok with some Captains putting more effort into training than others. | 7 | 7 | 5 | 7 | 11 | 3 | 4 | 3 | 5 | 5 | 57 | 37 | 0.649123 |
| | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | | | |
| 21 | We **should not** do any fire training | 45 | 7 | 3 | | 1 | 1 | | | | | 57 | 56 | 0.982456 |
| 22 | We should make every effort to be the best at what we do. | | 1 | | | 1 | 1 | 1 | 4 | 10 | 39 | 57 | 55 | 0.964912 |
| | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | I like when mobil props are brought to the station for training | 1 | | | | 7 | 1 | 7 | 10 | 10 | 21 | 57 | 49 | 0.859649 |
| 24 | I prefer when the Station Captain does the training for my crew | | 2 | 6 | 3 | 22 | 8 | 6 | 5 | 2 | 3 | 57 | 33 | 0.578947 |
| 25 | I want to go back to Engine Company training where the Captains led the training | 5 | 4 | 6 | 2 | 20 | 11 | 3 | 2 | 3 | 1 | 57 | 37 | 0.649123 |
| | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | | | |
| 26 | I **do not** want to go back to Engine Company Training. | 4 | 4 | 2 | 9 | 22 | 3 | 4 | 4 | 4 | 1 | 57 | 41 | 0.719298 |
| 27 | We should be able to out of district for training while on duty without coverage | 15 | 8 | 5 | 5 | 8 | 3 | 4 | 4 | 2 | 3 | 57 | 41 | 0.719298 |
| 28 | We should get ALS coverage so that we can go out of district for training. | 3 | | 1 | 4 | 14 | 6 | 3 | 1 | 6 | 19 | 57 | 35 | 0.614035 |
| 29 | We should be able to go OOS for training without coverage | 13 | 5 | 4 | 7 | 13 | 4 | 6 | 1 | 1 | 3 | 57 | 42 | 0.736842 |
| 30 | We should be able to go OOS for training with ALS coverage | 5 | 1 | 2 | 2 | 9 | 3 | 4 | 9 | 4 | 18 | 57 | 38 | 0.666667 |
| 31 | I am concerned that call volume will disrupt us in training? | 1 | 1 | 1 | 2 | 3 | 6 | 4 | 17 | 8 | 14 | 57 | 49 | 0.86 |
| 32 | I am concerned that when we get disrupted we miss valuable training. | | | 2 | 2 | 6 | 3 | 7 | 13 | 5 | 19 | 57 | 47 | 0.824561 |
| 33 | I am not concerned about missing training. | 15 | 10 | 8 | 6 | 8 | 2 | 2 | 1 | 2 | 3 | 57 | 47 | 0.824561 |
| 34 | I believe we should have individual training plans for improvement. | 1 | 2 | 3 | 3 | 17 | 5 | 12 | 3 | 3 | 8 | 57 | | |
| 35 | I think we should do yearly skills and training evaluations. | 7 | 3 | 5 | 2 | 10 | 2 | 15 | 5 | 4 | 4 | 57 | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | We should be training with other departments | 2 | 1 | 1 | 2 | 3 | 1 | 9 | 9 | 6 | 23 | 57 | 48 | 0.842105 |
| 37 | We should only train with our department. | 18 | 9 | 14 | 4 | 4 | 4 | 1 | | | 3 | 57 | 49 | 0.859649 |

Appendix D

## *Sponsored by the St. Charles Fire Department*

# *2009 St. Louis Metro Fire Department / Fire Protection District – Training Information Technology Survey*

We need your help to learn about how technology is being used by you and in our Fire Department. This survey is part of a Dissertation and will drive the Grant and IT projects for the St. Charles Fire Department in an effort to make training more accessible to the St. Louis Metro Region.

This survey is modeled after a National Public Radio (NPR) survey:
http://www.npr.org/programs/specials/poll/technology/technology.adults.html

**Please return this survey to:**

Captain Robb F. Watkins
Training Officer – St. Charles Fire Department
200 North Second St.
St. Charles, MO 63301
Or Email to Robb.Watkins@stcharlescitymo.gov
Or Fax to: 636-410-0330

**Results will be posted on my blog at:**
**http://scfdfiretrainingtech.blogspot.com/**

## There are no right or wrong answers to these questions.

**Familiarity with technology:**

**1. Science and technology make our way of life change too fast.**

**Place an X in the box that applies.**

| | |
|---|---|
| Strongly agree | |
| Agree to some extent | |
| Neither agree nor disagree | |
| Disagree to some extent | |
| Strongly disagree | |
| Don't know* | |

**2. Have you ever done any of the following?**

| Item | Yes | No |
|---|---|---|
| Programmed radio stations on a push-button car radio? | | |
| Programmed a VCR to record from TV? | | |
| Used a computer? | | |
| Operated a fax machine? | | |
| Used a cellular phone? | | |
| Sent an e-mail message? | | |
| Used the Internet? | | |
| Sent a cell phone text message? | | |
| Received a cell phone text message? | | |
| Attended a telephone conference call? | | |
| Initiated a telephone conference call? | | |
| Been in a text chat on the internet? | | |
| Used a web cam in a video chat? | | |
| Attended a web meeting? | | |

**3. When it comes to computers, would you say you are keeping up or being left behind?**

**Place an X in the box that applies.**

| | |
|---|---|
| Keeping up | |
| Being left behind | |
| Don't know | |

**4. (Only if "Being left behind" is checked above!) Why do you think you have been falling behind?**

| | |
|---|---|
| You don't have enough time. | |
| You don't have enough knowledge. | |
| It's too expensive. | |
| You're not that interested. | |
| Don't know | |

**5. Please tell me whether or not you have a reasonable understanding of what each of the following terms means?**

| Item | Yes | No |
|---|---|---|
| a. Software | | |
| b. Computer hardware | | |
| c. Web Surfing | | |
| d. E-commerce | | |
| e. The World Wide Web | | |
| f. The Internet | | |
| g. E-mail | | |
| h. Chat room | | |
| i. Download | | |
| j. Website | | |
| k. Broad band Speed/Connection | | |
| l. Video Teleconferencing | | |

**6. Do you use a computer in your work?**

| | |
|---|---|
| Yes | |
| No | |

**7. Do you think your computer is essential for the work you do?**

| | |
|---|---|
| Yes, essential | |
| No, not essential | |

**8. Do you use the Internet on your computer at work for training your department?**

| | |
|---|---|
| Yes | |
| No | |

**9. Do you ever use public video sites for training such as YouTube for Emergency Response Training?**

| | |
|---|---|
| Yes | |
| No | |

**10. Do you ever use Fire / EMS Sites and their videos for training? i.e. Vent Enter Search – Fire Video.net – Firefighter Close Call – Secret List?**

| | |
|---|---|
| Yes | |
| No | |

**11. Do you know what connection speed you have at your work?**

| | |
|---|---|
| Yes | |
| No | |

**12. Do you know what the connection speeds of all of your stations are?**

| | |
|---|---|
| Yes | |
| No | |

**13. Do you think the Internet is essential for the work you do?**

| | |
|---|---|
| Yes | |
| No | |

**14. Do you have an e-mail address for use at work?**

| | |
|---|---|
| Yes | |
| No | |

**15. Do you think e-mail is essential for the work you do?**

| | |
|---|---|
| Yes | |
| No | |

**16. About how many e-mail messages do you get during an average workday?**

Estimate the average per day – (Monday – Friday)

_____

**17. Do you think e-mail has made communication between people in the upper levels and people in the lower levels of your organization better or worse, or hasn't it made much difference?**

| | |
|---|---|
| Better | |
| Worse | |
| Hasn't made much difference | |
| Don't know | |

**18. Is your work email sent to your mobile phone?**

| | |
|---|---|
| Yes | |
| No | |

**19. Everybody experiences stress at times. How often does your work with computers on the job contribute to stress in your life?**

| | |
|---|---|
| Very often | |
| Somewhat often | |
| Hardly at all | |
| Never | |

**20. Do you consider these an essential part of your life?**

**Mark either yes or no for each item with an X**

| Item | Yes | No |
|---|---|---|
| a. A VCR/DVD/DVDR | | |
| b. A home fax machine | | |
| c. A cellular phone | | |
| d. A telephone answering machine or voicemail | | |
| e. Cable or satellite television | | |
| f. Work computer | | |
| g. Home computer | | |

**21. Do you currently have a computer in your home or a computer that you use at home?**

| | |
|---|---|
| Yes | |
| No | |

**22. (If 21 is checked yes.) How many computers are in use in your home?**

| | |
|---|---|
| 1 computer | |
| 2 computers | |
| 3 or more computers | |

**23. (If 21 is checked yes.) Do you have access to the Internet or e-mail on your computer at home?**

| | |
|---|---|
| Yes | |
| No | |

**24. (If 21 is checked yes.)9 In about what year did you get your first home computer?**

| | |
|---|---|
| Date | |
| Before 1988 | |
| 1988 – 1990 | |
| 1991 – 1993 | |
| 1994 – 1996 | |
| 1997 – 1999 | |
| 2000 – 2002 | |
| 2003 – 2005 | |
| 2005 – 2007 | |
| 2008 – present | |
| Don't know | |

**25. (If 21 is checked yes.) How old is the computer you use (most often) at home?**

| | |
|---|---|
| Less than 1 year | |
| 1 year | |
| 2 years | |
| 3 years | |
| 4 - 5 years | |
| 6+ years | |
| Don't know | |

**26. (If 21 is checked yes.) For which of the following purposes, if any, do you use a computer at home?**

**Place an X in All of the boxes that apply.**

| | |
|---|---|
| a. For writing or word processing? | |
| b. For education or school work? | |
| c. To pay bills? | |
| d. To keep personal financial records? | |
| e. To make investments in stocks and bonds? | |
| f. To shop? | |
| g. To get information about current events? | |
| h. To get information about entertainment, sports, and hobbies? | |
| i. To find news about travel or make travel arrangements | |
| j. To participate in chat rooms? | |
| k. To play games? | |
| l. To find adult-oriented pictures and stories? | |
| m. To do work for your paying job? | |
| n. To send and receive e-mail? | |
| o. To get health or medical information? | |

**27. (If 21 is checked yes.)Which of the following statements best describes how having a computer at home has affected where and how many hours you work doing your paying job?**

| | |
|---|---|
| You work more hours overall than you used to because you now work at home, too. | |
| You work the same number of hours, but work at home more and at the office less than you used to. | |
| It hasn't changed where or how many hours you work | |

**28. (If 21 is checked No.) What is the main reason you don't have a computer at home?**

| | |
|---|---|
| You don't know enough about computers to choose which one to buy | |
| Computers are too expensive | |
| You don't have time to learn how to use one | |
| You don't need one | |
| Don't know | |

**29. (If 21 is checked No.) Do you think it is a problem for you not having a computer?**

| | |
|---|---|
| Yes | |
| No | |

**30. If you had trouble figuring out how to do something on the computer, which of the following would you most likely do?**

| | |
|---|---|
| Look it up in a manual | |
| Use the help menu on the software you were trying to use | |
| Call a telephone help line | |
| Ask a friend or family member for help | |
| Just keep trying things until you got it | |
| Don't know | |

**31. Do you, yourself, have a cell phone?**

| | |
|---|---|
| Yes | |
| No | |

**32. Some people say they feel overloaded with information these days, considering all the TV news shows, magazines, newspapers, and the Internet. Others say they like having so much information to choose from. How about you: Do you feel overloaded, or do you like having so much information available? Place an X in the box that applies.**

| | |
|---|---|
| Feel overloaded | |
| Like having so much information available | |
| Don't know | |

**33. Which way do you feel more often?**

| | |
|---|---|
| I like the way new technologies allow me to keep in touch | |
| I don't like the way new technologies let people get in touch with me all the time. | |
| Don't know | |

**34. Are you concerned that you might lose your job in the future because of advances in technology, or not?**

| | |
|---|---|
| Yes | |
| No | |

**35. Are you very, somewhat, or only slightly concerned?**

| | |
|---|---|
| Very concerned | |
| Somewhat concerned | |
| Slightly concerned | |
| No, not concerned | |

**36. When you first started in your line of work, did you use a computer at work?**

| | |
|---|---|
| Yes | |
| No | |

**37. Do you use (or have a working knowledge of) a word processing program?**

| | |
|---|---|
| Yes | |
| No | |

**38. What program do you use?**

**Place an X in All of the boxes that apply.**

| | |
|---|---|
| MS Word | |
| Word Perfect | |
| Open Office | |
| Other | |

**39. Do you use (or have working knowledge of) spread sheets?**

| | |
|---|---|
| Yes | |
| No | |

**40. What program do you use?**

| | |
|---|---|
| MS Excell | |
| Lotus Notes | |
| Open Office | |
| Other | |

**41. Do you use (or have working knowledge of) a presentation program?**

| | |
|---|---|
| Yes | |
| No | |

**42. What program do you use?**

**Place an X in All of the boxes that apply.**

| | |
|---|---|
| MS Powerpoint | |
| Adobe | |
| Apple | |
| Open Office | |
| Other | |

Appendix E

**1. Science and technology make our way of life change too fast.**

| | |
|---|---|
| Strongly agree | 3 |
| Agree to some extent | 27 |
| Neither agree nor disagree | 12 |
| Disagree to some extent | 8 |
| Strongly disagree | 8 |
| Don't know* | |

**2. Have you ever done any of the following?**

| Item | Yes | No | Total |
|---|---|---|---|
| Programmed radio stations on a push-button car radio? | 56 | 2 | 58 |
| Programmed a VCR to record from TV? | 54 | 4 | 58 |
| Used a computer? | 57 | 1 | 58 |
| Operated a fax machine? | 58 | | 58 |
| Used a cellular phone? | 58 | | 58 |
| Sent an e-mail message? | 57 | 1 | 58 |
| Used the Internet? | 57 | 1 | 58 |
| Sent a cell phone text message? | 51 | 7 | 58 |
| Received a cell phone text message? | 53 | 5 | 58 |
| Attended a telephone conference call? | 37 | 21 | 58 |
| Initiated a telephone conference call? | 11 | 47 | 58 |
| Been in a text chat on the internet? | 32 | 26 | 58 |
| Used a web cam in a video chat? | 39 | 19 | 58 |
| Attended a web meeting? | 43 | 15 | 58 |

**3. When it comes to computers, would you say you are keeping up or being left behind?**

**Place an X in the box that applies.**

| | |
|---|---|
| Keeping up | 35 |
| Being left behind | 17 |
| Don't know | 6 |

**4. (Only if "Being left behind" is checked above!) Why do you think you have been falling behind?**

| | |
|---|---|
| You don't have enough time. | 9 |
| You don't have enough knowledge. | 12 |
| It's too expensive. | 3 |
| You're not that interested. | 8 |
| Don't know | 1 |

**5. Please tell me whether or not you have a reasonable understanding of what each of the following terms means?**

| Item | Yes | No |
|---|---|---|
| a. Software | 50 | 8 |
| b. Computer hardware | 47 | 11 |
| c. Web Surfing | 45 | 3 |
| d. E-commerce | 36 | 22 |
| e. The World Wide Web | 45 | 3 |
| f. The Internet | 58 | |
| g. E-mail | 58 | |
| h. Chat room | 46 | 12 |
| i. Download | 56 | 5 |
| j. Website | 56 | 2 |
| k. Broad band Speed/Connection | 39 | 19 |
| l. Video Teleconferencing | 43 | 15 |

**6. Do you use a computer in your work?**

| | |
|---|---|
| Yes | 57 |
| No | 1 |

**7. Do you think your computer is essential for the work you do?**

| | |
|---|---|
| Yes, essential | 41 |
| No, not essential | 17 |

**8. Do you use the Internet on your computer at work for training your department?**

| | |
|---|---|
| Yes | 47 |
| No | 11 |

**9. Do you ever use public video sites for training such as YouTube for Emergency Response Training?**

| | |
|---|---|
| Yes | 48 |
| No | 10 |

**10. Do you ever use Fire / EMS Sites and their videos for training? i.e. Vent Enter Search – Fire Video.net – Firefighter Close Call – Secret List?**

| | |
|---|---|
| Yes | 48 |
| No | 10 |

**11. Do you know what connection speed you have at your work?**

| | |
|---|---|
| Yes | 6 |
| No | 52 |

**12. Do you know what the connection speeds of all of your stations are?**

| | |
|---|---|
| Yes | 3 |
| No | 55 |

**13. Do you think the Internet is essential for the work you do?**

| | |
|---|---|
| Yes | 39 |
| No | 19 |

**14. Do you have an e-mail address for use at work?**

| | |
|---|---|
| Yes | 57 |
| No | 1 |

**15. Do you think e-mail is essential for the work you do?**

| | |
|---|---|
| Yes | 41 |
| No | 17 |

**16. About how many e-mail messages do you get during an average workday?**

| | |
|---|---|
| 0-5 | 27 |
| 5-10 | 18 |
| 10-20 | 3 |
| 20-30 | 2 |
| 30-40 | 2 |
| More | 5 |

**17. Do you think e-mail has made communication between people in the upper levels and people in the lower levels of your organization better or worse, or hasn't it made much difference?**

| | |
|---|---|
| Better | 28 |
| Worse | 8 |
| Hasn't made much difference | 20 |
| Don't know | 3 |

**18. Is your work email sent to your mobile phone?**

| | |
|---|---|
| Yes | 6 |
| No | 52 |

**19. Everybody experiences stress at times. How often does your work with computers on the job contribute to stress in your life?**

| | |
|---|---|
| Very often | 4 |
| Somewhat often | 13 |
| Hardly at all | 35 |
| Never | 6 |

**20. Do you consider these an essential part of your life?**
**Mark either yes or no for each item with an X**

| Item | Yes | No |
|---|---|---|
| a. A VCR/DVD/DVDR | 25 | 32 |
| b. A home fax machine | 8 | 50 |
| c. A cellular phone | 49 | 9 |
| d. A telephone answering machine or voicemail | 47 | 11 |
| e. Cable or satellite television | 31 | 26 |
| f. Work computer | 41 | 17 |
| g. Home computer | 47 | 11 |

**21. Do you currently have a computer in your home or a computer that you use at home?**

| | |
|---|---|
| Yes | 58 |
| No | |

**22. (If 21 is checked yes.) How many computers are in use in your home?**

| | |
|---|---|
| 1 computer | 20 |
| 2 computers | 20 |
| 3 or more computers | 18 |

**23. (If 21 is checked yes.)Do you have access to the Internet or e-mail on your computer at home?**

| | |
|---|---|
| Yes | 56 |
| No | 1 |

**24. (If 21 is checked yes.)In about what year did you get your first home computer?**

| | |
|---|---|
| Date | |
| Before 1988 | 8 |
| 1988 – 1990 | 7 |
| 1991 – 1993 | 10 |
| 1994 – 1996 | 15 |
| 1997 – 1999 | 10 |
| 2000 – 2002 | 1 |
| 2003 – 2005 | 3 |
| 2005 – 2007 | 1 |
| 2008 – present | |
| Don't know | 3 |

**25. (If 21 is checked yes.)How old is the computer you use (most often) at home?**

| | |
|---|---|
| Less than 1 year | 9 |
| 1 year | 14 |
| 2 years | 7 |
| 3 years | 15 |
| 4 - 5 years | 8 |
| 6+ years | 2 |
| Don't know | 2 |

**26. (If 21 is checked yes.) For which of the following purposes, if any, do you use a computer at home?**

| | |
|---|---|
| a. For writing or word processing? | 44 |
| b. For education or school work? | 38 |
| c. To pay bills? | 47 |
| d. To keep personal financial records? | 34 |
| e. To make investments in stocks and bonds? | 15 |
| f. To shop? | 53 |
| g. To get information about current events? | 53 |
| h. To get information about entertainment, sports, and hobbies? | 49 |
| i. To find news about travel or make travel arrangements | 47 |
| j. To participate in chat rooms? | 12 |
| k. To play games? | 25 |
| l. To find adult-oriented pictures and stories? | 14 |
| m. To do work for your paying job? | 25 |
| n. To send and receive e-mail? | 54 |
| o. To get health or medical information? | 34 |

**27. (If 21 is checked yes.)Which of the following statements best describes how having a computer at home has affected where and how many hours you work doing your paying job?**

| | |
|---|---|
| You work more hours overall than you used to because you now work at home, too. | 7 |
| You work the same number of hours, but work at home more and at the office less than you used to. | 2 |
| It hasn't changed where or how many hours you work | 50 |

**28. (If 21 is checked No.) What is the main reason you don't have a computer at home?**

| | |
|---|---|
| You don't know enough about computers to choose which one to buy | |
| Computers are too expensive | |
| You don't have time to learn how to use one | |
| You don't need one | |
| Don't know | |

**29. (If 21 is checked No.) Do you think it is a problem for you not having a computer?**

| | |
|---|---|
| Yes | 1 |
| No | 1 |

**30. If you had trouble figuring out how to do something on the computer, which of the following would you most likely do?**

| | |
|---|---|
| Look it up in a manual | 5 |
| Use the help menu on the software you were trying to use | 21 |
| Call a telephone help line | 3 |
| Ask a friend or family member for help | 26 |
| Just keep trying things until you got it | 21 |
| Don't know | 1 |

**31. Do you, yourself, have a cell phone?**

| | |
|---|---|
| Yes | 57 |
| No | 1 |

**32. Some people say they feel overloaded with information these days, considering all the TV news shows, magazines, newspapers, and the Internet. Others say they like having so much information to choose from. How about you: Do you feel overloaded, or do you like having so much information available? Place an X in the box that applies.**

| | |
|---|---|
| Feel overloaded | 10 |
| Like having so much information available | 39 |
| Don't know | 9 |

**33. Which way do you feel more often?**

| | |
|---|---|
| I like the way new technologies allow me to keep in touch | 42 |
| I don't like the way new technologies let people get in touch with me all the time. | 13 |
| Don't know | 3 |

**34. Are you concerned that you might lose your job in the future because of advances in technology, or not?**

| | |
|---|---|
| Yes | 1 |
| No | 57 |

**35. Are you very, somewhat, or only slightly concerned?**

| | |
|---|---|
| Very concerned | |
| Somewhat concerned | 1 |
| Slightly concerned | 5 |
| No, not concerned | 52 |

**36. When you first started in your line of work, did you use a computer at work?**

| | |
|---|---|
| Yes | 21 |
| No | 37 |

**37. Do you use (or have a working knowledge of) a word processing program?**

| | |
|---|---|
| Yes | 47 |
| No | 11 |

**38. What program do you use?**
**Place an X in All of the boxes that apply.**

| | |
|---|---|
| MS Word | 47 |
| Word Perfect | 23 |
| Open Office | 4 |
| Other | 5 |

**39. Do you use (or have working knowledge of) spread sheets?**

| | |
|---|---|
| Yes | 35 |
| No | 23 |

**40. What program do you use?**

| | |
|---|---|
| MS Excell | 39 |
| Lotus Notes | 1 |
| Open Office | 1 |
| Other | 3 |

**41. Do you use (or have working knowledge of) a presentation program?**

| | |
|---|---|
| Yes | 30 |
| No | 28 |

**42. What program do you use?**
**Place an X in All of the boxes that apply.**

| | |
|---|---|
| MS Powerpoint | 31 |
| Adobe | 9 |
| Apple | 5 |
| Open Office | 1 |
| Other | 2 |

Appendix F

# *Sponsored by the St. Charles Fire Department*

# *2009 St. Louis Metro Fire Department / Fire Protection District – Training Officer Interview*

***Conducted by: Captain Robb F Watkins***

**Date:_____**

**Training Officer Being Interviewed (Print):_____**

Do you give permission for this interview to take place?
Initials: _____ Yes _____ No

Do you give your permission for the interview to be recorded?
Initials: _____ Yes _____ No

Do you give permission for that recording to be transcribed?
Initials: _____ Yes _____ No

Do you give permission of that transcript to be sent back to you electronically for your verification?
Initials: _____ Yes _____ No

Will you agree to let the interviewer know by e-mail that you agree or dis-agree with the transcript?
Initials: _____ Yes _____ No

Do you agree that if you confirm that the transcript is correct that you will allow your transcript to be part of this study?
Initials: _____ Yes _____ No

## There are no right or wrong answers to these questions.

**1. Interviewer introduction.**

**2. Is it ok with you that we record this interview?**

**3. Please state you name?**

**4. Please state you employer and position?**

**5. How long have you been the training officer for your department?**

**6. Do you like your job?**

**7. What do you like the most about your job?**

**8. What do you like the least about your job?**

**9. Can you tell me what your biggest problems are in delivering training to your personnel?**

**10. Do you have any problems with maintaining minimum staffing for training? What do you do for coverage – Minimum Staffing?**

**11. What is your annual budget for Fire Suppression and EMS Training?**

**12. Does anyone work for you or under you in the Training Division? Do you need any assistance in your duties as a Training Officer?**

**13. Do you feel the training requirements of the Fire Service, as it is right now, are to much for the your organization to handle?**

**14. How are you trying to address these problems?**

**15. Do you worry about the added responsibilities being placed on the Training Division of your organization by world events?**

**16. Would you say that your Department is compliant with all Governmental Standards?**

**17. Do you know what connection speed you have at your work office?**

**18. Do you know what the connection speeds of all of your stations/classrooms are?**

**19. Do you think the Internet is essential for the work you do?**

**20. About how many e-mail messages do you get during an average workday?**

Estimate the average per day – (Monday – Friday)

**21. Is your work email sent to your mobile phone?**

**22. Is your work calendar or are your appointments sent to your mobile phone?**

**23. Have you ever considered the use of a networked and/or server based environment for training delivery.**

**24. Do you ever use public video sites for training such as YouTube for Emergency Response Training?**

**25. Do you ever use Fire / EMS Sites and their videos for training? i.e. Vent Enter Search – Fire Video.net – Firefighter Close Call – Secret List?**

**26. Do you use a database system for Training Records Management? What program do you use?**

**27. Do you have enough money in the training budget to send all of your employees to get the training they need?**

**28. Do you have enough money to fund sufficient support staff dedicated for training?**

**29. Do you have enough overtime money to allow coverage or off duty support for all of your personnel to attend training?**

**30. Do you allow on duty crews to take individual companies OOS for training?**

**31. Do you have sufficient staffing to allow on duty crews to bring the entire department together in one location for training?**

**32. Do you allow on duty crews to participate in or attend out of district/venue for training?**

**33. If you allow crews out of district for training do you require back fill at their station while they are gone?**

**34. Are you concerned that your call volume is so high that crews are constantly interrupted during training to go on a call?**

**35. Do you maintain an electronic software system for all of your department's individual certifications and/or programs (i.e instructor certs. ACLS, CPR, Drivers License)?**

**36. Do you use search engines to find answers to problems for training?**

**37. Do you do personal evaluations on a regular basis?**

**38. Do you do individual training record and certification reviews annually?**

**39. Do you develop training plans for performance improvement?**

**40. Do you do any assessment after your training sessions to assure learning?**

**41. Do you do summative assessments at the end of your training sessions?**

**42. Do you do any formative assessments at the end of your training sessions?**

**43. Do you have any way to assure that learning has taken place after your training session?**

**44. What do you know about video teleconferencing?**

**45. Are you concerned about the Fire Service's resistance to change as impedance to technology based training?**

**46. What are your concerns as a training officer over video teleconferencing?**

**47. Would a VTC system be easier to learn if the look and feel of the programs were similar to what you are already using?**

Appendix G

**Lindenwood University**
**St Charles Fire Department**
**Informed Consent to Participate in Human Subject Research**

Informed Consent Form

**Title of project:** A thesis proposal that explores the transition of emergency services training to a technology based environment. The use of technology is being used to solve several key problems, encountered by emergency responders, to receiving timely training that increases their in-service time.

**Name of Investigator:** Robb F Watkins **Phone:** (314) 486-6037

**Institutional Affiliation:** The researcher is a graduate student in the E.d. D. Instructional Leadership program at Lindenwood University. This research is being conducted in fulfillment of degree requirements at Lindenwood University.

*Invitation to Participate:* ***You are invited to participate in this research study. The following information is provided to help you make an informed decision whether or not to participate. If you have any questions, please do not hesitate to ask.***

**Purpose:** We hope to assess how the use of a video teleconferencing (VTC) or OCS and SharePoint system has enhanced your organizations training and communications.

**Subjects**: You are eligible to participate because you are either a Fire Department or private sector training officer.

**Timetable**: The interview should be completed within two hours. .

**Risks**: There is the potential for social risk (embarrassment) if your responses were to be disclosed. However, you will be identified only as a anonymous training officer in the research paper.

**Benefits:** The primary benefit to the study will be to develop a true needs assessment of emergency response training delivery. Then a best practices model will be developed to fill the gaps identified in the training needs assessment. This best practices model will be made available to the emergency services community as a best practices pilot project.

**Compensation for Participation**: There is no compensation for participating.

**Confidentiality** Any information obtained during this study which could identify you will be kept strictly confidential. The information may be published in educational journals or presented at educational meetings but your identity will be kept strictly confidential. Consent forms will be maintained separately from interview notes and from electronic recording files. Electronic recordings will not be labeled and the investigator will transcribe the audiotapes personally. Audiotapes will be destroyed following transcription.

**Right to Refuse or Withdraw**: You may refuse to participate and it will not jeopardize your standing at the bank in any way. You may change your mind about being involved in the study and can quit after the study has started. If the study design or use of the data is changed, you will be so informed and your consent obtained for the revised research study.

**Date:_____**

Do you give permission for this interview to take place?

Initials: _____ Yes _____ No

Do you give your permission for the interview to be recorded?

Initials: _____ Yes _____ No

Do you give permission for that recording to be transcribed?

Initials: _____ Yes _____ No

Do you give permission of that transcript to be sent back to you electronically for your verification?

Initials: _____ Yes _____ No

Will you agree to let the interviewer know by e-mail that you agree or dis-agree with the transcript?

Initials: _____ Yes _____ No

Do you agree that if you confirm that the transcript is correct that you will allow your transcript to be part of this study?

Initials: _____ Yes _____ No

**My signature below indicates that I have voluntarily decided to participate in this research project as a subject and that I have read and do understand the information provided above.**

**Training Officer's signature: _____**

**Training Officer's printed name: _____**

**Training Officer's e-mail: _____**

In my judgment, the subject is voluntarily and knowingly giving informed consent to participate in this research study.

_____ _____

Investigator's signature Date

_____

Investigator's printed name

Appendix H

# *2009 Video Teleconference - Practitioner*
# *Fire Department Training Officer Interview*

***Sponsored by: St. Charles Fire Department***
***200 North Second St.***
***St. Charles, Missouri 63301***

***Conducted by: Captain Robb F Watkins***

**Date:_____**

**Department:_____**

**Training Officer Being Interviewed (Print):_____**

Do you give permission for this interview to take place?
Initials: _____ Yes _____ No

Do you give your permission for the interview to be recorded?
Initials: _____ Yes _____ No

Do you give permission for that recording to be transcribed?
Initials: _____ Yes _____ No

Do you give permission of that transcript to be sent back to you electronically for your verification?
Initials: _____ Yes _____ No

Will you agree to let the interviewer know by e-mail that you agree or dis-agree with the transcript?
Initials: _____ Yes _____ No

Do you agree that if you confirm that the transcript is correct that you will allow your transcript to be part of this study?
Initials: _____ Yes _____ No

**Training Officer's signature: _____**

**Training Officer's e-mail: _____**

# There are no right or wrong answers to these questions.

**1. Is it ok with you that we record this interview?**

**2. Please state you name, employer and position.**

**3. How long has your organization been using VTC for training?**

**4. Can you tell me what you like the most about using VTC?**

**5. What obstacles have you encountered using VTC?**

**6. Do you have a set format that you follow for training?**

**7. Do you have a set format you follow for meetings?**

**8. Can you tell me what your biggest problems were in delivering training to your personnel before you implemented video teleconferencing?**

**9. Do those same problems still exist today - post implementation?**

**10. Have you completely eliminated "Hands on" training?**

**11. Why did your department decide to pursue VTC?**

**12. Did you or your organization have any reservations prior to implementation of the system?**

**13. What are the primary benefits for your organization from using VTC?**

**14. Were there any unforeseen benefits?**

**15. Were there any unforeseen negative issues?**

**16. Has VTC changed the work load on you as a training officer?**

**17. Has VTC made it easier for your Department to be compliant with Governmental Standards?**

**18. Was you network speed and stability a concern prior to instillation of VTC?**

**19. Has VTC allowed you more time for curriculum development?**

**20. Has VTC reduced your overtime costs for training?**

**21. Has VTC recording made a difference when your crews get interrupted during training?**

**22. Has VTC increased the amount of training you are able to deliver?**

**23. Do you have any way to assure that learning has taken place after your training session?**

**24. Was the Fire Service's resistance to change as impedance to your implementation of VTC?**

**25. If you want to add another VTC site what is the cost.**

**26. What is the maximum number of people you can connect at one time?**

**27. Can you connect people out side the organization who are on the same VTC hardware?**

**28. Can you connect to people outside the organization who are not on the same VTC hardware?**

**29. Can you connect to someone who works for you organization buy is traveling out of town?**

**30. Can you connect to someone who is on a simple web cam off site?**

**31. Can you connect to someone new, off site, in an emergency?**

**32. Can you invite someone into a VTC by sending them an e-mail with a link?**

**33. What are the limitations of you VTC system?**

**34. Can you store meetings/training sessions on your system?**

**35. Can anyone retrieve them?**

**36. Can you control access to who retrieves them?**

**37. Can these recordings be accessed from outside the organization?**

**38. Do you share these recordings with other organizations?**

**39. Can you see a regional use for your VTC system?**

**40. Did you do a needs assessment prior to making a decision on VTC?**

**41. What are your upgrade costs – Continuous - operational budget and every few years – CIP**

**42. How do you get feedback on your VTC sessions?**

Appendix I

# *2009 Video Teleconference - Practitioner Private Sector Training Professional Interview*

***Sponsored by: St. Charles Fire Department***
***200 North Second St.***
***St. Charles, Missouri 63301***

***Conducted by: Captain Robb F Watkins***

**Date:_____**

**Department:_____**

**Training Officer Being Interviewed (Print):_____**

Do you give permission for this interview to take place?
Initials: _____ Yes _____ No

Do you give your permission for the interview to be recorded?
Initials: _____ Yes _____ No

Do you give permission for that recording to be transcribed?
Initials: _____ Yes _____ No

Do you give permission of that transcript to be sent back to you electronically for your verification?
Initials: _____ Yes _____ No

Will you agree to let the interviewer know by e-mail that you agree or dis-agree with the transcript?
Initials: _____ Yes _____ No

Do you agree that if you confirm that the transcript is correct that you will allow your transcript to be part of this study?
Initials: _____ Yes _____ No

**Training Professional's signature: _____**

**Training Professional's e-mail: _____**

# There are no right or wrong answers to these questions.

**1. Is it ok with you that we record this interview?**

**2. Please state you name, employer and position.**

**3. How long has your organization been using MS Live Meeting (MSLM) for training?**

**4. Can you tell me what you like the most about using MSLM?**

**5. What obstacles have you encountered using MSLM?**

**6. What don't you like about MSLM?**

**7. Do you have a set format that you follow for training?**

**8. Do you have a set format you follow for meetings?**

**9. Can you tell me what your biggest problems were in delivering training to your personnel before you implemented MSLM?**

**10. Do those same problems still exist today - post implementation?**

**11. What does your normal training model look like?**

**12. Have you completely eliminated "Hands on or T-t-T" training?**

**13. Why did your department decide to pursue MSLM?**

**14. Did you or your organization have any reservations prior to implementation of the system?**

**15. What are the primary benefits for your organization from using MSLM?**

**16. Were there any unforeseen benefits?**

**17. Were there any unforeseen negative issues?**

**18. Has MSLM changed the work load on you as a training professional?**

**19. Has MSLM made it easier for your Organization to be compliant with Industry or Governmental standards?**

**20. Was you network speed and stability a concern prior to instillation of MSLM?**

**21. Has MSLM allowed you more time for curriculum development?**

**22. Has MSLM reduced your costs for training?**

**23. Has MSLM recording made a difference when your crews get interrupted during training?**

**24. Has MSLM increased the amount of training you are able to deliver?**

**25. Do you have any way to assure that learning has taken place after your training session?**

**26. Has MSLM increased the speed at which you can deliver training to your customers or employees?**

**27. What is the maximum number of people you can connect at one time?**

**28. What are the limitations of MSLM for your organization?**

**29. Can you store meetings/training sessions on your system?**

**30. Can anyone retrieve them?**

**31. Can you control access to who retrieves them?**

**32. Can these recordings be accessed from outside the organization?**

**33. Do you share these recordings with other organizations?**

**34. Did you do a needs assessment prior to making a decision on VTC?**

**35. How do you get feedback on your VTC sessions?**

Appendix J

# SCFD Daily Briefing – Template
# Day – Month - Year

Staffing Issues:

Apparatus Issues:

9412:
9417:
9467:
9420:
9498:
9432:
9440:
9449:
9479:
9489:
9450:
9457:
9497:

Station Issues:

1.
2.
3.
4.
5.

Training:

Special assignments:

Safety message:

Administrative Notes:

# Vitae

Robb Watkins has been the Battalion Chief - Training Officer for the City of St. Charles, Missouri Fire Department since February 2003. His duties include directing training and departmental scheduling. Directing assigned departmental budgets and leading research and development committees for breathing apparatus, IR cameras and bunker gear. Robb transitioned the departmental training records to an electronic server based file format and performs as the Fire Department's IT representative. He assisted in the design and implementation of a city wide server network. Fire service, EMS, technical rescue and instructor certifications are too numerous to mention.

Chief Watkins also serves as a Strike Team Leader for St. Louis Metro Urban Search and Rescue System Strike Team #1 and Duty Officer for St. Charles Warren County Haz-Mat Team assigned to assure regional Heavy Rescue and Haz-Mat/WMD Readiness. He is a member of Missouri Region "C" Type III All Hazards Incident Management Team as a Planning Section Chief. He is a member of Missouri Task Force # 1 a FEMA Federal USAR team as a rescue squad officer for St. Charles Squad # 1 and has been on multiple federal deployments to include Hurricane Katrina in 2005. Chief Watkins is a past member of the International Association of Fire Fighters Local 757.

Robb is the President and CEO of All Hazards Training and Consulting LLC, a female owned, Missouri registered corporation specializing in emergency response and Emergency Management training.

Robb's education includes an Associated of Applied Science in Fire Science technology from East Central College, Union Missouri in 2005. A Bachelors of Arts in Human Resource Management at Lindenwood University in St. Charles, Missouri in

2001. A Masters of Arts in Business Administration with an Emphasis in Public Management in 2004. Robb is currently awaiting approval of his Doctoral dissertation at Lindenwood University in Instructional Leadership. He serves as an Associate Professor for Lindenwood University in the Fire and EMS program.

Chief Watkins is a recipient of the Bronze Medal of Valor - St. Louis Metro Chief's Association in 2006 for his participation in the Clinton, Missouri building collapse. Additionally he received the Veterans of Foreign Wars "St. Charles County Fire Fighter of the Year" in 2005. Robb has also received multiple letters of commendation from the City of St. Charles, MO.