International Fire Service Journal of Leadership and Management

Building Theory to Impact Practice

IFSJLM

Journal Team

Editorial Board

In this Issue

Dr. John Granito Award for
Excellence in Fire Leadership and Management Research

The Dr. Granito Award

Fire Protection Publications (FPP) and the *International Fire Service Journal of Leadership and Management (IFSJLM)* headquartered on the campus of Oklahoma State University (OSU) are proud to announce the creation of the **Dr. John Granito Award for Excellence in Fire Leadership and Management Research (the Dr. Granito Award).** The award will be presented at the *IFSJLM* Research Symposium that supports the Journal held annually in July at the IFSTA Validation Conference. The award honors Dr. John Granito. John is one of the premier fire and public safety consultants in the United States. Just a few of his many fire, rescue, and emergency services research projects include: Oklahoma State University-Fire Protection Publications Line of Duty Death Reduction project (3 years); Centaur National Study (3 years); Research Triangle Institute/National Fire Protection Association/International City/County Management Association project (4 years); Fire Department Analysis Project (FireDAP) of the Urban Fire Forum (13 years); *Combination Department Leadership* project, University of Maryland, Maryland Fire & Rescue Institute (4 years); Worcester Polytechnic/International Association of Fire Fighters/International Association of Fire Chiefs/ National Institute for Occupational Safety and Health *Fire Ground Performance Study* (current). He has participated in more than 400 fire department studies. John also has strong ties to academia. He has served in a number of academic positions for the past 27 years, and for the last 16 years has served at the State University of New York at Binghamton. He is Professor Emeritus and Retired Vice President for Public Service and External Affairs at SUNY Binghamton, which is consistently ranked in the top public universities by *U.S. News and World Report.* John has published numerous articles, chapters, and technical papers, served as co-editor of the 2002 book published by the International City/County Management Association entitled, *Managing Fire and Rescue Service*, and is a Section Editor of the NFPA® 2008 *Fire Protection Handbook.* Dr. Granito will be the first recipient of the award that honors him and his service to the fire service and to academia. Each year the recipient of the **Dr. Granito Award** will present the Keynote Address at the annual *IFSJLM* Research Symposium and will be the Guest of Honor at the reception held on Friday night prior to the Research Symposium.

Nomination Form

Fire Protection Publications (FPP) and the *International Fire Service Journal of Leadership and Management (IFSJLM)* headquartered on the campus of Oklahoma State University (OSU) are accepting nominations for the **Dr. John Granito Award for Excellence in Fire Leadership and Management Research (the Dr. Granito Award).** The award is presented at the Research Symposium that supports the *International Fire Service Journal of Leadership and Management (IFSJLM)* held annually in July at the IFSTA Validation Conference.

The nominee should have made a significant contribution to the advancement of fire leadership and management through his/her scholarly/academic writing. The Dr. Granito Award is not necessarily a life-time achievement award, although such individuals certainly should be in a prominent position to be nominated. The nominee can be a person who, although early in their career as a practitioner/scholar or academic, has made a seminal contribution to the fire leadership and management literature.

To nominate an individual for the Dr. Granito Award, please submit by 15 January of the symposium year: (1) this form (or a copy of it), (2) no more than a one-page single-spaced letter explaining why you believe the person is deserving of the award, and (3) a copy of the nominee's resume or curriculum vitae. Send the materials to: Dr. Granito Award, Dr. Bob England, Editor, *International Fire Service Journal of Leadership and Management,* Department of Political Science, 531 Math Sciences, Oklahoma State University, Stillwater, Oklahoma 74078.

I nominate _____ for the **Dr. John Granito Award for Excellence in Fire Leadership and Management Research.** To support the nomination, I have included a letter of recommendation and a resume or curriculum vitae (CV) of the nominee. (A nomination is not accepted without the supporting letter and resume/CV.)

Nominator Name: _____

Address: _____

_____

Zip/Postcode: _____

Contact Information:

Telephone: _____

Email: _____

Dr. John M. Moschella, EFO, Anna Maria College

Sensemaking in Structural Fire Fighting: Applications for Signal Detection Theory in Firefighter Operations and Safety

Abstract

Leadership in the fire service can take on many facets, one of which is decision-making. Research from two tragic wildland fires has shown that a seldom-studied feature of leadership is sensemaking. While decision-making asks: "What shall we do?" sensemaking raises the question: "What is going on?" Lessons learned from Professor Karl Weick's investigations on wildland fire fighting can be applied to structural fire fighting perhaps employing a signal detection theory model, which has been used in psychophysics to describe and explain decisions that are made in uncertain or ambiguous times. This article investigates the role sensemaking can play in preventing firefighter deaths and provides a foundation for future research for firefighter safety in enclosed surroundings.

"Sensemaking involves turning circumstances into a situation that is comprehended explicitly in words and that serves as a springboard into action" (Weick, Sutcliffe, & Obstfeld, 2005, p. 409).

Background

On August 5, 1949, 12 members of the United States Fire Service Smokejumpers were killed fighting a wildland fire at Mann Gulch, Montana. The fire was thought to be a routine fire but turned fatal when the firefighters found themselves caught between the fire and a rocky slope that stood in the way of a safety route. Each member of the team who perished attempted to outrun the fire, while the foreman (Wagner Dodge) made what appeared to be an insane choice to employ a tactic that saved his life — setting a backfire to create a burned-out perimeter in which to seek refuge.

Described as the race that could not be won (Rothermel, 1993), theorists from various disciplines, including psychology and sociology, have long investigated this tragedy and argued that poor leadership resulted in the tragedy. Others contended that the death of the team members resulted from panic in the face of a situation of which they could not make sense.

Forty-five years later, on July 6, 1994, another incident of similar magnitude resulted in the deaths of 12 firefighters on Storm King Mountain, Colorado. It marked the first time that smokejumpers died combating wildland fires since the 1949 tragedy at Mann Gulch. Similar to the events over four decades earlier, crewmembers were killed attempting to outrun a fire. As psychologist Karl Weick (1995) noted, "something that Mann Gulch and South Canyon have in common is a series of events in which something very small escalated into something monstrous" (as cited in Roberto & Ferlins, 2003b, p. 1).

Investigators contended that the *can-do* attitude of both crews significantly led to their deaths. Others laid blame on various federal agencies for not reacting to the events soon enough to provide the necessary resources. One conclusion, accepted by most, was that those who died in both fires were confronted with a series of events of which they could not make sense. These events, combined with leadership flaws, organizational factors, and structural and technical conditions at Mann Gulch and Storm Mountain, created a toxic mix.

The purpose of this paper is to provide the reader with an alternative thesis, one that removes the onus of blame from those in command, structural or technical conditions, or leadership flaws and reexamines the organization itself and its inability to make sense of what was occurring. The deaths at Mann Gulch and Storm King Mountain can be seen as an organizational issue rather than simply the failure of the incident command scheme. From these studies, a different perspective emerges. This viewpoint not only places the organization squarely in the forefront, but also examines organizational group behavior. The objective of the research presented here is to practically apply the theoretical framework to a working model, one that can be employed in fire departments.

Introduction

The tragic wildland fires at Mann Gulch and Storm King Mountain are classic examples in the literature relative to the inefficacies of leadership. In the case of Mann Gulch, the foreman, Wagner Dodge, was a man of few words who led more by his experience than his orders. On that dreadful day in 1949, a time well before the appearance of leadership programs, Dodge's management of the fire, although correct in action, horribly

failed in command. Whether he was neither heard nor understood, his decision to set an escape fire proved to be his savior but was not conveyed to those under his command. Wagner Dodge's ability to make sense of the situation compelled him to take drastic actions; his failure was to ensure that those under him followed his lead.

Such was not the case 45 years later on Storm Mountain, Colorado, when 12 firefighters perished in another wildland fire. In both incidents, a fire small in nature at the onset, escalated (transitioned) to something horrific. Unlike the earlier fire, at least one person in charge, James Blanco, was trained and qualified as an incident commander. The "other" incident commander, Don Mackey, assumed command according to "tradition," which stated that the first smokejumper to parachute to the fire scene assumed command of the incident. Regardless of who was in charge during the incident, both men made critical errors, both strategic and tactical as well as in leadership that led to the firefighters' deaths.

There are insightful similarities between the two wildland incidents and structural fires. For example, the firefighters at Mann Gulch and Storm Mountain lost the sense of their surroundings. In structural fire fighting, firefighters may become disorientated and lose their way. This phenomenon will help to illustrate the relationship between the two types of fire fighting as well as the gap in understanding organizations. There are other notable parallels. Steffens (2001) wrote that there are an overwhelming number of similar characteristics between wildland and structural fire personnel including type of department, training issues, racial composition, age, and hierarchical supervisory structure. Nevertheless, the problem may not be so much a leadership issue but rather one of organization about what is commonly called *sensemaking*.

The structural fire service has been traditionally slow to develop or accept new theories relative to tactics and strategies. This reluctance to change might be a result of the tradition and consensus approach, which has permeated the profession for generations. Furthermore, where wildland fire fighting has undergone the scholarly scrutiny of interdisciplinary critique, the same cannot be said for those who fight structure fires.

Much can be learned from those who have paid the ultimate price while fighting wildland fires. The mental challenges confronting those who battle flames in open areas of flora are the same as those who enter burning structures and combat fires in limited spaces. If the existing research is applied to structural fire fighting, a new fresh perspective of our profession will emerge.

Making the Connection

William Mora (n.d.; 2003; 2005) has authored several studies that relate to firefighter disorientation in structures. One key finding in his research was that fire personnel who were killed in fires died conducting interior attacks. Furthermore, they died doing exactly "what they were trained, ordered, or expected to do" (n.d., para. 4). Fire personnel executed the strategy and tactics that they were taught and worked for them in the past. It was when "unknown risks" entered the situation that their decision-making processes failed with fatal consequences. The author stops short of introducing the term, *sensemaking*, when he outlines that firefighters "must be aware of the unknown risks and must be able to identify them *instinctively* at the beginning and during the course of operations" (n.d., para. 5). It is this *What is going on?* as opposed to *What shall we do?* that launches the argument for sensemaking. What follows is the presumed practical application of decision-making in the formulation of the question: *What do we do next?* (Weick, Sutcliffe, & Obstfeld, 2005).

Mora (n.d.) wrote that there are five underlying factors that contribute to certain fire fighting fatalities in enclosed structures:

1. Firefighters are not cognizant to the fact that being inside an enclosed structure is the most threatening location to fight a fire.

2. Personnel misinterpret the initial size-up.

3. Fast aggressive interior attack is not consistently safe or effective.

4. Traditional tactics and tasks are not consistently safe and effective.

5. Those who fight fires are not aware of *firefighter disorientation sequence*[1] that can lead to injury or death.

For the sake of comparison, consider similar factors related to wildland fire fighting.

- First, firefighters do not always accept that the types of fires they combat are extremely dangerous and potentially deadly, a *positive illusion* as Taylor (1989) refers to it.

- Second, personnel misinterpret the potential of a fire, in other words, the ten o'clock fire.[2]

- Third, overtly aggressive tactics, especially downhill fire attacks, are not safe or effective ways of fighting a fire.

- Fourth, traditional tactics do not always work.

- Fifth, firefighters are not aware of survival measures that can provide safety.

Even a quick comparison of the two situations confirms just how related the two types of fire fighting are concerning tactics, strategies, and organization. There is a sixth factor for consideration, one that reveals itself in the failure of decision-making.

The firefighters who lost their lives acted according to their training. They fought their respective fires "by the book" or at least the way they had performed it in the past. This *can-do attitude* prevailed in both types of crews. Wildland crews use standards as guidelines but

violate standard orders in pushing the envelope when judgment and experience say so (Roberto & Ferlins, 2003b). Similarly, structural firefighters also possess this *can-do attitude* in their belief that an aggressive attack will prevail (Mora, n.d.). It is when conditions worsen or change that the failure of decision-making skills occurs.

Studies of wildland firefighter fatalities during the previous decade have revealed that nearly 75 percent of the deaths occurred when fires were making the *transition* [italics added] from relatively small to relatively large or shortly after they had become large fires (Driessen, 2002, p. 4). As the term is now used in fire fighting, *transition* refers to the very complex changing fire events as well as to changing command structures (p. 10). It is analogous to the rapid changing series of events in smoke conditions within an enclosed environment. In short, transition occurs in both types of firefighting situations. In every case where the action occurred in an enclosed structure, the company's integrity was lost and firefighters became disorientated; and in 65 percent of the cases studied, firefighters exceeded their air supplies while attempting to evacuate (Mora, 2003, p. 4).

Mora (2003) found nine commonalities among the 17 fires he studied. The following four are of special note:

1. One hundred percent occurred in enclosed structures.

2. Ninety-four percent had nothing or light, moderate, or heavy smoke showing on arrival.[3]

3. One hundred percent utilized an aggressive interior attack.

4. One hundred percent developed prolonged zero-visibility conditions[4] (p. 4).

Transition wildland fires are very similar to numbers two and four where rapidly deteriorating conditions largely lead to problems.

The case to be made is that when comparing wildland and structural fires and fire fighting, there are several parallels where the two can be seen as one. Consequently, the argument can be made to examine the organization and its characteristics in the same fashion. As such, sensemaking finds its place in structural fire fighting.

Collapse of Decision-Making

Decision-making is about uncertainty. Decision-makers sometimes are not able to act, not due to the acquisition of adequate information, but because they are overwhelmed by the preponderance of conflicting meanings that it transmits (Lipshitz & Strauss, 1997; Weick, 1979; 1995). In some cases, information may be unavailable, ambiguous, or misleading (Feldman & March, 1981; Grandori, 1984; Wohlstetter, 1962, as cited in Lipshitz & Strauss, 1997).

Further research has shown that decision-makers first attempt to reduce uncertainty through the acquisition of data. They then include uncertainty that cannot be reduced this way as a factor in the choice of an alternative. Lipshitz (1997) labeled such attempts as the *RQP heuristic: Reduce* uncertainty by collecting relevant information, *Quantify* the uncertainty that cannot be reduced by expressing it as probability estimates, and *Plug* the result into a formula that incorporates uncertainty in the selection of a preferred alternative (Lipshitz, McClellan, Omodei, Sender, & Wearing, 2007). Research that is more recent has established that people cannot follow such a heuristic without assistance (Kahneman & Tversky, 2000). Lipshitz and Strauss (1997) further disclosed that decision-makers encounter three types of uncertainty: inadequate understanding, incomplete information, and undifferentiated alternatives, all of which can certainly be found in structural fire fighting.

To address these uncertainties the decision-making process employs five strategies of coping:

1. Reduction — trying to reduce uncertainty through information search;

2. Assumption — relying on knowledge and imagination to make sense;

3. Weighing pros and cons of rival options;

4. Forestalling — preparing a course of action to counter potential negative contingencies; and

5. Suppressing uncertainty — either by taking a risk or ignoring it (Lipshitz, et al., 2007, para. 3).

According to this *RAWFS heuristic*, "decision-making begins with an attempt to understand, recognize, and make sense of the situation" (Lipshitz, n.d., para. 5). This process can be illustrated in the signal detection theory, which is discussed next.

Putnam (1995) wrote that "stress, fear, and panic predictably lead to the collapse of clear thinking organizational structure" (p. 1). The collapse of such thinking has far-reaching repercussions in the fire service where it may result in serious injury or death. Under stressful conditions, leadership and decision-making can become more dogmatic and self-centered, which regresses toward more habituated behavior. The same process holds true for groups that tend to break apart under stress and form smaller units (p. 12). Driessen (1990) showed that there is an inverse correlation between crew cohesion and accident rates. This tendency is important when considering the collapse of decision-making.

It is central to note the difference between decision-making and sensemaking. *Decision-making* is based on strategic rationality. Decisions are derived from clear questions and clear answers that attempt to remove ignorance (Daft & MacKintosh, 1981). Crawford (2008) further defines this process to a particular moment aptly labeled the *firefighter tipping point* as the moment

when "the identifiable or unidentifiable actions or inactions, choices, or judgments made are recognized as having the greatest impact on the final outcome" (p. 93). It is imperative to note that while decision-making is concerned with strategic rationality and clear questions and answers that help to remove ignorance (Nathan, 2004), sensemaking is something different and begins where decision-making collapses. Although related, it is critical to understand that the two constructs are not the same.

One definition of *sensemaking* is "the process through which events and phenomena are noticed, interpreted, and reacted to as crisis events" (Pearson, Roux-Dufort, & Clair, 2007, p. 127). Sensemaking is about contextual rationality. "It is built from vague questions, muddy answers, and negotiated agreements that attempt to reduce confusion" (Weick, 1993, p. 32). With sensemaking "reality is an ongoing accomplishment that emerges to create order and make retrospective sense of what occurs" (p. 28). It is about an effort to give stability to the environment by paying it special attention.

Sensemaking emphasizes the way in which people try to make things rationally accountable to themselves and others. Sensemaking, as purported by Saveland (2005), evolves as one matures in life. This evolution may be the most critical element of leadership development and organizational change. The ability to overcome this resistance to change[5] transforms organizations into one based on reliable organizing principles that will be dependent on the emergence of highly developed leaders at all levels.

In the case of Mann Gulch, when the crewmembers first sized up the fire, they thought it was a 10:00 fire. They rationalized this belief until it was too late. At such point, everything they saw made less and less sense. Analogous events unfolded at Storm King 45 years later. In both tragedies, leadership was questioned, decisions were questioned. There was poor communication among groups and, most deadly, an underestimating of the current and potential fire behavior (Putnam,

1995). Once the condition became out of control, the crews lost the ability to make sense of the situation and chaos resulted, leading to their deaths.

Disorientation in an enclosed burning structure has parallel psychological factors. When working in unknown spaces under deteriorating conditions, a firefighter's sensemaking abilities equally degenerate. Sensemaking is the core element of fire fighting practices particularly when firefighters work on creating a shared understanding of their environment. Recall that it is different from decision-making where the question is "What shall we do?" as opposed to sensemaking where the question focuses on "What is going on?" Mora's (2003) study of firefighter disorientation argued that firefighters were killed doing what they were trained and expected to do (by the book). Nevertheless, some were unable to vacate the building and perished. Mora asks a rhetorical "why" but stops short of the most obvious and logical reason, namely the collapse of sensemaking.

Making Sense of Sensemaking

There has been significant progress made in the fire management community with respect to firefighter safety. Notwithstanding, as the job becomes increasingly more complex and simultaneously more dangerous, improvements have barely kept pace. Where wildland fire fighting separates itself from its structural fire-fighting counterparts is in the interdisciplinary realm. Empirical research remains lacking in the latter. Consensus and experience are still the critical elements that form the foundation for progress and development among structural fire-fighting operations. However, research outside of the field of fire science can be suitably applied.

Signal detection theory has been used in psychophysics to describe and explain decisions that are made in uncertain or ambiguous times (Wickens, 2001). *Psychophysics* is the study that investigates the relationship between a physical stimulus and its subjective or psychological effects. Moreover, the theory has impli-

Figure 1: Decision-Making Process (Green & Swets, 1966)
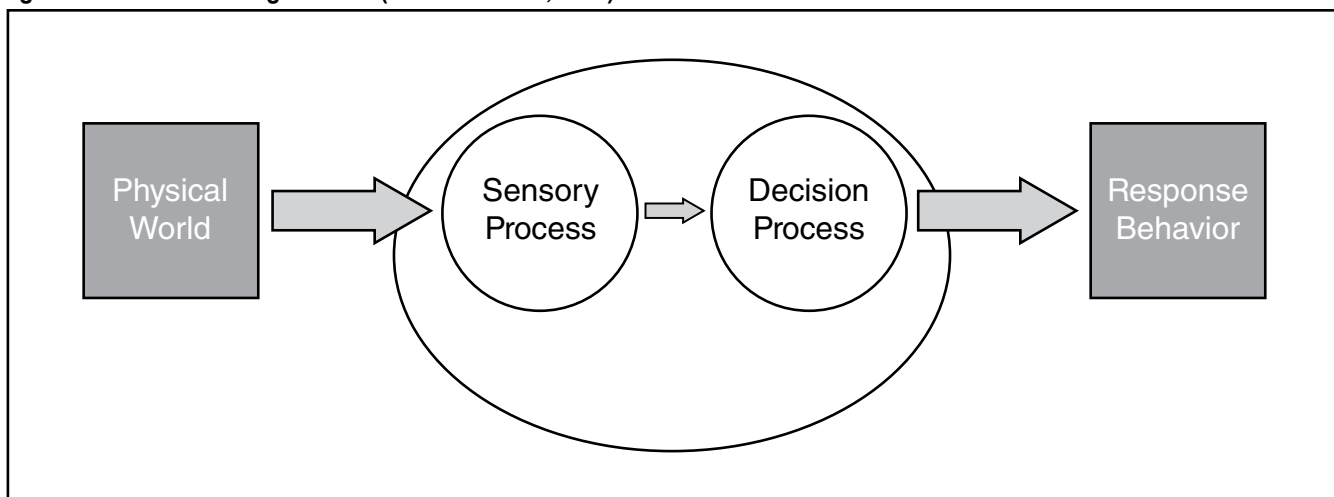
Figure 2: Generic Example of a Signal Detection Matrix (Saveland, 2005, p. 5)
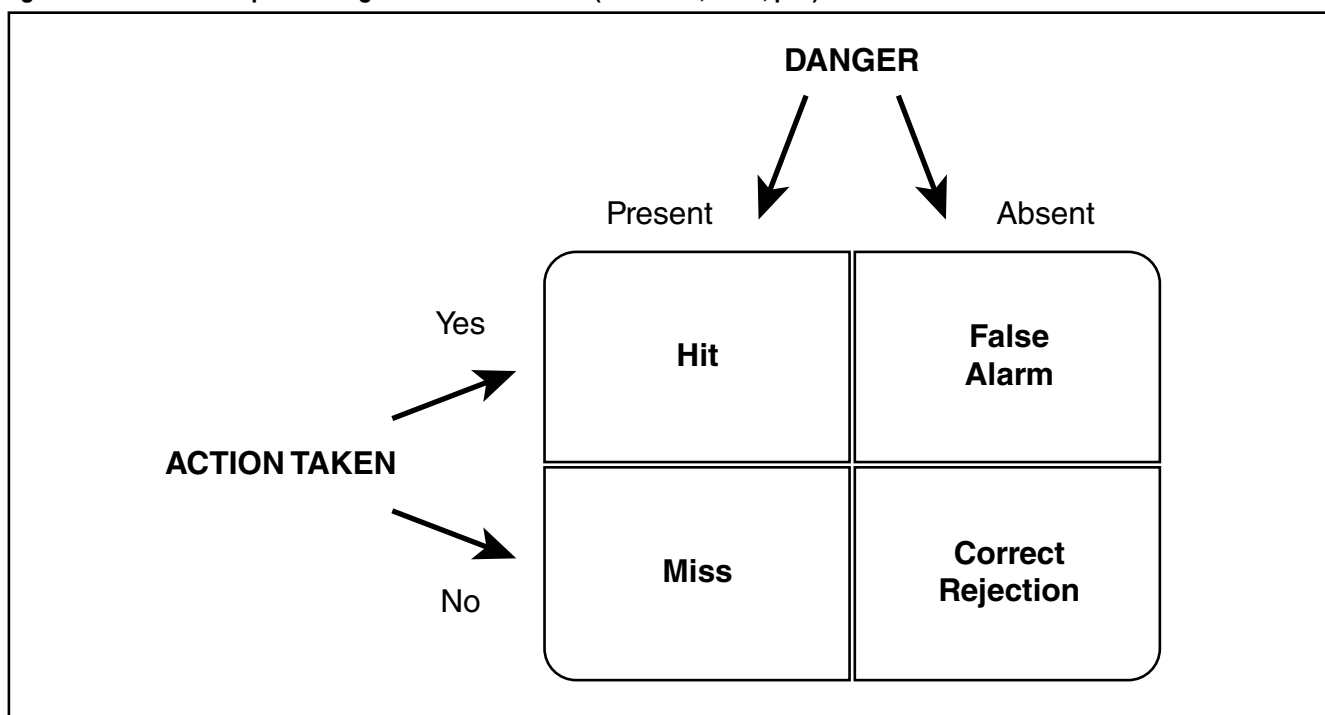
cations where decisions are made under uncertainty. In simple terms, although a decision is relative to a simple *Yes* or *No*, the elements upon which the decision is made may be ambiguous, incomplete, and contradictory. Such limitations make the decision difficult at best. Each decision depends on what the decider knows, expects, and believes and how later information affects the interpretation of the original observation (Wickens, 2001, p. 4). Figure 1 illustrates the process. It is the accurate interpretation of the physical world (what is actually occurring) through the sensory process that will hopefully lead to a decisions process and result in the correct decision or behavior.

J. M. Saveland (2005) made the argument for integrating signal detection theory as a mechanism for facilitating sensemaking. His hypothesis argued that by combining the two States of Nature[6] (namely, what is dangerous and what is not) with both sensemaking options (danger is approaching or danger is not approaching), a matrix can be constructed for firefighter safety. The following four options are then revealed:

1. **Hit** — Make sense of the situation and decide that it is **life threatening** and take **appropriate action** to get out of harm's way, when the situation is **in fact life threatening**. Example: realizing that there is a problem and evacuating the structure.

2. **Miss** — Make sense of the situation and decide that it is **not life threatening** and take **(in)appropriate action**, when the situation **is in fact life threatening**. Example: not taking an action that should have been taken and dire consequences resulted.

3. **False Alarm** — Make sense of the situation and decide that it is **life threatening** and take **(in)appropriate action**; when the situation **is in fact not life threatening**. Example: taking an action that one did not have to take.

4. **Correct Rejection** — Make sense of the situation and decide that it is **not life threatening** and take **appropriate action**, when the situation **is in fact not life threatening**. Example: taking no action when no action is required (pp. 5–6).

The four choices of Hit, Miss, False Alarm, and Correct Rejection identify, on a most elementary level, the traits of sensemaking. Consider Figure 2. Three of the four possible decisions will cause no harm to the decision-maker. It is only when there is a present danger and no response is taken do dire consequences result. It is the blending of this signal detection theory with coherent sensemaking that results in correct decision-making, thus ensuring the safety of the fire personnel.

Research in Germany has affirmed that there is practical application of sensemaking in structural fire fighting. Dyrks, Denef, and Ramirez (n.d.) argued that sensemaking is a core element of fire-fighting practices. Their research specifically addressed the potential for fire personnel to work on creating "a shared understanding of *unknown spaces*" [italics added] (p. 1). They were able to observe how important it was for firefighters to build cognitive maps as part of the sensemaking process; and in rapidly changing environments (transition), information cannot be trusted and is in continuous need of updates (communication). Since a key sensemaking activity for firefighters is understanding space (especially enclosed space), there is a twofold benefit

of the study. First, a greater perception of enclosed spaces assists in the sensemaking activity. Second is how sensemaking plays a critical role in a firefighter's professionally trained practices. Of note, the research was conducted with the Paris Fire Brigade, outside of the United States. There was no such study conducted in this country.

Steffens (2001) examined previous research conducted by Weick and MacLean and suggested that there are a number of actions that can be taken to minimize the potential for firefighter fatalities. First, care should be taken to maintain consistency in crew assignments. Second, wisdom should be promoted as a value to be respected. Third, personnel should be trained in and practice respectful interaction. Fourth, personnel should receive training to develop the characteristics of what is know as *bricolage*.[7]

Where Do We Go From Here?

It is obvious that leadership is imperative to safe, successful fire-fighting operations, whether wildland or structural. The tragedies at Mann Gulch and Storm King Mountain are just two examples where ineffective leadership led to the deaths of firefighters. Notwithstanding leadership represents just one part of the puzzle. The organization must possess the ability to make coherent and logical sense of a situation for its self-preservation. This ability, of course, results from sensemaking. Before leadership, there must be the ability to make sense in hazardous environments. Those in the structural fire-fighting profession must ensure that personnel are educated with respect to the necessary thought process.

Whiten (2005; 2007) has provided a model for wildland fire fighting from which a boilerplate could be created for structural fire fighting. The author consolidated 59 current wildland fire-fighting guidelines into ten crucial categories he thus named, *Ten Essential Factors in Fire Fighting (TEFF)*. These were further divided into the necessary components of each such as communications, escape routes, safety zones, fire-fighting resources, fire behavior, status or scope of the fire, and fuel types. This amalgamation represents a sort of checklist or factors to consider that can assist the firefighter in the field. The same methodology can be applied to structural fire fighting through the sensemaking heuristic.

There are marked similarities between the two fire-fighting professions, and it would do well for structural firefighters to learn as much as possible from those in the wildland domain. In the case of sensemaking, it might benefit the structural firefighter to learn from the mistakes made by those involved in the Mann Gulch and Storm King Mountain incidents and the research that followed and apply the lessons learned toward the safety of those who enter burning structures. Wieck (1995) reminds us that personnel can be taught that sensemaking in a crisis situation is one possible solution. His research and recommendations can form

the basis for research in structural fire-fighting safety. Furthermore, emergency organizations are likely to have the data for this exploration simply because they deal with such incidents on a regular basis (Bigley & Roberts, 2001). Before any of this learning can be accomplished, sensemaking must be first recognized as a possible solution. Second, its relationship to separate issues such as situational awareness and firefighter disorientation as it fits in tactical command must additionally be recognized and researched. The models discussed previously just briefly touch on the possible solutions related to the proper place of sensemaking in structural fire fighting. The final result will come from sound empirical research rather than consensus and experience. Yet, consensus plays its role in the common understanding relative to the importance of this topic. This paper's aim was simply to reveal this matter in the context of combating fires inside enclosed structures. The task now will be to apply the research conducted elsewhere in wildland fire fighting, for example, to devise a heuristic that can be applied to structural fire fighting.

Firefighter safety has its roots in many fields and disciplines. It is time to harvest such data.

References

Bigley, G., & Roberts, K. (2001). The incident command system: High-reliability organizing for complex and volatile task environments. *Academy of Management Journal*, *44*, 1281–1299.

Crawford, B. (2008). Decision making: Firefighter tipping points. *Fire Engineering Magazine, 61*(9), 93–98.

Daft, R., & MacKintosh, N. (1981). A tentative exploration into the amount and equivocality of information processing in organizational work units. *Administrative Science Quarterly, 26*(2), 207–224.

Downhill, S. (2005). Born of tragedy. The human factors movement rises out of South Canyon. *Wildland Firefighter*, *23*(2), 26–29.

Driessen, J. (1990). *The supervisor and the work crew*. Missoula, MT: USDA Forest Service's Technology and Development Center.

Driessen, J. (2002). *Crew cohesion wildland fire transition and fatalities*. TE02T16 Fire and Aviation Management Technical Services. Missoula MT: USDA Forest Service's Technology and Development Program.

Dyrks, T., Denef, S., & Ramirez, L. (n.d.) *An empirical study of firefighting sensemaking practices to inform the design of ubicomp technology*. Germany: Fraunhofer FIT, Retrieved April 20, 2008, from http://dmrussell.googlepages.com/Dryks-final.pdf.

Feldman M., & March, J. (1981). Information in organizations as signal and symbol. *Administrative Science Quarterly*, *26*(2), 171–186.

Grandori, A. (1984). A prescriptive contingency view of organizational decision-making. *Administrative Science Quarterly*, *29*(2), 192–209.

Green, D. M., & Swets, J. A. (1966). *Signal detection theory & psychophysics*. New York: John Wiley & Sons.

Kahneman, D., & Tversky, A. (Eds.) (2000). *Frames, values, and choices*. New York: Cambridge University Press.

Larson, G. (2003). A "worldview" of disaster: Organizational sensemaking in a wildland firefighting tragedy. *American Communication Journal, 6*(2), Retrieved April 20, 2008, from http://www.acjournal.org/holdings/vol6/iss2/articles/larson.htm.

Lipshitz, R. (1997). Coping with uncertainty: Beyond the reduce, quantify, and plug heuristic. In. R. Flin, E. Sala, M. Strub & L. Martin (Eds.),

Decision making under stress: Emerging themes and applications. (pp. 149–160) Aldershot, UK: Asshgate.

Lipshitz, R., & Strauss, O. (1997). Coping with uncertainty: A naturalistic decision-making analysis. *Organizational Behavior and Human Decision Processes*, *69*(2), 149–163.

Lipshitz, R., McClellan, J., Omodei, M., Sender, A., & Wearing, A. (2007). What's burning? The RAWFS heuristic on the fireground. Retrieved December 3, 2008, from http://organizations.haifa.ac.il/html/html_eng/Memberspublications/Lipshitz3.pdf 2008.

MacLean, N. (1992). *Young men and fire*. Chicago: University of Chicago Press.

Mora, W. (n.d.). *Preventing enclosed structure line-of-duty deaths*. Retrieved April 20, 2008, from http://everyonegoeshome.com/cgi-bin/hiprint.pl.

Mora, W. (2003). *U.S. firefighter disorientation study*. Retrieved April 20, 2008, from http://www.sanantonio.gov/safd/pdf/FirefighterDisorientationStudy.pdf.

Mora, W. (2005, June). Understanding and solving firefighter disorientation. *Fire Engineering Magazine*, *158*(6), 103–114.

Nathan, M. (2004, March). How past becomes prologue: A sensemaking interpretation of the hindsight-foresight relationship given the circumstances of crisis. *Futures*, *36*(2), 181–199.

Pearson, C. M., Roux-Dufort, C., & Clair, J. (Eds.). (2007) *International handbook of organizational crisis management*. Thousand Oaks, CA: Sage.

Putnam, T. (1995). *The collapse of decisionmaking and organizational structure on Storm King Mountain*. Retrieved April 1, 2008, from http://www.au.af.mil/au/awc/awcgate/usda/blm_putnam_storm_king.pdf.

Roberto, M., & Ferlins, E. (2003a). *Fire at Mann Gulch*. (Rep. 9-304-089). Cambridge, MA: Harvard Business School.

Roberto, M., & Ferlins, E. (2003b). *Storm King Mountain*. (Rep. 9-304-046).Cambridge MA: Harvard Business School.

Rothermel, R. (1993). *Mann Gulch fire: A race that couldn't be won*. (Gen. Tech. Rep. INT-299, Ogden UT: United States Department of Agriculture, Forest Service Intermountain Research Station.

Saveland, J. M. (2005). *Integral leadership and signal detection for high reliability organizing and learning*. Paper presented at the Eighth International Wildland Fire Safety Summit, April 26–28, 2005, Missoula, MT. Retrieved April 20, 2008, from www.fs.fed.us/rm/pubs/saveland/integral_leadership.doc.

Steffens, J. (2001). Sensemaking collapse and structural fire incidents. *Fire Engineers Journal*, *61*(215), 43–46.

Taylor, S. E. (1989). *Positive illusions*. New York: Basic Books.

Weick, K. (1979). *The social psychology of organizing*. Reading, MA: Addison Wesley.

Weick, K. (1993). The collapse of sensemaking in organizations: The Mann Gulch disaster. *Administrative Science Quarterly*, *38*(4), 628–652.

Weick, K. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: Sage.

Weick, K., Sutcliffe, K., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization Science*, *16*(4), 409–421.

Whiten, P. (2005). *TEFF: The ten essential factors in firefighting.* Paper presented at the Eighth International Wildland Fire Safety Summit, April 26–28, 2005, Missoula, MT. Retrieved August 10, 2008, from http://www.wildfirelessons.net/documents/Withen.pdf.

Whiten, P. (2007). An analysis of the risk management decision making process & the decision support systems in the wildland fire agencies. Retrieved December 4, 2008, from http://www.fire.uni-freiburg.de/sevilla-2007/contributions/doc/SESIONES_TEMATICAS/ST7/Withen_USA.pdf

Wickens, T. (2001). *Elementary signal detection theory*. USA: Oxford.

Wohlstetter, R. (1962). *Pearl Harbor: Warning and decision*. Stanford CA: Stanford University Press.

Notes

[1]As stated in Mora's (2005) study of firefighter disorientation, the following factors lead to fatality or serious injury:

- Fire in an enclosed structure with smoke showing,
- Aggressive interior attack,
- Deteriorating conditions of visibility,
- Handline separation or entanglement,
- Disorientation, and
- Serious injury or firefighter fatality (p. 110).

[2]A 10:00 (ten o'clock) fire is one determined to be so small in nature that it can be extinguished by 10 a.m. the following day; in wildland fire-fighting nuance, an easy fire.

[3]The remaining 6 percent represented structures where fire showing was reported, hence no smoke condition.

[4]Prolonged-zero visibility conditions (PZVC) are heavy smoke conditions lasting longer than 15 minutes. Since these conditions last longer than the breathing-time of most 30-minute self-contained breathing apparatus (SCBA), they should be considered as extremely dangerous.

[5]See Kegan, R. and Lahey, L. (2001). *How the way we talk can change the way we work: Seven languages for transformation*. San Francisco: Jossey-Bass and Kegan, R. and Lahey, L. (2001, November). The real reason people won't change. *Harvard Business Review 79*(10), 84–92.

[6]"The State of Nature is what is actually out there. In this case, there is a dangerous or threatening situation or there isn't" (Saveland, 2005, p. 5).

[7]*Bricolage* is the act of creating order from whatever materials are at hand. *Improvisation* is the application of that characteristic to a real-life situation.

About the Author

John Moschella is a three-decade veteran of the Revere (Massachusetts) Fire Department, having attained the rank of deputy chief. John also serves as adjunct professor at Anna Maria College. He holds the Master of Arts degree in fire science and administration from Anna Maria College and a Doctor of Education from Cambridge College. His dissertation research examined graduate fire centric programs offered both in the U.S. and internationally. Dr. Moschella has numerous fire-related publications in various journals and is currently a member of the editorial board of the *International Fire Service Journal of Leadership and Management*. He is an Executive Fire Officer and a member of the Institute of Fire Engineers. He can be contacted at **Jmosch13@aol.com.**

Dr. Wayne Peate, Zuckerman College of Public Health, University of Arizona
Jonathan Sexton, Zuckerman College of Public Health, University of Arizona
Dr. Kelly Reynolds, Zuckerman College of Public Health, University of Arizona
Deputy Chief Ed Nied, Jr., Tucson (AZ) Fire Department

Methicillin-Resistant Staphylococcus Aureus (MRSA) in Fire Facilities: A Guide for Firefighter Management

Abstract

Methicillin-resistant *Staphylococcus aureus (MRSA) poses a significant health risk to firefighters. Five hundred samples from nine fire stations and administrative/training facilities were collected using laboratory swabs and sponges. MRSA was detected on 7% of all surfaces tested in the fire station environment. This data was essential in the evaluation of bacteria transmission routes and potential risk of exposure among fire personnel. Measures to decrease the risks for MRSA to fire personnel are discussed, including education and awareness, protective measures, and standard operating procedures.*

Purpose and Objectives

Methicillin-resistant *Staphylococcus aureus* (MRSA) poses a significant health and occupational risk to firefighters. Our study objective was to evaluate the extent of MRSA (often called *staph*) in the firehouse environment. This data on environmental MRSA contamination will aid the evaluation of possible transmission routes of the bacteria and potential risk of exposure among fire personnel. Subsequent studies will incorporate this information in the design of measures to decrease the risks for MRSA to fire personnel, including increasing education and awareness, engineering protective measures into the workplace, and enforcing standard operating procedures and guidelines where appropriate.

Background

Staphylococcus aureus (*S. aureus*) is a bacteria found on the epidermis and in the nose of about a third of healthy individuals. *S. aureus* may cause infections with symptoms ranging from pimples, boils, and other skin conditions to life-threatening pneumonias and septicemia. Some strains are more difficult to treat due to resistance to many commonly administered antibiotics. As mentioned previously, these strains are known as *methicillin-resistant Staphylococcus aureus* (MRSA). MRSA is one of the leading causes of infections in patients in hospitals and long-term care facilities (Enright, Robinson, & Randle, 2002).

MRSA is an emerging infectious disease that presents multiple issues for not only the fire service, but for patients and families. Many fire service providers, including the Tucson (AZ) Fire Department (TFD), may not be aware of the potential for MRSA infection, and departments may not be employing effective mitigation.

According to the United States Centers for Disease Control and Prevention (CDC, 2005), there were 94,360 cases of MRSA in 2005 in the U.S. and 18,650 deaths. The number of new cases of MRSA in the U.S. now exceeds that of human immunodeficiency virus (HIV) (Klevens et al., 2007). A 2007 Mayo Clinic report suggested that 1.2 million hospital patients are infected with MRSA each year in the U.S., and of those, 4 to 12% will die. An additional 423,000 people become colonized annually while hospitalized (Mayo Clinic, 2007).

Since the early 1990s, reports of MRSA infections have steadily increased in communities with no association to hospitals and long-term care facilities. No longer confined to hospitals, MRSA infections occur in certain populations at an increased rate, in particular populations with close physical contacts (i.e., prison inmates, sports teams, and child care attendees) (CDC, 2005; CDC, July 2008b).

Fire station personnel represent a unique population in that they are exposed to both hospital-acquired (HA-MRSA) and community-acquired (CA-MRSA) strains of the bacteria. Documented occupational exposures, including high-risk patient contacts and a communal lifestyle, pose an increased risk of exposure for all personnel (NFPA®, 2005; NFPA®, 2007). Forty-eight percent of ambulances tested positive for MRSA (Roline, 2007). From 2003 to 2006, the City of Los Angeles (CA) Fire Department reported 136 medical claims of MRSA, with five individuals requiring hospitalization for aggressive antibiotic treatment (Williams, 2006). Individuals were identified as part of the cluster of those infected who had no contact with patients, suggesting a common transmission route in the fire station between employees. Further investigation found that MRSA was community-acquired and thought to be spread by surface contact in shared kitchen, bathroom, and workout room spaces at the fire stations. Conditions of occupational and community exposure increase the risk of disease transmission to fire personnel and may also promote indirect transmission to other environments such as homes or patients (Lejeune & Berkowitz, 2000).

Table 1: Tucson Fire Department MRSA Cases: 2004 Through 2007

	2004	2005	2006	2007
MRSA Cellulites cases	2	6	3	6
Exposure to MRSA respiratory infections	7	2	2	26

Note: MRSA = Methicillin-resistant *Staphylococcus aureus*.

The United States fire service responds to nearly three million calls for service annually (USFA, 2007). Of these, 55% are emergency medical service (EMS) orientated (USFA, 2007). In 2006, the TFD responded to nearly 70,000 calls for service, with just over 60,000 being EMS related (TFD, 2007a). It is during these EMS-related calls that firefighters are potentially exposed, knowingly or not, to numerous types of communicable and infectious diseases.

In addition, firefighters may potentially expose patients and coworkers with work equipment. Approximately one in three stethoscopes used by EMS personnel was found to carry MRSA based on a recent study at a tertiary care facility. Of 52 stethoscopes tested, 16 were MRSA positive. Sixteen subjects were unable to remember when they had cleaned their stethoscopes. The time from most recent stethoscope cleaning to testing was 1 to 7 days. The odds of MRSA colonization fell significantly (*p = 0.038*) with the most recent cleaning dates (Merlin et al., 2009).

In 2004 to 2007, the TFD had 17 confirmed MRSA cases requiring medical treatment, including 4 hospitalizations and 37 cases of personnel being exposed to respiratory MRSA alone. Table 1 summarizes numbers of TFD personnel treated for MRSA cellulites, an infection of the skin, and the number exposed to respiratory MRSA from 2004 to 2007 (TFD, 2006a; TFD, 2007b).

The remainder of this article presents information on MRSA exposure potentials in fire personnel and provides guidelines for minimizing exposure risks.

Methods

One hundred fifty samples from ten locations (nine fire stations and one administrative\training facility were collected using laboratory swabs and sponges. Fifty samples were taken from each location. Sites selected for testing were areas of high potential MRSA risk such as busy human traffic areas where the bacteria might be brought into the facility by personnel, including day

Table 2a: Sample Results

Samples Tested	Sample Site	HPC (cfu/site)	Percent of Sites That Tested Positive			
			Total Coliform	Fecal Coliform	*S. Aureus*	MRSA
30	Office	6,960	60	3	13	6
20	Couch	25,600	90	5	20	20
10	Remotes	4,360	40	0	10	5
10	Table	5,630	30	0	5	5
30	Kitchen	13,700	50	3	10	3
10	Class Desk	20,900	70	0	20	10
10	Classroom Equipment/ Tools	4,970	30	0	10	10
10	Transit Bags	3,040	20	0	0	0
10	Locker Room	53,400	100	20	0	0
150	**Total Sites**	__	**54**	**3**	**10**	**7**

Note: MRSA = Methicillin-resistant *Staphylococcus aureus*; HPC = heterotrophic plate count; cfu = colony forming units; *S. aureus* = *Staphylococcus aureus*.

Table 2b: Summary Findings of Different Sites Tested

Sample Site	Comments
Office	Frequently contaminated with MRSA and fecal bacteria.
Couch	• Number one site for MRSA isolation. • Frequently contaminated with staph and fecal bacteria.
Remotes	Frequently contaminated with MRSA and staph bacteria.
Table	Frequently contaminated with MRSA and staph bacteria.
Kitchen	Frequently contaminated with MRSA, staph, and fecal bacteria.
Desks	Frequently contaminated with MRSA and staph bacteria.
Classroom equipment	Frequently contaminated with MRSA and staph bacteria.
Transit Bags	Like other sites, failed hygiene test.
Locker Room	Number one site for fecal bacteria but no MRSA or staph bacteria isolated.

Note: All sites failed hygiene tests and were positive with more than 1,000 general bacteria; MRSA = Methicillin-resistant *Staphylococcus aureus* (often called *staph*).

rooms, apparatus bays, kitchens, and bathrooms. Biochemical tests were used to identify *S. aureus* bacteria. The *S. aureus* that was MRSA was then identified by growth on media containing methicillin-derived antibiotics. Samples were also tested for heterotrophic plate count (HPC) bacteria and total coliforme, an indicator of general hygiene, and *Escherichia coli* (*E. coli*), an indicator of fecal contamination.

Results

Of the 150 samples collected from numerous sites in the fire station, nine general sites emerged as high-risk areas (see Tables 2a & 2b). All of the sites listed in Table 2a failed the hygiene test, with average HPC counts exceeding 1,000 colony forming units (cfu), which is the standard for hygienic surfaces based on generally accepted international microbiology standards. These results suggest that common surfaces need to be cleaned and disinfected more frequently. The site that contained the highest HPC was the locker room with 53,400 cfu/site. The locker room also contained the highest percentage of total and fecal coliforms, 100% and 20%, respectively, and general office surfaces as well as kitchen surfaces also tested positive for the fecal indicator bacteria.

Conversely, MRSA was never found in the locker room, suggesting that the presence of high HPC counts is not necessarily indicative of harmful bacteria presence. Overall, MRSA was detected on 7% of all surfaces tested in the fire station environment. All surfaces listed in Table 2a tested positive for MRSA except the locker room and transit bags. The highest percentage of *S. aureus* (20%) was found on firehouse couches and desks with the couches also containing the highest percentage of MRSA (20%).

Based on these results, a focused intervention was implemented. The fire facilities used a certified microbe-killing product with the expectation that MRSA would be reduced (EPA, 2009). A 90 to 99% reduction in HPC occurred at sites sampled after the intervention and only two staph colonies and one MRSA colony were found on couches, the place of highest previous colonization (see Table 3, p. 16).

Discussion

Based on this study, several focused interventions should be considered for fire personnel. The first intervention is increased education in infection control. This intervention may be implemented in a variety of ways such as posters and signs throughout the firehouse, a teacher-instructed class, or an Internet-based, self-paced lesson.

A second level of intervention is the use of MRSA-abatement products. MRSA is known to survive for days to weeks and even months on inanimate objects, increasing the chance for exposure if the cycle of contamination is not broken. The need for frequent application of certified microbe-killing products is expected to reduce the risk of MRSA exposure from contaminated surfaces. The U.S. Environmental Protection Agency (EPA) maintains a growing list of certified MRSA-abatement products and further states that disinfectants, when used properly, can be expected to reduce bacteria, including MRSA, by 99.9% (EPA, 2009; also see Appendix B).

A third intervention is increased hand washing and the application of anti-MRSA products on exposed body parts during high-risk exposures such as a splash of MRSA-containing bodily fluids on a firefighter during a medical call. Washing hands for 30 to 60 seconds has

Table 3: Conditions Before and After Using Disinfecting Spray

Sample Site	Heterotrophic Plate Count (HPC) cfu/Site	
	Before	After
Office	2,380	337
Couch	664,000	3,230
Remotes	1,140	70
Table	1,120	237
Kitchen	5,560	85
Classroom Desks	2,398	248
Classroom Equipment/ Tools	1,815	365
Transit Bags	640	337
Locker Room	22,113	705

Note: cfu = colony forming units.

been shown to reduce bacteria and viruses on hands by 99 to 99.9% (CDC, 2002; Siegel, Rhinehart, Jackson, & Chiarello, 2006). Frequent hand washing should be encouraged throughout the work shift and before entering firehouse living and eating areas.

A combination of interventions is likely the most effective approach. Policies and incentives should be put into place focused on improving the hygiene of the station. Procedures should be implemented aimed at designating "clean" and "dirty" areas of the firehouse and increasing personal protection precautions when on high-risk calls. Interventions including the issue of guidelines for station-cleaning procedures, hand washing and decontamination following patient contacts, and the use of personal protective equipment (PPE) (e.g., gloves) and sprays have the potential to reduce MRSA-related infections in the workplace.

Studies have shown that the most common reason for infectious disease exposure was the lack of compliance with agency procedures for cleaning and disinfection (Siegel et al., 2006). Housekeeping personnel at hospitals were found to have a decrease in pathogen acquisition when they were monitored for compliance on a regular basis (Siegel et al., 2006). Such compliance is also likely to be critical for prehospital personnel such as firefighters.

Pre-EMS response and during response information sharing is also a critical piece of MRSA prevention. The TFD utilizes a series of three questions, which are asked of every calling party about the patient in question (TFD, 2006b):

1. Are they coughing?

2. Do they have a fever?

3. Do they have an ongoing disease process?

This information is then shared via computer link with responding crews. It is expected that the firefighter officer and crewmembers will assure proper PPE is utilized on that call. If so, and there is MRSA within the environment, limited exposure should occur. Unfortunately, not every caller provides accurate information, or the unexpected occurs. Often in more serious cases of bodily fluids exposure, PPE is not adequate. Masks and gloves can become soaked or leak.

Humans have long recognized the need to disinfect items to reduce disease transmissions. Regular and routine cleaning of medical equipment began as early as 1970. In the 1980s, HIV and hepatitis B and hepatitis C viruses were the focus of health care worker protection (West, 2007). To prevent infectious disease transmission, it is important to decontaminate any equipment used. If these items are not properly decontaminated, potential exposure to MRSA and other biohazards can occur. A disinfectant or bleach concentration can be effective. However, bleach must be used correctly. Many products are premixed at the proper dilution for maximum effectiveness. If dilution instructions for killing MRSA are not available, use "1/4 cup of regular household bleach in 1 gallon of water (a 1:100 dilution equivalent to 500–615 parts per million [ppm] of available chlorine) to disinfect pre-cleaned surfaces" (CDC, 2008a). All organic materials must be cleaned from the object before disinfectants are applied, otherwise their efficacy will be compromised.

Conclusion

In conclusion, a comprehensive approach is advised for fire personnel, including the following (Kowalski, Berbari, & Osmon, 2005; CDC, 2002; CDC, 2007b):

1. Frequent hand washing — after calls, before eating, and when entering common areas

2. Designation of clean and dirty areas for placing contaminated boots and clothing, eating, exercising, and lounging

3. Use of disinfectants on both hard and soft surfaces

4. Dedicated washers and dryers for uniform cleaning

5. Posted guidelines for hygiene and protective equipment use, including fomites such as stethoscopes

Appendices at the end of this article include (A) standard operating procedures that can be adopted by fire-fighting agencies and (B) a list of EPA-registered products effective against MRSA and Vancomycin-Resistant *Enterococci faecalis* (VRE) bacteria. Although future research may bring changes to these guidelines, they represent the consensus among MRSA experts.

References

Centers for Disease Control and Prevention (CDC). (2002). *Guideline for hand hygiene in healthcare settings*. Retrieved July 14, 2009, from http://www.cdc.gov/handhygiene/.

Centers for Disease Control and Prevention (CDC). (2005). Community-associated MRSA information for the public. Retrieved October 6, 2007, from http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca_public.html#8.

Centers for Disease Control and Prevention (CDC). (2007a). *CA-MRSA clinician FAQs: CDC infection control in health care*. Retrieved October 4, 2007, from http://www.cdc.gov/ncidod/dhqp/ar_MRSA_spotlight_2006.html.

Centers for Disease Control and Prevention (CDC). (2007b). *NIOSH safety and health topics: MRSA and the workplace*. Retrieved November 13, 2007, from http://www.cdc.gov/niosh/topics/mrsa/.

Centers for Disease Control and Prevention (CDC). (2007c). *Understanding MRSA*. Reviewed by D. Perlman, MD. Retrieved October 26, 2007, from http://www.webmd.com/skin-problems-and-treatments/understanding-MRSA-methicillin-resistant-staphylococcus-aureus.

Centers for Disease Control and Prevention (CDC). (2008a). *Community-associated MRSA information for the public*. Retrieved August 4, 2008, from http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca_public.html#4.

Centers for Disease Control and Prevention (CDC). (2008b). *Environmental management of staff and MRSA in community settings*. Retrieved July 13, 2008, from http://www.cdc.gov/ncidod/dhqp/ar_mrsa_Enviro_Manage.html#9.

Enright, M. C., Robinson, D. A., & Randle, G. (2002). The evolutionary history of methicillin-resistant *Staphylococcus aureus*. *Proceedings of the National Academy of Sciences*, *99*(11), 7687-7692.

Environmental Protection Agency (EPA). (2009). *List H.: EPA's registered products effective against methicillin-resistant Staphylococcus aureus (MRSA) and Vancomycin resistant Enterococcus faecalis or faecium (VRE)*. Retrieved January 9, 2009, from http://epa.gov/oppad001/list_h_mrsa_vre.pdf.

International Association of Firefighters. (2007). *MRSA—Methicillin-resistant Staphylococcus aureus*. Retrieved October 6, 2007, from http://www.iaff.org/HS/Resi/MRSA.html.

Klevens, R. M., Morrison, M. A., Nadle, J., Petit, S., Gershman, K., Ray, S., Harrison, L. H., Lynfield, R., Dumyati, G., Townes, J. M., Craig, A. S., Zell, E. R., Fosheim, G. E., McDougal, L.K., Carey, R.B., & Fridkin, S.K. (2007). Active bacterial core surveillance (ABCs) MRSA investigators. Invasive methicillin-resistant *Staphylococcus aureus* infections in the United States. *Journal of the American Medical Association*, *298*(15), 1763–1771.

Kowalski T., Berbari E., Osmon D. (2005). Epidemiology, treatment and prevention of community-acquired methicillin-resistant *Staphylococcus aureus infections. Mayo Clinic Proceedings*, *80*(9), 1201–1208.

Lejeune, J. R., & Berkowitz, D. M. (2000). Bad bugs: What you need to know about VRE/MRSA. *Journal of Emergency Medical Systems, 25*(12), 56-61.

Mayo Clinic. (2007). MRSA infection. Retrieved November 23, 2007, http://www.mayoclinic.com/health/mrsa/DS00735.

Merlin, M. A., Wong, M. L., Pryor, P. W., Rynn, K., Marques-Baptista, A., Perritt, R., Stanescu, C. G., & Fallon, T. (2009). Prevalence of methicillin-resistant *Staphylococcus aureus* on the stethoscopes of emergency medical services providers. *Prehospital Emergency Care*, *13*(1), 71–74.

National Fire Protection Association. (2005). *NFPA® 1581: Standard on Fire Department Infection Control Program*. Quincy, MA.

National Fire Protection Association. (2007). *NFPA® 1500: Standard on Fire Department Occupational Safety and Health Program*. Quincy, MA.

Roline C. E. (2007). Can methicillin-resistant *Staphylococcus aureus* be found in an ambulance fleet? *Prehospital Emergency Care*, *11*(11), 241–244.

Siegel, J. D., Rhinehart, E., Jackson, M., & Chiarello, L. (2006). *Management of multi-drug resistant organisms in the healthcare setting*. Retrieved October 2007, from http://www.cdc.gov/ncidod/dhqp/pdf/ar/MDROGuideline2006.pdf.

Siegel, J. D., Rhinehart, E., Jackson, M., & Chiarrello, L. (2007). *Guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings*. Retrieved July 13, 2008, from http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf.

Tucson Fire Department. (2006a). *Master memorandum No. 38: 2005 injury and exposure report*. March.

Tucson Fire Department. (2006b). *Master memorandum No. 68: New infection control code*.

Tucson Fire Department. (2007a). *Annual report for City of Tucson fire department*.

Tucson Fire Department. (2007b). *Master memorandum No. 38: Injury and exposure report 2006*.

United States Fire Administration (USFA). (2007). *Run reports: Topical fire report series-fire run profile*. Vol. 7-3. (December). Retrieved January 19, 2008, from http://www.usfa.dhs.gov/downloads/pdf/tfrs/v7i3.pdf.

West, K. (2007). Basic principles of cleaning, decontamination and disinfection for EMS. *Emergency Medical Services*. Retrieved November 24, 2007, from http://www.emsresponder.com/print/Emergency—Medical-Services/Bug-PATROL/1$6546.

Williams, D. (2006). Danger in the fire station: Drug resistant infections. *Fire Engineering*, December, 69–74.

Appendix A

Example: MRSA/VRE Standard Operating Procedures (SOPs)

PURPOSE: To provide guidance to all employees on preventative measures to combat bacteria commonly found in the workplace, specifically methicillin-resistant *Staphylococcus aureus* (MRSA) and Vancomycin-Resistant *Enterococci faecalis* (VRE)

SCOPE: This guideline applies to all employees and volunteers.

DEFINITIONS:
- **Cleaning**: The use of water, chemical, towel, or friction to wipe surfaces giving them a clean appearance.

- **Concentration**: The amount of concentrated bulk cleaning agent that will be diluted with water to create a cleaning solution. Cleaning solutions that exceed recommended concentrations may be harmful to the user, the surface to be cleaned, or the environment. Concentrations that do not meet the minimum solution recommended by the manufacturer may not be effective against the intended agent.

- **Contact Time**: The amount of time recommended or specified by the manufacturer that the cleaning product must remain on the surface being disinfected before the bacteria is effectively eliminated (killed).

- **Disinfection**: The application of a cleaning or disinfection product according to the manufacturer's specifications that will include a "contact kill time" before removal of the chemical, where required. The contact kill time will be different for specific bacteria.

- **Hand Sanitizer**: A liquid product with an alcohol content of 60% or greater (or other ingredient such as benzylkonium chloride, isopropanol or ethanol) for the control of MRSA or Vancomycin-resistant *Enterococci faecalis* (VRE) bacteria.

- **Methicillin-resistant *Staphylococcus aureus* (MRSA)**: A type of "staph" bacteria that is resistant to penicillin as well as some other common antibiotics. It most commonly manifests as a skin infection.

- **Vancomycin-resistant *Enterococcus faecalis* (VRE)**: A type of common bacteria that is resistant to the antibiotic Vancomycin and is clinically similar to MRSA.

PROCEDURE:
General Recommendations
Any exposure to MRSA or VRE shall be addressed in accordance with the Exposure Control Plan. All on-duty exposures shall be reported to the employee's immediate supervisor and medical evaluation/treatment shall be sought.

The following are recommendations to minimize the risk of MRSA and other microbes:

- **Disinfect surfaces regularly**: Establish a regular cleaning schedule for work surfaces including medic trucks, stethoscopes, blood pressure cuffs, door handles, telephones, computer keyboards and mice, and truck door handles.

- **Address MRSA hot spots**: Disinfect fabric couches and chairs on a regular schedule (once a week). If possible, cover them with vinyl or replace them with furniture that is vinyl or leather.

- **Make a "clean area" (living quarters) and a "dirty area" (apparatus bay)**: Ban turnouts and duty boots from living quarters. Place a large sign in the apparatus bay as a reminder. Disinfecting won't help if the living area is reinfected.

- **Report possible skin infections early**: See a health care professional if a red spot or bump on the skin is larger than a dime. Any red streaks or pus require immediate evaluation, personal accountability, and monitoring.

- **Wash hands**: Use soap and water or an alcohol-base hand sanitizer and wash thoroughly. Experts suggest washing hands for as long as it takes to recite the alphabet. Consider adding a hand cleanser dispenser to the apparatus bay. Wash hands anytime returning from a medical call and before entering the station living area. Reinforce washing hands, arms, or other exposed body parts prior to reentering the station. Use the sink in the bay rather than the kitchen sink. Signs demonstrating proper hand washing (20 seconds, scrub arms, wrists, between fingers, under jewelry and nails, etc.) at the sinks would be helpful.

- **Cover cuts and scrapes with a clean bandage**: Prevent spreading bacteria to other people. This requirement assumes personal accountability and monitoring.

- **Do not touch other people's wounds or bandages unless wearing gloves**.

- **Do not share personal items like towels or razors**: Wipe any shared equipment before and after use. Drying clothes, sheets, and towels in a dryer, rather than letting them air dry, also helps kill bacteria.

Any exposure to Methicillin-resistant *Staphylococcus aureus* (MRSA) or Vancomycin-resistant *Enterococcus faecalis* (VRE) shall be addressed in accordance with the Exposure Control Policy. Persons who contract

MRSA or VRE shall report it immediately and seek medical attention.

Cleaning is the application of a chemical to a surface, followed by the immediate wiping or removal of the chemical. Precleaning of dirty surfaces is recommended prior to disinfection. Disinfection of a surface is usually achieved when the chemical is applied according to the manufacturer's instruction listed on the product label and the chemical is left on the surface long enough to kill the agent before the excess chemical is removed or wiped away. This process is called the "Contact Time" or "Contact Kill Time." It is only when the disinfecting product is mixed into its proper solution (if required), applied according to manufacturer's instruction, and left on the surface for the required amount of contact time, that the user can be reasonably assured the disinfection process is complete. It is preferred that most disinfecting agents are allowed to evaporate or dry on the surface without removal to complete disinfection.

Disinfection products are available through various vendors. It is important that all disinfection products in the workplace are surveyed to verify a manufacturer's claim that the product is effective against the *Staphylococcus aureus* bacteria.

A product with a manufacturer's claim that it is tested against specific bacteria (MRSA or VRE) and found to kill the specific bacteria when applied to the manufacturer's recommendations would be an effective product. In cases where a commercial disinfection product may not available, practical, or cost-effective, a bleach solution, mixed in accordance with the manufacturer's instructions (on the label), can be used effectively if left on a nonporous surface for a minimum of 10 minutes.

In many cases, a disinfection product will also be effective against other infectious agents such as viruses like hepatitis B, HIV-1, norovirus (stomach virus), rotavirus (cold virus), and others. Disinfection products may also be effective against bacteria such as *Mycobacterium tuberculosis* (*MTB*) and *Escherichia coli* (*E. coli*) and others. A disinfection product may also be effective against certain fungal spores, commonly called *mold*.

A disinfection product that is effective against the greatest spectrum of bacteria, viruses, and fungi, when applied and utilized according to the manufacturer's recommendation, may be the best product for use. It should be noted that in many cases, contact times may differ between bacteria versus a virus or other infectious agent. When utilizing the product to kill the full spectrum of bacteria, virus, or fungus listed by the manufacturer, the cleaning agent must be left on for the longest duration recommended by the manufacturer.

Unused solutions of disinfectant can be poured down the sanitary sewer (drain), other than toilet facilities. Disposable wipes can be discarded in the normal waste stream (trash).

It is mandatory that whenever any cleaning product is added to the chemical inventory, even for products under trial use, the Material Data Safety Sheet (MSDS) is added to the electronic MSDS inventory and a printed copy is added to the MSDS Manual. All secondary containers (spray/squirt bottles) for the dispensing of disinfection solutions shall be labeled with the appropriate contents (product/chemical name).

Where custodial service is provided, disinfection is generally limited to common areas: floors, entry glass doors, drinking fountains, handrails, and assembly spaces such as conference rooms. Additional efforts must be made by employees to augment these efforts.

Work/Living Areas

Employees can disinfect their personal work spaces by ensuring that all hard (nonporous) surfaces in the working environment that may come into contact with bodily fluids are disinfected daily or regularly with an EPA-registered or effective cleaning product. These surfaces include but are not limited to desks, tables, doorknobs (push bars), computer desks, and countertops. Disposable bacterial wipes are the preferred method for disinfecting electronic appliances, keyboards, mice, light switches, and other electronic control buttons.

Fabric-covered furniture and other porous surfaces should be regularly cleaned and/or covered with vinyl or replaced with vinyl or leather. Vinyl is preferable. If carpeting is present in a facility, it should be thoroughly cleaned on a regular basis or as needed. Smooth flooring surfaces should be considered in the design of all facilities. These surfaces are easier to clean and disinfect than carpeted surfaces.

Turnouts and duty boots shall not be worn in the living quarters at fire stations. Disinfecting won't help if the living area is cleaned and then reinfected. A large sign shall be placed at all doorways leading from the apparatus bay(s) into the living areas of the station stating "No Turnouts or Duty Boots Beyond This Point" as a reminder. In addition, turnouts shall not be worn into other workplaces or other public places unless necessary.

Employees who share the operation of motor vehicle equipment can disinfect the steering wheel, armrest(s), control knobs, and buttons with a disposable bacterial wipe between each use of the vehicle. Care should be taken when utilizing an alcohol-based wipe on vehicles that have been parked in direct sunlight.

Exercise Areas

In areas where exercise or weight rooms are present, equipment where bodily fluids may be present should be disinfected between each use. Disinfectant shall be provided. Specific areas to be disinfected would include benches, seats, grips, bars, and handles. Wall dispensers or "pump-type" hand sanitizers (≥60% alcohol) should be present for occupant use.

Restrooms

Hand towels shall be restricted to disposable paper and the employer shall provide liquid soap/dispensers and/or hand sanitizers.

Infection Control Policy and Checklist		
Review the recommendations for disinfection procedures below. Utilize this checklist to ensure daily and periodic cleaning and disinfection control is practiced in every facility.		
General	**Yes**	**No**
All hard environmental surfaces that may come in contact with body fluids are cleaned and disinfected daily with an EPA-registered product.		
Light switches, doorknobs, door push bars, elevator controls, handrails, and community phones are disinfected daily with an EPA-registered product.		
All hard flooring is cleaned and disinfected daily with an EPA-registered product.		
Mop heads and buckets utilized for restrooms, locker rooms, and showers should be independent from program areas and office space. Mop heads are cleaned and disinfected weekly.		
Restrooms — wall dispensers are utilized for liquid soap (no bar soap).		
Exercise/Weight Rooms		
Grip areas on weights, bars, dumbbells, and machines are wiped down at the beginning of each day (shift), between each use, and end of day (shift) with an EPA-registered product or bleach solution.		
Grip areas on weights, bars, dumbbells, and machines shall not be taped.		
Wall padding, lifting benches, stationary bike seats, and/or floor mats are cleaned daily with an approved product or bleach solution.		
Wall dispensers for hand cleaner (≥60% alcohol) are placed at each entry/exit door. Signage is present to indicate minimum use when entering/leaving facility.		
Shower Rooms/Locker Rooms		
Showers and locker rooms (shower areas, locker room floors, and benches) are cleaned and disinfected daily with an EPA-registered product, and wall dispensers utilized for liquid soap are placed within or directly adjacent to showers (no bar soap).		
Used towels or linens utilized are only handled by employees with latex (or similar) gloves.		
Towels or linens laundered in the facility shall be washed in hot water and dried on the warm or hot setting in a clothes dryer.		
Sports Equipment		
All sports equipment used during the day is cleaned and disinfected daily with an EPA-registered product.		
Vehicles		
Steering wheels, armrests, control knobs, and buttons should be wiped daily with an EPA-registered product.		
First Aid/Bodily Fluids		
Hand sanitizer (≥60 alcohol) is utilized before and after practicing first aid when caring for an injury or cleaning bodily fluids; disposable gloves and eye protection shall be utilized.		

Shower Areas

In areas where showers and locker rooms are present, floors, walls, and fixtures should be disinfected daily. Wall dispensers with liquid soap shall be provided. Use of communal bar soap shall not be allowed. Employees should not handle another person's personal items such as towels without the use of gloves.

Showers, lockers, exercise rooms, and restrooms should have cleaning equipment (mops and buckets) independent from other common areas. Mop heads should be changed or disinfected weekly at a minimum.

Program Areas/High-Use Areas

In areas where "sports equipment" is utilized, the equipment should be disinfected after each use. This equipment includes specialty equipment, footballs, basketballs, kick balls, soccer balls, softballs, volley balls, etc.

In areas where sports or play activities are conducted, employees are required and participants should be encouraged to bandage or securely cover every skin abrasion, cut, or laceration before participating in an activity. Participants observed with active bleeding should be removed from participation. Participants with active skin infections (wound drainage) should be referred to a physician for evaluation.

In public program areas or high-use employee areas, hand sanitizer should be readily available in portable containers or mounted in a fixed location between the apparatus bay and the living areas of the station. Hand sanitizer should also be placed in additional locations as deemed appropriate to encourage good hand hygiene. Disposable latex (or similar) gloves should be included or located adjacent to every first aid kit.

Safety

MRSA is a serious infection that can become life-threatening if left untreated. If someone has been diagnosed with MRSA, there are steps that need to be taken now to avoid spreading it further to family members and friends.

Appendix B

Registered Products Effective Against MRSA and VRE

The following link, http://www.epa.gov/oppad001/list_h_mrsa_vre.pdf, shows List H. *EPA's Registered Products Effective Against Methicillin-Resistant Staphylococcus aureus (MRSA) and Vancomycin Resistant Enterococcus faecalis or faecium (VRE)*.

About the Authors

Dr. Wayne Peate is a Harvard-trained physician who has specialized in research with firefighters and has been involved in the treatment of MRSA infected personnel. He is an associate professor at the Zuckerman College of Public Health and the College of Medicine, University of Arizona. Dr. Peate serves as the corresponding author of this article and can be reached at **peate@email.arizona.edu**.

Dr. Kelly Reynolds, microbiologist, has conducted numerous studies on the prevalence and mitigation of pathogens. She has also been involved in firefighter MRSA research. Dr. Reynolds is an associate professor at the Zuckerman College of Public Health, University of Arizona.

Ed Nied is the Deputy Chief of the Tucson (AZ) Fire Department. He identified fire stations that were of high risk of MRSA exposures and has been involved in MRSA mitigation strategies.

Jonathan Sexton is a Master of Science candidate in environmental science in the Zuckerman College of Public Health. He participated in site determination, recruitment and sample collection, and laboratory support.

Dr. R. Jeffrey Maxfield, Utah Valley University

Asynchronous Online Learning: Perceptions and Experiences of Nontraditional Adult Emergency Services Students

Abstract

This study used hermeneutic phenomenology, a qualitative methodology, to explore and interpret the lived experience of nontraditional emergency services students in an asynchronous online learning environment. This understanding was achieved through rigorous analysis of in-depth, semistructured interviews and journal entries of four nontraditional adult students enrolled in an online baccalaureate degree program. The research question for this study was: How do nontraditional adult undergraduate students experience asynchronous online instruction? Results revealed that student experiences fell into two overarching themes, each with related subthemes. The two identified themes and subthemes are: (a) Theme I: Flexible Learning, with the subthemes of convenience, self-directedness/self-discipline, and reflectivity and (b) Theme II: Conflict of Values: A Paradox of Learning, with the subthemes of communication/socialization between students, student/instructor interaction, and the students' paradigmatic shifting and conflicted beliefs on learning.

Introduction

Van Manen (1990) argued that the prescribed method for human science, in contrast to natural science, involved description, interpretations, and self-reflective or critical analysis. In other words, humans explain nature, but they must understand human life. This work investigated and interpreted the human experience of the nontraditional online emergency services learner.

The goal of this study was to better understand the lived experiences, perceptions, and attitudes of nontraditional adult college students in an asynchronous online environment. This understanding was achieved through rigorous analysis of in-depth, semistructured interviews and journal entries of nontraditional adult students enrolled in an online emergency services baccalaureate degree program. The online bachelor's program was offered by Utah Valley University in Orem, Utah. The purpose of the analysis was to describe the various experiences and perceptions and then group these experiences and perceptions into a logically organized description of the lived experience of adult emergency services students in the asynchronous online environment.

With the creation of the Internet and increased societal emphasis on education, the adult learner has become the focus of many institutions of higher education. Berg (2005) stated:

> Over the last two decades, higher education in America has witnessed an enormous shift in the demographics of students, while at the same time technology has enabled access to formal higher education. By the late 1990s, national attendance figures showed that 42 percent of the undergraduate and 59 percent of the graduate students attended part-time (UCEA, 1998)

Of those part-time students, the largest segment was women thirty-five years and older. Clearly, there has been an important shift in the past twenty-five years in the profile of the average college student, which is changing the American University. In addition to putting pressure on the University for an increasingly vocational and professionally oriented curriculum, this shift is also leading to pressure for the general accommodation of the working adult student through more convenient scheduling and location of courses. (p. 3)

This premise was supported by research commissioned by the United States Department of Education in the Report of the Web-Based Education Commission to the President and the Congress of the United States (Kerry et al., 2000, p. 4), which stated:

> Large numbers of older persons, working adults, and part-time students attended college in 1999. The adult age cohort is the fastest growing segment of students in postsecondary courses. Despite rising enrollment noted above, just 16% of college students fit the traditional 18- to 22-year-old profile, attend full-time, and live on campus.

The andragogical (adult learning) assumption may yet prove to be of great value in distance education, particularly in light of the changing demographics of many, if not most, universities and colleges. Adult students seem to have a different learning style, requiring a careful approach when using modern technology (Pelletier, 2005). This situation may be particularly true for the emergency services worker (law enforcement, fire, emergency medical services workers, and

emergency managers). Due to the nature of their jobs, previous training, and education experiences, like most adult students, they have an expectation for immediate response and effect (Fidishun, n.d., p. 2). In addition, most of the students from this group are 25 years of age or older (the nontraditional student profile) and are accustomed to being self-directed (Gibbons & Wentworth, 2001). Enticing mature emergency services adults to return to school and retaining them as students may be challenging because of conflicting work schedules, family responsibilities, and possibly fear due to the length of time the person has been away from formal educational experiences. Online delivery may just prove to be the solution.

The literature is replete with quantitative data comparing and contrasting cognition between traditional face-to-face teaching methods and Internet-based online delivery of curriculum. However, very little qualitative data are available with respect to the experiences and perceptions of online students, especially the nontraditional adult emergency services population. There also seems to be little data respective to the affective domain of nontraditional adult students and online education. Krathwohl, Bloom, and Masia (1964), in their extensive work on educational taxonomies, asserted the need to explore the human reaction or response to educational content. This exploration included a range of human responses, including knowing about something, solving problems, evincing an interest in human experiences, having an attitude toward some object or concept, and/or expressing one's feelings and opinions on a variety of subjects.

The use of learning-at-distance models in higher education could be a major factor in motivating an adult student to return to school (Tsai & Chuang, 2005). Since the disaster of the terrorist attack on the World Trade Center, September 11, 2001, more emphasis on a requirement of higher education for officers, chief officers, or those who aspire to rise through the ranks is being exerted throughout the emergency-services field. The job of being a firefighter has become increasingly more professional and technologically advanced and has evolved with extreme complexity in mitigating strategies and expectations (Childs, 2005). Unfortunately, due to odd work schedules (e.g., 24-hour shifts), attendance in traditionally delivered campus classes is at best extremely difficult, if not impossible, for many of these potential students (Klingonsmith, 2006). Therefore, using distance education and, in particular, asynchronous online delivery may be a desirable alternative for this demographic.

For nontraditional adult students such as fire and emergency services workers, online delivery of information, which does not include a way of integrating life experience into the model, may not be accepted well (Berg, 2005). The initial training and education of emergency services workers are heavily dependent on memorization of procedures and practices, followed by repetitive psychomotor skills application. The rest

of their education is derived through on-the-job experience. This process identifies a lack-of-research issue regarding learning styles for adult learners like emergency services workers. "Identifying whether courses and programs are responsive to the learning styles of the emergency responder student is an issue that has not been adequately addressed in either responsible training programs or educational institutions of these students" (Klingonsmith, 2006, p. 15).

Barab, Thomas, and Merrill (2001) noted a concern for the human or social dimension of online learning environments. They addressed the fact that much is often discussed about the technical components of distance education, but less often discussed is the human or social dimension of these environments. They found that online instruction might foster a reflective and social environment (Merrill, DiSilvestro, & Young, 2003). A need exists to find a way to transform experience(s) into learning.

Adults usually bring a plethora of real-life experiences with them to the classroom, experiences that need to be recognized and integrated into the learning process (Knowles, 1984). Key points of andragogy or adult learning include consideration of the learner's experiences, the importance of the learning environment, the learner's readiness to learn, and the teacher as a facilitator (Brown, 2001). Kolb (1984) proposed a four-stage cycle: (a) concrete experience, (b) reflective observation, (c) abstract conceptualization (theory building) and, (d) active experimentation or application.

The purpose of this hermeneutic (interpretive) phenomenological study was to describe the attitudes, perceptions, and experiences of nontraditional adult emergency services students participating in an asynchronous online college course, using the lens of constructivism. The research question for this study was: How do nontraditional adult emergency services undergraduate students experience asynchronous online instruction?

Methods

The review of the literature led to the research question stated earlier. A qualitative study is most appropriate to explore this question. The students of this study were purposely selected based on two criteria: (a) they were nontraditional adult learners (which are students over the age of 25 years who may or may not have some prior higher educational experience and/or may or may not be employed in a career field) and (b) they were enrolled in the Public Emergency Services Management Bachelor of Science program.

To best gain insight into this experience, in-depth interviews were conducted with four students enrolled in the Public Emergency Services Management Bachelor of Science program. In addition to the interviews, each student was asked to keep a journal of personal feelings and experiences throughout the course and submit them to the author at least weekly.

The students of this study varied in age and experience. They ranged from 26 to 49 years of age and consisted of a firefighter, two fire captains, and a detective from a law enforcement agency. Three were married and one was divorced. Each had children as well as other family and community responsibilities. Each also had limited higher education experience.

Results

Analysis

A constant comparative methodology was used to analyze the data through examination of the transcribed interviews and the text of the submitted journal entries. Care was taken to ensure that the original intent of each statement had not been compromised by the meaning(s) derived. The aggregate meanings were then coded (grouped or clustered by theme). Several codes or themes were identified or differentiated. This process led to the need of further interviewing for clarification or more detailed information and then more grouping or coding until saturation had been achieved. To verify the themes, they were compared to the original statements to ensure that something significant in the original statements had not been omitted in the groupings or that the coding created something not in the original statements. A structural description was used to identify all possible meanings and perspectives to construct a description of how the phenomenon was experienced by the participants. Lastly, an overall description of the meaning of the experience or phenomenon was developed (Creswell, 1998).

Verification

To verify the findings, the phenomenon description was presented to participants for their review. The participants reviewed the interpretation and presentation of the data. With the exception of some word editing for clarity, each student agreed that the description fairly summarized his or her experience and the data was considered verified. This summary was the process of member checking, whereby participants provided insights and deeper understanding as they reviewed the transcripts; that is, the meaning was negotiated between the participants and the researcher.

Next, a peer review of the data was conducted of the analysis to ensure that the process was consistent and held to the integrity of the intent of the students and that bias was kept minimal. The selected peer reviewed the material and felt satisfied that the study results were consistent with the lived experience of the students.

Findings

Through identifying and analyzing the essential themes, these fire and emergency services adult students were found to have a strong value system regarding the importance of education. Each of the participants found traditional deliveries (face-to-face and scheduled class periods) not conducive to their individual situations and found that the online environment better facilitated their desire to improve themselves through education. The material and reflective activity of their experiences and perceptions spoke about their desire to learn as opposed to "just getting a degree." For example, one of the students commented:

> Because of life, and because now I think I'm more, hopefully, wiser I can look back … the first time I went to college on an athletic scholarship school was something I had to do to play sports. I messed around; I could have had a free education and I kick myself in the butt because I didn't do it. I left without anything. So now, looking at life and now seeing how important education is, I try harder. I don't feel like I'm messing around as much. I get it done. I don't procrastinate. I don't know if that's really what you're looking for but, that's what it's kind of been to me. Because I have a second chance at an education and I'm not going to mess around this time.

This concept was reinforced by one of the other students as well:

> I definitely take it a lot more seriously and I am there for me and not for anyone else. And I know what my goals are and what I am ultimately trying to achieve and so my motives are more clear and I have more of a desire because of it — more of a drive.

Two overarching themes, each supported with a number of subthemes emerged about nontraditional adult students in the emergency services online program. The first theme, *Flexible Learning*, exemplified the adult-learning assumptions of convenience, self-directedness/self-discipline, and reflectivity. The second theme, *Conflict of Values: A Paradox of Learning*, addressed the comparison of the traditional (face-to-face) learning experience with a new (online) experience and contrasted student-to-student communication/socialization, student and instructor interaction, and paradigmatic shifting and conflicted beliefs on learning.

Theme 1: Flexible Learning

The flexible learning environment was an important consideration for the students of this study. Flexible learning, by inference, is the ability to study and participate in a class anytime and anywhere. The students in this study were very passionate about the importance of this characteristic of online training. For emergency services workers, this flexibility is paramount to their success as a student and was emphasized by the students in both the interviews and journal entries. More importantly, flexibility was reported as one of the most critical points in their learning experience. However, the

flexibility reported was not just the convenience of the medium itself, but also the ability to be flexible in what and how they learned. Based on this flexibility, three subthemes were revealed that defined the essence of their asynchronous experience: convenience, self-directedness/self-discipline, and reflectivity.

Convenience. In most of the literature regarding on-line research, convenience is usually one of the primary considerations for students to take this type of class. The students of this study were no different. Convenience was the reason cited most by these students for choosing to participate in an asynchronous online learning environment. They reported that if it were not for this convenience, they would not have been able to participate in the program or finish their degree. For example, one of the students relayed the following, which was consistent among all participants:

> Just the convenience of being able to take the classes with kind of an irregular work schedule and also it is a lot easier on me because I don't live in the city where I work. I have extra time commuting here and there and so making an extra trip two times a week to the university to go to on-campus courses would have probably been too much and would have slowed my goals down a little bit; also, because the majority of the courses that I have left to finish my degree are basically online courses. So, I am glad they are.

Self-directedness/self-discipline. Another aspect of flexibility that was revealed in the study was the ability to self-direct and be responsible for the educational experience. Self-directing learning schemas have been identified as components of andragogy (Knowles, 1970). Some identified self-directing activities are used in traditional and online courses (Whipp & Chiarelli, 2004). They are: (a) forethought (characterized by setting goals and planning activities); (b) performance and self-observation (characterized by taking notes, outlining, reducing distractions, performing relaxation techniques, seeking help from peers/instructor, etc.); and (c) self-reflection (characterized by self-judgment activities like creating checklists, creating rubrics, noting instructor comments, and placing success based on academic performance). The course in this study seemed to match most, if not all, of these criteria as demonstrated by a student response:

> My purpose in online education is to allow me the opportunity to achieve goals, enroll in courses, accomplish the objectives, and complete the assignments at my own pace (within certain parameters and deadlines), wherever I please, as long as I have an Internet connection.

All of the student participants reported a deep understanding of their individual responsibility for education. The flexibility of the online environment seemed to enhance this understanding and facilitated the discipline necessary to work in an environment for which there is no apparent or constant authority figure presiding in the class.

Reflectivity. One particular phenomenon revealed in this study providing a rich view of the nontraditional adult student was reflectivity. Reflectivity was not only used on the lesson material but also on the entire on-line experience itself. Each of the students, at one time or another, reported their use of reflectivity for all parts of the course. This use was demonstrated by one of the journal entries regarding online discussions:

> In this format, the discussion board allows us to comment and reply to other students' postings as well. This gives us a chance to elaborate on topics and issues, while allowing us time to respond to comments, gather our thoughts, and choose our words more carefully. In a classroom setting, on the other hand, there is not so much opportunity for that. In the classroom, discussions happen in real-time/real-life speed.

Theme II: Conflict of Values: A Paradox of Learning

This overarching theme provided an interesting and rich base for understanding the lived experience of the non-traditional adult fire and emergency services learner. From the beginning of the data collection, the students appeared to be in a conflict with long-held beliefs or schemes of how learning best occurs and their current experience. As the data analysis and collection continued, this apparent values conflict was probed with each student. In fact, in the final interview each student was asked, based on what he or she had previously stated to the contrary, why he or she continued to hold onto the belief that face-to-face delivery was superior to the online experience. The responses in general, though reported differently for each individual, were that there was just a sense of the familiar and the desire to hold onto what was most comfortable; this desire caused the conflict. During this discussion, each admitted that he or she needed to be more open to the growth that he or she was experiencing. Again, each was revealing shifting learning schemas.

Student-to-student communication/socialization. As the extant literature purports, student-to-student communication and the social aspect of being a student are critical to learning. As stated before, critics of online and/or distance education find that the lack of spatial proximity can be detrimental to the overall learning experience of the student. However, this situation did not appear to be true or consistent with the student experiences of this study.

In the initial stages of data gathering, all of the students voiced or wrote concerns about not having the luxury of being physically present with other students in the class. They believed that not being able to read body language and hear intonation would lessen their

learning experiences and in the end create an untoward learning environment. This initial perception, however, was not consistent with the experiences reported by the students regarding communication.

Throughout the study, each student reported a rich learning experience facilitated from the course design and other students of the class (they were identifying a community of learning). The most common reason offered was that unlike the traditional face-to-face class experience where students could hold back and not participate in class discussions, the students in the online class were required to participate for part of their grade. This reason produced some very thoughtful discussions, which allowed the students to learn from the perspectives and experiences of classmates at a much deeper level. They had to discover a new method of communicating. This discovery supports the findings of McDonald and Thompson (2005), where they assert in a study of online deliveries that "A whole new communication process has to be learned. It is not simply a process of shifting from speaking and listening, to reading and writing" (p. 11). The students of this study believed that this process was due to the reflections and research-supported postings of most of the classmates. When probed to discover whether they believed that the lack of spatial proximity helped, harmed, or had no effect on their learning, they all reported that they believed it helped. In fact, all of them reported that they believed that they would not have had as many focused discussions and achieved the depth of learning they experienced had they been in a face-to-face environment. This experience was in conflict with the initial perceptions that they reported.

One significant reason for the depth of learning seemed to be the lack of anonymity of the online student. In the findings of this report, the students shared how being somewhat anonymous (just a name on the computer screen) allowed them to experience more freedom to opine or share without the sense of close, face-to-face scrutiny. However, the opposite was also evident. The students did not have the luxury of being anonymous like in a classroom. If a student chose and the instructor allowed it, a student in the face-to-face delivery situation may choose to not participate in the discussion, thereby becoming anonymous in or detached from the discussion. In the online environment, "they are usually required to contribute to the discussion and to use good manners since the typed word remains visible once the discussion has ended" (Pelletier, 2005, p. 3).

Another phenomenon of this study in conflict with the critics of distance/online education regarding socialization was the practice of the students to find or create mechanisms of sociality or learning communities. All of the participants reported that if they had questions or wanted further enlightenment about a topic in addition to the instructor or peers, they would seek people outside of the class. These social contacts may have been peers, friends, relatives, supervisors, past students of the same course, or experts in the field. In other words, the students went beyond the confines of the class to construct a better learning experience. While this experience may be similar in the traditional class, the students reported that the online experience seemed to facilitate this phenomenon more.

Student/instructor interaction. Student/instructor interaction was found to be somewhat lacking by the students. Many times throughout the study, they reported frustration with not having enough timely feedback from the instructor regarding their assignments or other work. While this particular phenomenon was frustrating to them, when asked if the lack hurt their learning, enhanced their learning, or had no impact on their learning, they reported that it really had no impact on their learning. However, they would have liked to have received feedback on a more consistent basis. They shared that the feedback they received was helpful, but the lack of feedback was not detrimental to their ability to learn.

What was important to them was that they were in control of what they learned and how deeply they wanted to pursue knowledge within the topics, which is consistent with andragogical principles (Knowles, 1970). The control is also consistent with their developing views or schemas on learning.

Paradigmatic shifting and conflicted beliefs on learning. The subtheme of paradigmatic shifting and conflicted beliefs on learning appeared to be evident from the beginning of the interaction with the students. In the first interview as each talked about the convenience of online deliveries, the students first began by saying that they would prefer to be taking the class in the traditional face-to-face manner because they believed that it would be a better learning experience. However, as the interview progressed, they were talking about how much they were learning and how surprised they were at this discovery. In one journal entry, a student talked about how he was convinced that he would learn more in a traditional class. Yet, as he continued to write about his experiences, he stated how he was learning so much more in the online format, more than he thought he would have in the traditional delivery.

Discussion

The results of this study appeared to be consistent with many of the theories and assumptions of the adult learner. A more detailed look at some of these theories/assumptions is presented in the sections that follow.

Andragogy

Since the early 1970s, when Malcolm Knowles first introduced the concept of andragogy to the United States, adult learning theories and assumptions have been developed and debated. This study revealed that the nontraditional adult student in an asynchronous online environment experienced and reinforced adult

learning assumptions. In Knowles' original work (1970), he offered a set of criteria that separates the adult learner from the child learner. They are: (a) changes in self-concept — the assumption that as a person grows and matures, his or her self-concept moves from one of total dependency to one of increasing self-directedness; (b) the role of experience — the assumption that as an individual matures, he or she accumulates an expanding reservoir of experiences that cause him or her to become an increasingly rich resource for learning and creates a broad base on which to relate new learning; (c) readiness to learn — the assumption that as an individual matures, his or her readiness to learn is increasingly the product of his or her biological development and academic pressure and is increasingly the product of the tasks required for his or her evolving social roles; (d) orientation to learning — the assumption that children have been conditioned to have a subject-centered orientation to learning, while adults tend to have a problem-centered orientation to learning; and (e) motivation to learn is intrinsic rather than extrinsic. The process of looking at each of these assumptions and comparing them to the experiences of the students is interesting, and the results of this study seem to affirm Knowles' assumptions.

One underlying question must be addressed: Does the asynchronous learning environment fit the assumptions of andragogy and is it a good way for adults (specifically, fire and emergency services personnel) to learn? Student experiences reported in the present study affirm the effectiveness of online learning for the nontraditional adult. This affirmation is also consistent with the writings of Rossman (2000), who asserts that distance education and distance learning programs are popular ways for adults to learn.

McClusky's Theory of Margin

McClusky presented his theory of margin in 1963 (Merriam, Cafferella, & Baumgatner, 2007). His theory is based on the premise that an adult's life is full of growth, change, and integration. Because of this growth, an adult is constantly seeking to reach a balance between the amount of energy needed and the amount of power available to manage life. Hiemstra (2002) explained McClusky's theory in the following way:

> According to McClusky (1974) in his theory of Power-Load-Margin, the key factors of adult life are the load the adult carries in living, and the power that is available to him or her to carry the load. Margin was conceived of as a formula expressing a ratio or relationship between the "load" (of living) and the "power" (to carry the load). According to McClusky (1970, p. 27), load is "the self and social demands required by a person to maintain a minimal level of autonomy .... [Power is] the resources, i.e. [sic] abilities, possessions, position, allies, etc. [sic], which a

person can command in coping with load [sic]." In this formula for margin (M), he placed designations of load (L) in the numerator and designations of power (P) in the denominator (M = L/P).

As can be seen, the greater amount of power in relationship to load, the more margin available for use. In other words, if one has more power than load, one is able to negotiate or handle the issues or problems natural to one's life. Conversely, if load is greater than power, then one has diminished capacity to handle the problems or issues.

The participants of this study, without knowing it, talked much about the theory of margin as identified by McClusky. In the initial stages of the study, the students identified that one of the major reasons they were grateful for the online learning environment was that their work schedules as firefighters and law enforcement officers as well as other responsibilities made going to school difficult at best. In the journal entries, each student made comments about the difficulty he or she was having with demands upon his or her time and how it was impacting his or her ability to participate in the class. In fact, one of them made the comment that without the online offering, he would not have been able to be in school at this time because the load would have been too great.

Another interesting factor revealed in the perceptions and experiences of the students was related to external and internal load factors. Hiemstra (2002) posited that *external load* consists of things such as family, career, socioeconomic status, and so forth. *Internal load* is composed of things such as self-concept, goals, and personal expectations. The students of this study made comments in the interviews and journal entries about their personal standards of performance and personal goals along with the external load factors of work, family, and community. While there was no way to quantitatively measure the relationship to power and load in this study, the experiences and perceptions of the participants were that they may have been close to an equal distribution and that having to attend scheduled classes on top of the assignments may have tipped the balance to load being greater than power. Maintaining a sense of balance is something emergency services personnel as adult students are aware of and seek when engaged in learning activities (Merriam et al., 2007).

Jarvis' Process of Learning

British researcher and teacher, Peter Jarvis (1987), introduced an adult learning model based around experience. He posited that all learning begins with experience and more particularly, social experience. Some of these experiences are repeated often enough that they become routine and therefore do not lead to learning. Other experiences are so "out of the norm" that prior learning methods no longer work with the situation. This new experience causes a person to reassess, rethink, or create a new plan for how to act or what to do. Jarvis

believed this process fits one of three groups of strategies or responses (Merriam & Cafferella, 1999). The first group consists of presumption (presuming that everything fits into one of the past experiences as will this new one), nonconsideration (one is too busy or too distracted to give any consideration to the experience), and rejection (outright rejection of the experience as meaningful). In this group, Jarvis asserted that little or no learning took place.

The second group consists of preconscious (a person unconsciously internalizes an experience), practice (a person can practice something repeatedly until it is learned), and memorization (a new skill or knowledge is internalized to be brought forth again at a later time). In this group, Jarvis asserted some learning occurs.

The third group is composed of contemplation (taking the time to think about the experience), reflective practice (thinking about something using processes similar to problem-solving), and experimental synthesis (someone experiments by implementing strategies or actions based upon what was contemplated and reflected). It is this final group in which Jarvis believed deep learning occurs.

The results of this study when applied to this model indicate that some deep learning took place with these students. Throughout the study, the students reported their use of and satisfaction with reflective practice. By employing reflectivity, they claimed to have had a deeper and potentially better learning experience. While it is difficult to determine whether they reached the experimentation stage or not (it was reported by the students, however, that they were applying some of the learned principles to their work situations), it is apparent that they were reflective and contemplative in their approach to this online experience. This stage appears to be very relevant and an important methodology of instruction for the fire and emergency services student.

Affective Domain

Affective learning outcomes involve attitudes, motivation, and values (Miller, 2005). As can be seen from previous discussions and the amount of research available, the cognitive approach to online education has been the focus of much research. Hence, it appears much emphasis has been put forward asserting the best way to get to the affective domain is through the cognitive domain. Once a student has achieved "cognition," it is assumed that the student will then apply the knowledge and, by process, have a change in attitude or be "affected." Krathwohl and colleagues (1964) posed an interesting question: What if the reverse was applied — using the affective domain to achieve cognition? This posits that educators must be more aware of the affective domain (motivation, drives, and emotions) to develop or bring about achievement of cognitive behavior. "Obviously motivation is critical to learning and thus is one of the major ways in which the affective domain is used as a means to the cognitive" (Krathwohl et al., 1964, p. 57).

Krathwohl's et al. (1964) taxonomy attempted to classify learning in the affective domain. It posits that the intensity of a given attitude is built through successive stages. Learning at a given level is dependent on prior learning at lower levels, hence, the five levels of taxonomy: (a) receiving/attending (willingness to become aware); (b) responding (appreciating or internalizing); (c) valuing (accepting, preferring, or becoming committed to); (d) conceptualizing/organizing (incorporating into a value system); and (e) characterizing by value (orienting toward or identifying with).

Based on the results of this study, asynchronous online learning environments have the potential to be an important and effective method of educating fire and emergency services students. Fire and emergency services leaders should be confident that asynchronous online learning courses are significant and allow employees to obtain relevant education. Anecdotally, it is rare to see an advertisement for a leadership position in the fire and emergency services that does not require a degree. As the services seek professional status through efforts of the International Association of Fire Chiefs, International Association of Fire Fighters, and other bodies, access to educational opportunities need to be expanded. The online delivery can fill that need, and as the results of this study indicate, online delivery may actually be a more effective way of meeting educational goals for this population.

As this process develops, more care and concern for the design and use of pedagogies and/or adult learning models can enhance the experiences and learning of the adult online student. This process may require the instructors and designers of curricula to be more aware of the experiences and perceptions of students. As Krathwohl and colleagues (1964) asserted, the affective domain can be very effective in helping achieve the desired outcomes of the cognitive domain. If students are having an untoward time in their learning experience, they may do what is necessary to pass the course, but has learning in its truest sense been accomplished? Learning is best described as, "a persisting change in human performance or performance potential." This description means that learners are capable of actions that they could not perform before learning occurred, and this is true whether or not they actually have an opportunity to exhibit the newly acquired performance (Driscoll, 2005, p. 9).

References

Barab, S., Thomas, M. K., & Merrill, H. (2001). Online learning: From information dissemination to fostering collaboration. *Journal of Interactive Learning Research*, *12*(1), 105–143.

Berg, G. A. (2005). *Lessons from the edge: For profit and nontraditional higher education in America*. Westport, CT: Praeger.

Brown, J. O. (2001). The portfolio: A reflective bridge connecting the learner, higher education, and the workplace. *Journal of Continuing Higher Education*, *49*(2), 2-13.

Childs, M. (2005). Beyond training: New firefighters and critical reflection. *Disaster Prevention and Management*, *14*(4), 558–566.

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage.

Driscoll, M. P. (2005). *Psychology of learning for instruction*. Upper Saddle River, NJ: Allyn & Bacon.

Fidishun, D. (n.d.). *Andragogy and technology: Integrating adult learning theory as we teach with technology*. Retrieved June 22, 2004, from http://www.mtsu.edu/ ~itconf/proceed00/fidishun.htm.

Gibbons, H. S., & Wentworth, G. P. (2001). Andragogical and pedagogical training differences for online instructors. Retrieved July 13, 2004, from http://www.westga.edu/~distance/ojdla/fall43/gibbons_wentworth43.html.

Hiemstra, R. (2002). *Howard McClusky and educational gerontology: The encyclopedia of informal education*. Retrieved October 23, 2007, from www.infed.org/thinkers/ mcclusky.htm.

Jarvis, P. (Ed.). (1987). *Adult learning in the social context*. London: Croom Helm.

Kerry, B., Isakson, J., Abraham, B., Arkatov, A., Bailey, G., Benjamin, J., Bingaman, J., Brown, R., Collins, S. R., Enzi, M. B., Fattah, C., Gage, Gowen, R. J., King, D. R., McGinn, F., Pfund, N., & Winston, D (2000). *The power of the Internet for learning: Moving from promise to practice*. Report of the Web-Based Education Commission to the President and the Congress of the United States. Washington, D.C.

Klingonsmith, B. L. (2006). *Learning styles of emergency services responders*. Unpublished doctoral dissertation, Walden University.

Knowles, M. S. (1970). *The modern practice of adult education*. New York: Association Press.

Knowles, M. S. (1984). *Andragogy in action*. San Francisco: Jossey-Bass.

Kolb, D. A. (1984) *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.

Krathwohl, D. R., Bloom, B. B., & Masia, B. B. (1964). *Taxonomy of educational objectives: Handbook II: Affective domain*. New York: McKay.

McDonald, C. J., & Thompson, T. L. (2005). Structure content, delivery, service, and outcomes: quality e-learning in higher education. *International Review of Research in Open and Distance Learning*, *6*(2), 1–25.

Merriam, S. B., & Cafferella, R. S. (1999). *Learning in adulthood*. San Francisco. Jossey-Bass.

Merriam, S. B., Cafferella, R. S., & Baumgatner, L. M. (2007). *Learning in adulthood: A comprehensive guide*. San Francisco. Jossey-Bass.

Merrill, H. S., DiSilvestro, F., & Young, R. C. (2003). *Assessing and improving online learning using data from practice*. Retrieved July 2, 2004, from http://www.alumni-osu.org/midwest/proceedings.html.

Miller, M. (2005). Teaching and learning in the affective domain. In M. Orey (Ed.). *Emerging perspectives on learning, teaching, and technology*. Retrieved March 6, 2008, from http://projects.coe.uga.edu/epltt/.

Rossman, M. H. (2000). Andragogy and distance education: Together in the new millenium. *New Horizons in Adult Education*, *14*(1), 4–11.

Pelletier, J. E. (2005). *Bridging the gap between asynchronous and traditional learning environments: Technology for adult learners*. Unpublished doctoral dissertation, University of New Hampshire.

Tsai, C.-C., & Chuang, S.-C. (2005). Colloquium: The correlation between epistemological beliefs and preferences toward Internet-based learning environments. *British Journal of Education Technology*, *36*(1), 97–100.

Van Manen, M. (1990). *Researching lived experience: Human science for an action sensitive pedagogy*. Albany: State University of New York Press.

Whipp, J. L., & Chiarelli, S. (2004). Self-regulation in a web-based course: A case study. *Education Technology Research and Development*, *52*(4), 5–22.

Ziegahn, L. (2001). "'Talk' about culture online: The potential for transformation. *Distance Education*, *22*(1), 144–150.

About the Author

R. Jeffery (Jeff) Maxfield is a retired Assistant Chief/Chief Operations Officer for Salt Lake County (UT) Fire Department with over 24 years of service. He holds a Master of Public Administration degree from Brigham Young University and a Doctor of Education degree from Utah State University. His dissertation research examined the attitudes and perceptions of nontraditional emergency services students in asynchronous online learning environments. Dr. Maxfield has published numerous articles in various journals and currently serves as the Assistant Dean over the Emergency Services program at Utah Valley University. He was recently invited to the Naval Postgraduate School in Monterey, CA, as one of 24 members of a panel to develop a national model for Homeland Security curriculum. He has worked as a consultant for many international companies and government agencies. He can be contacted at **jmaxfield@uvu.edu**.

Book Review

Review of:

Denhardt, J. V., & Denhardt, R. B. (2007). *The new public service: Serving not steering*. Expanded edition. Armonk, New York: M. E. Sharpe. 222 pp. ($29.95 paperback).

Since the Great Depression of the 20th century, the United States has found itself in the throes of an economic crisis that nearly rivals that calamity of a generation past. It brings to mind the enduring words of Thomas Payne who in 1776 wrote in his revolutionary pamphlet, *Common Sense*, "These are the times that try men's souls."

With countless layoffs, giant corporations filing for bankruptcy, and government bailouts, this nation is experiencing a phase in its existence of potentially catastrophic consequences. The dire need for financial assistance has forced the private sector to come to terms with a metamorphosis of organizational restructuring if it is to survive. Moreover, this calamity has been magnified in the public sector where elected officials either cannot or fail to recognize their roles in the fiscal problem.

As an example of administrative ineptitude, just recently, this reviewer witnessed a city council meeting where the mayor was attempting to make his argument for budget cuts with subsequent layoffs to members of the city council who would not hear of it. Councilors howled for no layoffs among police and firefighters, proclaiming the compromising of public safety, while the perplexed mayor attempted to argue the reality of the situation, namely that funds were not available to compensate these public servants and the realization was that layoffs were indeed a reality.

The paradox of the scene was either the shortsightedness or naiveté of the council to realize that its function is to set policy, or the mayor, whose responsibility is to execute the directives of the council as the administrator of the policy set by the body. This separation of responsibilities is not something new. It was as far back as the 19th century when then Professor Woodrow Wilson argued that administration should be located outside the sphere of politics. Administrative questions, the future president argued, were not political questions.

Wilson's ideas of separating politics from administration found its actualization in the *council*/*manager* example, which the Denhardts have aptly revealed in their book. Simply stated, the council was tasked with the responsibility of policy-making, and the manager/mayor's responsibly was implementing it. Unfortunately, as the authors relate, this division has blurred over time with each assuming a role or at least more than a partial interest in the responsibilities of the other. Consider for a moment if each role remained separate: The council would set the policy and the manager would merely execute it. Although cold and perhaps heartless, budget reduction would be as simple as crunching numbers and executing the result. Needless to say, this procedure is not the way politics is conducted in today's municipalities. City and town leaders try to make do with less, while council members castigate the mayor for jeopardizing the safety of the citizens they represent, who, of course, will hopefully reelect them. It is a sort of vicious circle and not one likely to change in the foreseeable future.

In a recent edition of *IFSJLM* (Moschella, 2008), this reviewer critiqued a book written by David Osborne and Peter Hutchinson (2004) entitled *The Price of Government: Getting the Results We Need in an Age of Permanent Fiscal Crisis*. The authors' argument shifted the onus of responsibility from elected officials to the citizens of a community. For Osborne and Hutchinson, the price of government is "the amount of purchasing power a *community* is *willing* to commit to its government" (p. 41).

These simple but powerful words repositioned governmental responsibility to the will of the people, so to speak, while empowering elected officials to find new and innovative ways to achieve results or privatize functions. In the Osborne/Hutchinson world, government is run like a business and its citizens assume the position of customers. By posing such questions as:

- Is the problem long or short term?

- How much are citizens willing to spend?

- What do citizens want for their money?

- How much will the state or city pay to produce these results?

- How best can money be spent?

The authors drew up ten approaches to provide the means to solving a community's financial crisis under the new title of *New Public Management*.

It is not this reviewer's desire to recritique Osborne and Hutchinson's book, one need only to consult the previous review, but rather to establish a background from which one might gather a better perspective of the Denhardts' work. Both, although professing contrary views, are philosophically joined, and a firm understanding of Osborne and Hutchinson's book will help to better explain the Denhardts' thesis.

As maintained by Osborne and Hutchinson, the New Public Management's aim is to loosen what the Denhardts describe as an inefficient monopoly franchise of public agencies and public employees by changing the methodology of elected officials from *rowing to steering* the municipal boat. Rather than holding on fiercely to the control of bureaucracy and the delivery of services, new public officials now direct the

course of action. This approach was a marked contrast from traditional bureaucracies (known as *Traditional Public Administration*), which were characterized by shunning innovation and serving their own needs (Denhardt & Denhardt, 2000, p. 551). Something intrinsic to the fire service of yesterday, or even today, one might say?

As Osborne wrote in a previous work, (Osborne & Gaebler, 1992), those who steer a boat have greater power in the ultimate destination of the craft than those who just propel it. Steering can be accomplished by properly selecting goals or directions and charting the destination. Government would be better run as a business by not assuming the burden of service delivery but rather by defining the programs that others would conduct. By steering the organization, public managers were tasked with finding new and innovative ways to produce results or to privatize functions originally provided by the government. The New Public Management viewed the government from the perspective of markets and customers and it was those to whom public servants were responsive. This view was under the umbrella of business from which elected officials operated the government.

Much like the *New Public Management*, what the Denhardts call New Public Service consists of varying elements. The central focus is on the primary role of the public servant whose aim is "to help citizens articulate and meet their shared interests rather than to attempt to control or *steer* society" (Denhardt & Denhardt, 2000, p. 549). They argue that by placing citizens at the forefront, the emphasis should drift from either steering or rowing the governmental boat to building public institutions marked by integrity and responsiveness (p. 549). Public servants do not merely respond to the demands of customers but focus on building relationships of "trust and collaboration" with and among citizens (Denhardt & Denhardt, 2007, p. 55). This relationship, which will be examined in the following paragraphs, is the central focus of New Public Service, and its implications relative to the fire service might provide for stimulating discussion.

The most elementary question here is how the fire service perceives the people it serves. More specifically, the answer might be found by examining just how the fire service regards itself. This question, one might add, is ongoing.

In a dated but noteworthy contribution to the literature, Greenwood (1957) wrote that professions are distinguishable by the possession of five characteristics, all of which would support the argument for fire fighting being considered a profession: (1) authority recognized by the clientele of the professional body; (2) broader community sanction and approval of this authority; (3) a code of ethics; (4) a professional culture; and (5) a basis of systematic theory. The first four characteristics can readily be found in the fire service. The last is an ongoing process and subject for a later article.

Nonprofessional occupations have *customers*; professions have *clientele*. The difference is that a professional dictates what is good for the client. Obviously in the case of fire fighting, decisions are solely made by the personnel on scene, hence making the argument for professionalism. This example might be construed as challenging to both the New Public Management, which recognizes customers, and the New Public Service, which recognizes that the relationship between the government and its population is not the same as that between a business and its customers. The differentiation as the Denhardts see it is that government must be concerned with the interests of citizens and respond to selfish, short-termed interests of customers.

The authors' also desire to move beyond self-interest and discover shared interests that are in the public welfare. Government should encourage citizens to "demonstrate concern for the larger community, their commitment to matters beyond short termed interests" (p. 79). The distinction is government's responsibility to enhance citizenship and better serve the public interest (p. 81).

Continuing along the same lines, the Denhardts preach valuing citizenship over entrepreneurship. Public interest is better advanced by both public servants and citizens who are committed to making meaningful contributions to society rather than acting as if the money were their own. The way to accomplish this goal is via collective and collaborative processes. In the New Public Service, the focus of implementation is citizen engagement and community building.

The authors use an example of community policing to illustrate how this process might be performed. The role of the police department, they articulate, would be to ensure that citizens and neighborhood groups clearly understand objectives and adsorb as many policing functions as practical and cost efficient. The goal would be to build a stronger community. In a related area, although they admit that accountability is not simple, a refocusing might result in meeting performance standards to produce results.

The authors preach that leaders do not seek control nor do they assume that the self-interest choice serves as a surrogate for dialogue and shared values (Denhardt & Denhardt, 2000, pp.153–154). Leaders must share the power and lead with "passion, commitment, and integrity" in a way that empowers their citizens. Last, the Denhardts value people and not just productivity. Based on characteristics such as fairness, equity, empowerment, and respect, to mention just a few, public organizations will be more successful if they operate through the processes of collaboration and shared leadership.

In a perfect world, the Denhardt formula would be a welcome philosophy with which to aspire. The democratic principles of citizenship, citizen action, public interest, democratic action, serving not steering, and valuing people as espoused in the New Public Service model have a place in this nation's public administration. Realizing such aspiration is much more

difficult. The intent of this essay is not to rebuke the Denhardts for their, may one say, utopian philosophy but to critically examine whether it has a place in today's fire service and administration. In my opinion, it does. The question is whether the fire service can remain a profession in its purest sense while integrating the doctrines of the New Public Service.

The New Public Service preaches dialogue about shared values, shared entities so to speak. These values might be construed as fire protection, emergency response, and medical assistance, for example. If we are to let citizens have their say in the manner, the Denhardts would intend the onus of burden relative to budget dissemination, for instance, could be left to their decision. More and more each day, we see budget override referenda appearing on ballots throughout the nation. If left to the choice of the voting populous, the decision of finance appropriation would be removed from the elected officials and placed squarely on the shoulders of the voters/citizens as the Denhardts wish (tax overrides are common referenda today). Furthermore, if budget appropriations result in station closings or layoffs, then attribute it to the will of the citizens. This democratic approach in its purest sense at least exculpates elected officials when executing staffing reductions and its consequences and, moreover, places the responsibilities squarely on the voters.

Now while some might consider this approach to be somewhat elementary and infantile, it does help to empower the Denhardts' citizenry with the ability to choose a city or town's course of action more or less in the Osborne/Hutchinson vain. Would this approach ensure the safety of its community? No. Could it lead to disastrous consequences, jeopardizing the life and safety of fire personnel? Possibility. Nevertheless, it would help to awaken voters, the citizens of a community, as to the realities of the times. As one cannot get blood from a rock, so also caveat emptor!

In another venue, the authors do put forth a relatively concrete idea when writing about thinking strategically while acting democratically in the form of community policing. This idea has practical implications in the fire service.

Consider the possibility of transforming fire prevention into a civilian-based operation. First, fire personnel would be freed for other line operations, thereby helping to address staffing issues on the fireground. In addition, the funds generated by volunteer inspectors, who are trained by fire personnel, would be limited only by the number of inspections conducted by the newly created civilian fire prevention staff. Similar to community policing, community fire prevention and code enforcement could be a financial benefit to the fire service as well as a societal benefit.

Robert and Janet Denhardt write that the New Public Service "requires that we rethink organizational processes, structures, and rules to open access and participation to those we serve in all phases of the governance process" (Denhard & Denhardt, 2007, p.

187). It is not a "blueprint for a structure" or a "quantifiable objective" to be met, nor do they intend to operationalize the tenets of New Public Service "even if were possible" [their own words] (p. 187). Their goal is to do a better job than what has preceded.

When seen in this way, the Denhardts have provided the reader with a wonderful treatise whose aim is greater citizen participation. Taken as such, the book has merit and provides the basis for more voter involvement and participation; but merit alone does not pay the bills or solve the country's financial crisis. If given a choice between the New Public Management and the New Public Service, which one would better solve the country's economic woes?

Dr. John M. Moschella, EFO
Anna Maria College

References

Denhardt, R. B., & Denhardt, J. V. (2000). The new public service: Serving rather than steering. *Public Administration Review*, *60*(6). 549–559.

Greenwood. E. (1957, July). Attributes of a profession. *Social Work*, *2*(3), 44–55.

Moschella, J. M. (2008). Review of Osborne, D. & Hutchinson, P. (2004). *The price of government: Getting the Results we need in an age of permanent fiscal crisis. New York: Basic Books. International Fire Service Journal of Leadership and Management*, *2*(2), 49–50.

Osborne, D., & Gaebler, T. (1992). *Reinventing government*. Reading, MA: Addison-Wesley.

Osborne, D., & Hutchinson, P. (2004). *The price of government: Getting the results we need in the age of permanent fiscal crisis*. New York: Basic Books.

Journal Information

The *International Fire Service Journal of Leadership and Management* is a refereed or peer-reviewed journal published biannually. It is published by Oklahoma State University (OSU), International Fire Service Training Association (IFSTA), and Fire Protection Publications (FPP). Detailed information about the journal is provided below.

Preparing an Article for Publication in IFSJLM

Articles submitted for review should be in general conformance with the guidelines outlined below. If the manuscript is accepted for publication it is the responsibility of the author(s) to prepare a final manuscript that conforms to *IFSJLM* style requirements and to submit to the editor one hard copy of the final paper and one electronic copy of the paper as a Microsoft Word© file.

Articles should be no longer than 30 pages in length (including tables, figures, references, and notes). Research notes should not exceed 18 total pages. Manuscripts must be typed, double-spaced, on paper sized 8.5 by 11 inches, and use standard margins.

Given the readership of the journal, articles should avoid technical jargon, mathematical modeling, etc. and be of interest to both academics and practitioners. Articles using survey and statistical data are encouraged, but information and findings should be communicated clearly and concisely.

Tables and figures should not be placed in the text. Each table or figure should appear on a separate piece of paper and placed at the end of the manuscript. In the text of the manuscript, indicate approximate placement of tables and figures by using inserts – [e.g., Table 1 About Here].

On a detachable first page of the manuscript include the title of the manuscript and all identifying material for each author – i.e., names, affiliations, mailing addresses, telephones numbers, and email addresses. If the article is co-authored, place an asterisk by the name of the person who will serve as a point of contact. Also on this page provide a short 75 to 100-word biographical sketch that includes information about each author, their positions, their organizations, and previous publications and/or professional interests.

A 50 to 75-word article abstract should accompany an article. The abstract should concisely identify the research question studied, theoretical framework employed, methods used, and major findings of the research.

IFSJLM uses the American Psychological Association (APA) reference style to cite literature used in the article. This author-date method of citation requires that you cite the author's surname and date of publication (e.g., Neal, 2000). To cite a specific part of a source, such as a quote from an article, provide the author's surname, date of publication, p. for page and page number (e.g., Neal, 2000, p. 42). For complete information on using the APA style see the 6th edition of the Publication Manual of the American Psychological Association. This manual can be found at your local bookstore, research library, or can be purchased on-line at: http://www.apastyle.org/. Sources cited in the text should be listed in a references list following the style also outlined in the APA Manual.

Submission Requirements and Information

All manuscripts submitted to *IFSJLM*: (1) must be original (not previously published in whole or part in either print or electronic format) and (2) must not be under review for publication elsewhere. Upon acceptance and publication, the Board of Regents for the State of Oklahoma retain the exclusive rights to publication. Journal articles and book reviews are copyrighted by the Oklahoma State University Board of Regents, with all rights reserved. Copyright assignment is a condition of publication. Authors will be provided and will be asked to sign a copyright assignment. Crown manuscripts are exempt from the copyright requirement. Articles submitted for review are not returned. Electronic submissions are NOT accepted.

Please submit four hard (4) copies and one electronic copy in Microsoft Word© format of an article or three hard (3) copies and one electronic copy in Microsoft Word© format of a book review to: Robert E. England, Editor, *International Fire Service Journal of Leadership and Management*, Fire Protection Publications, Oklahoma State University, 930 N. Willis St., Stillwater, Oklahoma 74078-8045.

Article Review Process

All articles, unless otherwise noted upon publication, submitted to *IFSJLM* are peer reviewed. *IFSJLM* uses a double-blind review process: The author does not know who reviewed the article and the reviewers do not know who wrote the article. Thus, it is important that the author only be identified on the cover page. The editor will remove the cover page before the article is sent out for review. Avoid making references to previous research by referring to oneself in the third person and referencing such work. The review version of the article should not thank colleagues for reviewing a draft of the manuscript or state that an earlier version of the paper was presented at a conference. If accepted for publication, the final version of the article can contain such information. As they read an article, peer reviewers are trying to answer the following questions. Is the material in the article accurate and relevant? Is the article grounded in theory? Are the methods used in the study appropriate and appropriately used? Does the article significantly add to our understanding of fire leadership and management? If not, the article may merit publication, but not in *IFSJLM*.

Reviewers are asked to evaluate articles within a 30- to 45-day time frame. If they cannot meet this parameter, they are instructed to inform the editor as soon as possible so that a new reviewer can be selected. After the editor receives all peer reviews, a decision is made to (1) accept the article for publication (subject to preparation guidelines and editing by journal staff), (2) accept the article pending specific revisions required by the peer reviewers, (3) allow the author to "revise and resubmit" the article for review based on general guidelines suggested by the reviewers, or (4) reject the article. Articles accepted under the "revise and resubmit" category are sent out for a second round of reviewers with no implied guarantee of acceptance The editor of *IFSJLM* decides which articles will appear in the journal based on the peer review process. Decisions made by the editor are final. Reviewers' comments are made available to manuscript authors. Book reviews are NOT peer reviewed. The journal editor is responsible for deciding which book reviews to include in *IFSJLM*.

Journal Information

Book Reviews

Book reviews can be of a single book or several books that are tied together by a common theme (e.g., four different books on the topic of terrorism). Book reviews should not exceed five (5) double spaced 8.5" by 11" pages using standard margins. Book reviews are not peer reviewed and are published at the discretion of the editor.

Book reviews should provide thoughtful analyses of the importance, utility, and/or meaning of a single book or several books to the development of the international fire service. In other words, the review should not focus on the merits and demerits of the book itself, but rather should focus on the nexus between the message of the book(s) and the development of fire leadership and management. Book reviews must focus on leadership and management issues, topics, and themes.

Electronic Access

Electronic access to the journal is not available at this time.

Permissions:

Contact: Susan F. Walker, Fire Protection Publications, Oklahoma State University, 930 N. Willis St., Stillwater, Oklahoma 74078-8045; E-mail: Royals@osufpp.org, 405-744-7046

Subscriptions

IFSJLM is published biannually (usually, but not necessarily in January and July). Subscriptions prices are: $20 per year for students and $50 for all other individuals and institutions. A flat fee of $10 per year is added to all international subscriptions. Proof of student status is not required; we rely on professional ethics.

Please complete this page and submit to:

IFSJLM-Subscriptions
C/O Susan F. Walker
Fire Protection Publications
Oklahoma State University
930 North Willis St.
Stillwater, Oklahoma 74078

Name: _____

Address: _____

_____

Zip/Postcode: _____

Phone Number: _____

Email: _____

Payment: If paying by credit card, please call 1-800-654-4055. We accept Visa and Mastercard. Please have your card number and card expiration date handy. If paying by check: Make payable to Fire Protection Publications. Remember to add $10 per year if the journal is being delivered outside of the United States.

DISCLAIMER

The International Fire Service Journal of Leadership and Management is an academic journal. As such, articles that appear in the journal are "approved" for publication by two to four anonymous members of the Journal's Editorial Board and/or ad hoc peer reviewers. As editor I do not choose the articles that appear in the journal nor do I edit the content or message of an article once accepted. The copy editor and I only edit for style and readability.

The ideas and comments expressed in an article are those of the author(s) and should not be attributed to members of the Journal's production team, Editorial Board, or to the sponsors of the journal--which are Oklahoma State University (OSU), the International Fire Service Training Association (IFSTA), and Fire Protection Publications (FPP). We simply publish that which has been peer approved. If for some reason an article causes consternation, you, the reader, are urged to contact the author directly to engage in a dialogue; that is how academic journals work. An author's e-mail is provided with each article. Or, if you wish, you can submit a three to five page "response" to an article in which you outline significant theoretical and or methodological objections to an article. The response may be accepted for publication. If so, the author will be allowed to offer a three to five page "rejoinder" to the response. This is how academic journals work. For the most part, however, you should direct your comments directly to the author. Responses and corresponding rejoinders will be rare and will be published at the discretion of the Journal editor. Journals are intended to stimulate debate and conversation. If you do not like what you read, contact the author or write an article for peer review that offers an alternative perspective.

Dr. Robert E. England
Editor