

Transferring Wildland Fire Knowledge Using A National Lessons Learned Center

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Abstract

The Wildland Fire Lessons Learned Center (LLC), located at the National Advanced Fire & Resource Institute in the United States, promotes and encourages a learning culture to enhance safe and effective work practices within the wildland fire community. The LLC fosters collaboration among fire professionals by facilitating their networks, providing access to state-of-the-art organizational learning tools, and integrating valuable lessons and effective practices into wildland fire training. The Center provides an avenue and resources for the community to improve skills in continuously creating, acquiring, interpreting, transferring, and retaining knowledge. LLC initiatives serve the community's ability to continue learning, mature through gained knowledge, and sustain effective practices.

Several other nations have expressed an interest in learning how the LLC was established in 2002 and already provides extensive high-value services to individual fire professionals, interdisciplinary groups, incident management teams, and multiple agencies involved in the wildland fire community.

The Center organizes its activities using six organizational learning critical tasks: collecting information; benchmarking; examining and learning from past experiences; experimenting with new knowledge applications; systematic problem-solving; and transferring knowledge through multiple venues. (Garvin 2000)

The value of LLC activities to wildland fire community leaders is seen and understood through a systematic approach that aligns with their organizational goals, priorities and projects. The center has developed a strong word-of-mouth reputation by supporting and enabling individuals and their networks of people. The LLC fosters positive relationships with the formal institutions that use the center as a forum for systematic problem-solving and a resource for implementing strategies. Incident management teams use the LLC's online Team Center to support their internal team needs and to transfer knowledge between teams. The LLC cultivates "Communities of Practice" from the informal networks of people that share a concern or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis using the LLC community center online forum called MyFireCommunity. (Wenger and others 2002)

Introduction

The wildland fire community was shaken in 1994 when The South Canyon Fire claimed the lives of 14 firefighters. Several things changed as a direct result of this incident. The human factors movement began in earnest throughout the interagency community due to the efforts of leaders like Ted Putnam, an investigator on the Safety Investigation Team. The International Association of Wildland Firefighters sponsored the first Human Factors Workshop the next summer in Missoula, Montana. A Firefighter Safety Awareness Study was commissioned to be done by Tri-Data, a company outside of the interagency community. They generated a multi-phase series

of reports that included nearly three hundred recommendations over several years. In 1996 in the Phase III Report, Goal 4 they stated, “The five agencies should strive to obtain a clear, quantitative picture of the patterns of safety incidents, their causes, trends, and the lessons learned; and to identify potential problems at the earliest time possible. Establish a safety-oriented Center for Lessons Learned.”

Create a National Wildland Fire Lessons Learned Center

December of 2006, the Center was visited by Mary Omodei, a researcher with the Bushfire CRC from LaTrobe University, Australia. Her country is interested in the idea of creating their own Lessons Learned Center for Wildland Fire and she interviewed our LLC staff over several days on how ours began. Her report is soon to be published but has given the Center permission to quote from the draft version.

“Many of the issues that arose and were addressed by the LLC staff in the early phases of start up (in 2002) have implications for similar endeavours in the Australasian fire community. The following priorities, in no particular order of importance, are suggested:

- Obtain as wide a range of skills as possible including: knowledge of fire and firefighting, team building skills, skills in encouraging agency uptake of any learnings identified (i.e., technology transfer skills)
- Adopt a relatively flat management structure
- Create an online presence as quickly as possible by developing a Website
- Survey user populations for perceived needs and expectations of a lessons learned center
- Benchmark against other lessons learned centres (such as the Army)
- Collect After Action Reviews and incident level summaries (AAR Rollups) as an inexpensive, yet dramatic way to begin building a learning organization
- From the outset, establish independence for The Center from the political infrastructure of wildland fire organizations
- Select as early targets for centre activity goals and objectives known to be held by key persons in fire agencies who have already identified themselves as champions of the LLC concept
- Start ‘smart’ with a focus on small, achievable, goals
- Do not expect lessons identified by the LLC to be immediately integrated into training curricula
- Create strong reciprocal links with the centralized research and training facility, including co-location of facilities
- In order to extract the full range of lessons to be learned have multiple analysts, each with a different perspective, review the materials collected”

The LLC Roadmap

The LLC determined early on that it needed to help the entire wildland fire community to learn, becoming a successful, enterprise-wide learning organization. In order to organize all of the Center's activities and prioritize possible endeavors, the LLC created a "Roadmap" around the Six Critical Tasks of a Learning Organization described in detail by David Garvin in his book, *Learning in Action, A Guide to Putting the Learning Organization to Work*. From the LLC Roadmap:

The Center performs the six critical tasks necessary to help the wildland fire community become a Learning Organization:

1. Collect information

Find information that already exists in paper documents, databases and personal sources; verify that the information is true; inquire, question and answer, to get the information that is only in people's heads; observe, directly look at what and how people do things

2. Benchmarking

Search for industry best practices (not just performance numbers) that will lead to superior performance, both inside and outside of wildland fire; copy, analyze, adopt and implement practices; stimulate creative thinking

3. Examine past experiences and learn from them

Review as a regular practice; systematically (i.e. AAR); record it in a form that is useful and accessible to the rest of the organization

4. Experiment with new knowledge applications

Cultivate a continual flow of new ideas

5. Do community of practice problem solving in a systematic way

Distinguish hard facts from gut facts

6. Transfer knowledge through multiple venues

Traditional methods of written, oral and visual reports (i.e. video of sand table exercise using a case study); new methods that apply (interactive CD, DVD, Internet, 3-D Simulations, virtual reality, scientific visualization); checklists to remind you and to keep from overlooking things you already know, to be consistent from person to person, department to department; create opportunity for people to learn from each other; install and maintain networking enablers

Transferring Wildland Fire Knowledge

Face to Face Opportunities

Talking with people is what is called a "rich" media opportunity. Since 2002, the Lessons Learned Center Staff has been active in doing briefings, presentations, and providing the LLC exhibit for various meetings, conferences and workshops throughout the country. As of January of 2007 almost thirty thousand contacts have been made. The Center has determined that an outreach program is never done.

People are continually coming into the wildland fire community and even after over four years, many veterans are not aware of what the Center offers them.

The Lessons Learned Center Online

The World Wide Web has been a primary tool since the beginnings of the Center. Developing one Website has evolved into three interconnected sites.

The original site (www.wildfirelessons.net) has grown into a robust mechanism for distributing recent advances in fire practice, case studies, presentations, hot tips, Information Collection Team reports, portal stories, and “toolboxes” for several types of incidents. A national database has been established here for Reviews and Investigations that also has a Multiple Incident Analysis Section. The Scratchline Newsletters are stored here as well as Learning Curve Newsletters, both collections of lessons and effective practices on specific topics from across the nation. An entire section is dedicated to Organizational Learning supporting people with information and practical tools to enhance their ability to become “Highly Reliable” in a high risk industry, develop the skills needed to effectively facilitate After Action Reviews, and find ways that others have transferred lessons from their incident management teams to other teams through AAR Rollups. High quality videos of workshops and fully developed training packages to support the transfer of knowledge on AAR facilitation techniques, staff rides, and subject matter expert’s interviews are all available for the minimal price of reproduction, shipping and handling.

Advances in Fire Practice

“There can be differing viewpoints within the fire community. There are those who have been using BEHAVE all their careers and are completely comfortable with it, and then there are those that like to explore other ways of working with fire. Not to take away from anyone, but it's just my nature to see what might be different or better out there. There are so many tools coming out, and it takes years to learn them and to put them into practice in the field. So, if there was a place I could go to read how other people are trying new tactics or tools before I started investing time in learning how... I would use it.” Ross Oxford, BLM - Fire Use Module Leader

Conversations we have had with fire managers and practitioners from across the U.S. have shaped our approach to Advances in Fire Practice. We want to bring efforts and ideas to the forefront that leaders in the fire management, practice, and research communities have identified as innovative and widely applicable, while also providing access to critical and proven fire information and resources. Our goal is not to be a "one-stop shop" for information on fire science and practice. Readers who are looking for a database of tools and resources are advised to check out FRAMES, a web-based fire science and research site.

We spotlight innovation in the fire profession, provide access to some of the latest and most useful fire science being produced, and spur constructive discussions on the challenges and issues facing fire professionals. There are a number of features found on this site directly related to these goals. First, there is the access to and reviews of research articles, tools, and findings coming out of fire science. We have developed summaries of fire resources available from the Forest Service Research Stations and Labs, and created fire centered indexes of science journal articles – allowing readers to scan recent abstracts and fire science titles in major

journals. Second, we will be building a collection of case studies of innovative projects tackling some of the most common and general challenges facing fire professionals – invasive species, fuels management, smoke management, public involvement/outreach, and training and mentoring. And, finally, we will also provide resources for fire instructors and students in fire science classes with a curriculum swap corner, lesson plans, and an article review platform.

Portal Stories

The Center solicits and publishes the stories of wildland firefighters. This section of the Lessons Learned Center is inspired by Paul Chamberlin, Northern Rockies Fire Operations Safety, US Fish & Wildlife Service.

"Science fiction Portals are amazing. Pass through an undulating Portal, or Worm Hole, or even Dorothy's tornado, and experience altered realities, new dimensions; see the universe from a new perspective. Career firefighters usually pass through a 'Portal' of sorts, a Safety Awareness Portal, achieving new perspectives, their reality altered. Transiting the Portal can be painful, maybe physically, always emotionally. They are often related to traumatic events such as South Canyon, Mann Gulch, Thirty Mile, Cramer, or a less legendary incident; perhaps a near miss, or a personal Waterloo. It may have happened to us, or involve a co-worker, or we have strong empathy for a situation we read about. Some think there is no significant emotional growth without a link to traumatic experience. Many have been through the Portal before us. Once through the Portal, you straighten up, blink your eyes, and finally comprehend how veterans you previously considered bland and worrisome embody a depth of humanity. They understand the severe implications of risk, and demonstrate an absolute commitment to safe practice. Entry level firefighters must be very careful when choosing which old salts to emulate. Transiting the Portal is likened to a wake-up call, or the light turning on. All of a sudden we 'get it'. Dorothy learns "There is no Place Like Home". Firefighters see the forest as trees that will grow back, we see buildings as 'things' that will also 'grow back'; we correctly see each human life as precious and irreplaceable, it can never grow back." (Chamberlin 2005)

These stories are often an opportunity to tell the story of a near miss in the language of the people that were there. The lessons come through as very real and personal. They are deeply etched into their minds of course, but now have the chance to migrate to the people who weren't there, but can see it through the form of a story. The Center provides editorial services and helps the person get it right, just the way they intended it to be read or heard, before it is posted.

Information Collection Team Reports

LLC Information Collection Teams (ICTs) of three to six people have been proactively going out on or shortly after incidents to collect lessons that firefighters felt other firefighters would appreciate knowing about. The LLC uses this method of information collection several times each year. The Center has benchmarked how the Center for Army Lessons Learned (CALL) has developed this method and continued to improve upon early successes over the last twenty years.

Type 1 suppression events, wildland fire use fires, wildland urban interface fires, hurricane assignments and now Type 3 organization activities are visited. Interviews with people at multiple levels throughout the organizations contribute valuable

perspectives. Often, units using experiences and insights have prepared materials to use for training that they are willing to share with the larger community. They just needed someone to ask. Trends can also be identified by visiting several similar incidents. Innovative ideas surface on how to overcome both common and extraordinary obstacles. Knowledge gaps are identified and unresolved issues are collected to be placed in the hands of those who can best deal with them.

The Deep Smarts Project

The Center is working with Dorothy Leonard, the co-author of Deep Smarts, to transfer the wisdom of fire behavior analysts, fire use specialists, and prescribed fire specialists to the new people in those areas of interest. From the raw material collected from thirty five recently videotaped interviews, a subject matter expert (SME) will sort and distill the information into two formats that can be passed on within the organization. These knowledge transfer formats will include: a) written lessons learned documents from the filmed interviews and b) written scripts for fire behavior and fire use story video products.

The SME will also facilitate a one-day meeting at the LLC with a panel of experts and learning organization communities of practice to peer review the procedures, concepts and draft-products created in the previous task. After the input is received from this meeting, recommendations will be incorporated into final draft products. The two written lessons learned documents will be prepared for posting on the LLC Web sites. The written video scripts will be finalized for a professional videographer to create fire behavior and fire use story products.

The Community Center

The Community Center (www.myfirecommunity.net) supports over 2,500 firefighters that have voluntarily come together in groups using nearly 200 neighborhoods to collaborate and exchange information on subjects they are interested in. A few are teams working on the revision of training materials or setting up an event, like a workshop. Most are groups we call communities of practice.

Through this online community center, the Lessons Learned Center assists wildland fire work groups to identify one another, share learning opportunities, discuss issues and concerns, and exchange knowledge. Some are formal teams, but many are actually "communities of practice." A CoP is an informal group of people with similar work-related activities and interests, who deepen their knowledge and expertise area by interacting on an ongoing basis. A good example: course graduates wanting to continue connecting with colleagues and the cadre after they leave the classroom.

Every group has the ability to have their own place in the larger community, an online work space called a "neighborhood." Neighborhoods are created in the community center as parts of the larger wildland fire community. Unlike a physical neighborhood, it is a virtual place for your group to get together around interests you share. Many group members are spread across distances, different agencies, and different disciplines. Here they can connect to one another, network with others that have knowledge about their issues, work on projects and engage in joint activities. They interact and learn from each other.

Some neighborhood groups are more than people with common interests--people who like certain kinds of sports for instance. More effective n'hoods develop a shared collection of resources: experiences, stories, tools, ways of addressing recurring problems---in short a shared practice. They make a concerted effort to collect and document the lessons and effective practices they have learned into a knowledge base. The concept of "community of practice" has become a practical application in many agencies, businesses, organizational design, education, and civic life (Wenger 2002).

Community Center neighborhoods can be created in one of three ways:

1. Public---Anyone can join by adding his/her account to the group. Anyone can post messages once they have joined. All of your neighborhood web pages are viewable by the public.
2. Private---People must be invited to join the group by a group coordinator before they can read or post messages. All of your neighborhood web pages are hidden from the public.
3. Partially Public---People must be invited to join the group by a group coordinator before they can read or post messages. You decide which of the neighborhood web pages are viewable by the public.

The Team Center

A survey of incident management teams (IMTs) helped illuminate the problems that they were having in trying to use the Internet as effective tool to support their teams. Some did not have Websites at all. Those that did were often frustrated because they had little opportunity to update the content in a timely way. Webmasters they had maintaining sites also had many other sites to work on at their regular job. The team's site was not often at the top of their immediate supervisor's "to do list."

Since January, 2007, the Team Center (www.imtcenter.net) is a way for IMTs to set up and maintain their own Web sites without the need for a webmaster or special software and the training that they usually require. Team leaders are able to change their site's content whenever they are online immediately. Team members can maintain their contact and availability information in a secure, private part of their team's site roster. A calendar can be updated not only with team events, but also with the unavailability dates of individual team members with schedule conflicts that can be generated in a report for section chiefs. A message center, news page, photo gallery, document downloads page and links page are all filled with tools and created without a site coordinator needing to know any HTML coding skills to use them. They can also create there own pages and edit them according to their team's needs. For example, a safety officer can have her own page for transferring safety information to her team and update the content daily, or even more often, if the need arises.

The Lessons Learned Center expects that the Team Center will become a true point of gravity that IMTs will eventually use to exchange concerns, ideas, lessons and effective practices. This is greatly different than their normal information exchange opportunities transferring command on an extended assignment or at an annual meeting.

Integration of All Three Sites

Some have already begun to use all three of the Center's Websites on a regular basis. For example, there are trainers regularly drawing upon the content in the LLC Library of case studies that are involved in multiple interdisciplinary neighborhoods on their topics of interest. The same person is also be a member of an IMT using the Team Center to transfer her knowledge from activities in the other two Centers to her team. Currently over 500 people are actual visitors to the sites on any day, some several times throughout the day.

Conclusion

The lessons Learned Center has built a case for firefighters to use the knowledge transfer services provided through its multiple venues. They can learn from the experiences others and become contributors themselves. The community now has a recognized place to meet, converse, solve problems and create a memory; what some would call a Knowledge Management System. Unlike many other KMS efforts throughout the world of the last two decades, this one is successful because it focuses on the people, supporting their relationships with enabling technologies. Individuals, teams, organizations and ultimately entire the wildland fire community benefits from this national knowledge transfer effort.

References

- Chamberlin, Paul 2005, *Portals*, presented at the Eighth International Wildland Fire Safety Summit, April 26-28, Missoula, MT.
- Garvin, David A., 2000, *Learning in Action: A Guide to Putting the Learning Organization to Work*, Harvard Business School Press
- Leonard Dorothy and Walter Swap 2005, *Deep Smarts: How to Cultivate and Transfer Enduring Business Wisdom*, Harvard Business School Press
- Tri-Data 1998, *Firefighter Safety Awareness Study Phase III*, online at the LLC http://www.wildfirelessons.net/documents/Wildland_Firefighter_Safety_Awareness_Study_PhaseIII_Chapter_Links.pdf
- Weick, Karl E. & Sutcliffe, Kathleen M., 2001, *Managing the Unexpected: Assuring High Performance in an Age of Complexity*, published by Jossey-Bass, a John Wiley & Sons, Inc. Company
- Wenger, McDermott and Snyder 2002, *Cultivating Communities of Practice: A Guide to Managing Knowledge*, published by Harvard Business School Press