

Cost Efficiency through Integrating Lessons Learned into Wildland Fire Training

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Abstract

The U.S. National Advanced Fire and Resources Institute (NAFRI) and Wildland Fire Lessons Learned Center (LLC) follow an organizational learning model. They focus their lessons learned integration program around the six critical tasks of organizational learning. (Garvin, 2000) These are methods that significantly assist fire organizations to continually improve the cost efficiency of programs.

The fire community is beginning to understand, accept and recognize the value in having knowledge shared by systematic learning organization efforts. The LLC started with a group of individuals and managers in fire that was anxious for positive change. They wanted to see what right looks like in addition to lessons derived from mistakes. This prototype group helped the LLC and NAFRI determine what the important lessons learned components were and how to include them in the training curriculum.

Cost efficient lessons learned, effective practices, and identified knowledge gaps are collected primarily through two avenues. Proactive information collection teams are sent out by the LLC on assignments to observe and interview fire professionals during and after wildland fire and all-hazard incidents. After Action Review Rollups are also submitted to the LLC by incident management teams or others after an incident. Both methods highlight notable cost efficient successes, how difficult challenges were mediated, and training curriculum and unresolved issue recommendations. Important lessons and practices are analyzed, interpreted, and transferred to entry, intermediate and high level training programs.

A virtual community center also helps bring formal teams, classmates and informal communities of practice together. This online forum is used to update course plans, distribute course pre-work, and develop training scenario team cohesion before they physically come together at training facilities. Required on-campus days have been reduced, from fourteen days down to eight in one course, creating significant efficiencies for all units involved. Afterward, through the wildland fire community center, classmates continue to learn from each other, faculty, and subject matter experts in follow-up designed to support cost efficiency implementation, continuously reinforce training, and provide new knowledge as it is developed.

Introduction

In the past 20 years, wildland fire training in the United States has developed a core training curriculum which has served the community well by bringing common firefighting skills and processes to a diverse, multi-agency, national workforce. Most of these standard courses are for positions in the Incident Command System (ICS). The challenge now facing the community is transforming training into learning. "On one hand, training is done to someone. On the other hand, learning is something that the student desires, needs and sees an immediate application for." (Greeno, 2006) Much of the curriculum is lecture or classroom based and is required to obtain

incident management qualifications. The most direct application for the participants is accomplishing the required training for the next qualification. This often creates a situation of being “done” to the individual. While some degree of learning may take place in the training course, it also occurs through the required on-incident experience. Position Task Books are used on site to document successful position performance. Therefore, improvements in the formal training curriculum could shorten the experiential time and expenditures, resulting in cost efficiencies in either training or experience activities. Position competencies are currently being developed for the ICS positions, and the revision of the skills, leadership training and field performance evaluation will follow, with a greater emphasis on learning rather than training.

As is the case for most training programs, costs for wildland fire training are calculated on the cost per participant. This does not reflect the true costs and is rarely measured with accuracy. Therefore, this document identifies areas or methods where cost efficiencies can be realized, but no specific data is provided.

The tools provided by the U.S. Wildland Fire Lessons Learned Center are enabling the wildland fire training community to move closer to the learning organization model. The basis of this model is built around six critical tasks. (Garvin 2000)

Collect information

Benchmarking

Examine past experiences and learn from others

Experiment with new knowledge applications

Community of practice problem solving in a systematic way

Transfer knowledge through multiple venues

The development, deployment and evaluation of the current wildland fire curriculum are beginning to integrate these methods, which is in turn changing how the organization thinks about training and workforce development. This movement has also provided cost efficiencies to the training environment with more to be realized as management, employees, and the governing bodies and work groups strive to adopt the principles. Because very little research is done in this area, the following information is primarily anecdotal from the author’s twenty plus years in the wildland fire training field.

Identification and analysis of the use of the six critical tasks demonstrated within wildland fire training and the resulting cost efficiencies can provide a look at the current progression toward a learning organization model and also the areas needing improvement.

Collect Information

The traditional method to collect information when developing entry and mid-level wildland fire training in the U.S. has been the use of subject matter experts (SMEs) brought into a centralized location to develop the basic content of the training, with the facilitation of a training specialist. In general a course (24 to 40 hour lecture style) takes two years to develop or to revise. During this process, and the intervening years until revision starts the cycle again, course evaluations, notes from course participants and instructors and changes in policy or procedures are

gathered by the training specialist into a file to be reviewed by the SMEs for inclusion in the next version. This has allowed for the maintenance of the courseware, but at a high cost in terms of funds used for the development processes and the time between revisions which is generally five to seven years.

The National Advanced Fire and Resource Institute uses similar processes for the advanced, national-level courses, but revises them on an annual or semi-annual basis, with at least one meeting of the course steering group and one with the faculty. This ensures more updated information is provided in trainings at this higher level. However, there remains issues of high costs associated with the time, staffing and travel required for such meetings.

Through expanding the use of tools introduced by the U.S. Lessons Learned Center, the development time and funds expended in the information gathering process can be reduced by using the lessons learned identified by means of After Action Reviews (AARs), collection team interviews and other lessons learned documented by the Center, as well as the traditional use of SMEs.

After Action Reviews are done for the purpose of documenting experience in the pursuit of performance improvement and not repeating errors, but reinforcing successful actions. (DeGrosky, 2005) Information is gleaned from the AARs to incorporate into training in order to reproduce the successes. AARs are “rolled up” to summarize information from a series of individual AARs. Data assembled during the collection team activities are also analyzed and interpreted for inclusion in training programs. The website hosted by the Lessons Learned Center maintains many instances of lessons learned that can be disseminated through training to increase performance and safety for the wildland fire community.

Benchmarking

Benchmarking is a tool currently underutilized within fire management. To date, most of the efforts in this area have been completed by the Lessons Learned Center as it expands its role in the community and strives for continuous improvement. The U.S. military and associated private contractors are the primary source of information, including lessons learned center deployment, knowledge management, training management, simulations, distance learning and military universities.

Through collaborative projects, the training community also evaluates areas of expertise in other agencies involved in emergency response efforts, such as those under the U. S. Department of Homeland Security. Currently a joint project is underway to finalize competencies for the Incident Command System positions which are used by all first responders in the U.S. The positions used exclusively by the wildland fire community are also being defined by competencies. These will be transferred into Position Task Books for the fire community. The sharing of standards for ICS positions will bring cost efficiencies to emergency response operations as the development and delivery of training and other learning tools can be shared. Currently joint development and distance delivery of common training is being implemented. The shared use of contractors and common learning practices makes good sense and provides cost savings for all agencies involved.

Several other benchmarking projects are being initiated at this time. Looking at the manner in which distance learning is being implemented is an on-going project. Also, a broader benchmarking project on corporate universities, using the military

models and international corporations, is being conducted. Simulation and training processes in the U.S. military, Australia and France are being analyzed for applicability in the wildland fire management learning processes. By paying attention to the lessons learned by others in the training field and by sharing resources, cost efficiencies can be practiced and costly mistakes avoided, particularly at the start-up of new initiatives.

Examine Past Experiences and Learn from Others

In the wildland fire community, there are always good stories to tell about that one big fire or the specifics of a significant event. The key is to examine these experiences and bring to light the positive things that should continue, the mistakes that should not be carried into the future, and the best way to handle the challenges in today's environment. The U.S. wildland fire community brings this principle into the training curriculum in four specific ways: through the telling of stories with learning objectives, the use of simulations based on past experiences, the use of case studies and, most recently, by conducting staff rides.

Many of the lectures and activities presented in fire management courses contain stories with a purpose. Examples of past experiences are designed to stimulate the participants to learn new information, to think in new ways, or to test them on the learning taking place. Through examples cited, the experiences of the past are used to teach others the appropriate actions to be taken. This is cost efficiency in that the expenditures of the actual experience do not have to be incurred and learning can be done in a controlled environment.

Simulated exercises and testing are used extensively in the curriculum within the wildland fire training program, particularly at the higher levels. These are generally based upon past incidents (fire or all-hazard) and designed around learning objectives. Up to six-hour simulations are instituted as tests of participant competency in several of the courses. The assessment of skills is required, particularly for complex positions within the Incident Command System. Also gaining widespread use for training and assessments are sand table exercises in which large tables of sand are set up, complete with topographical features built into the sand. Toy equipment and resources are maneuvered based upon scenarios and unscripted input from the role players and the actions of the student. Decision making and technical competency are tested in this safer and more cost effective way to determine actual learning and skill transference. This provides criteria-based evaluation for managers on qualifications for determining the certification of individuals for specific ICS positions.

Case studies have always played a role in the training of the wildland fire community, but now, with the Lessons Learned Center knowledge management capabilities, additional case studies are available to be integrated into the programs of study. The "Deep Smarts" (Leonard, 2005) project of the LLC focuses on collecting the business wisdom via video interviews with experts in the fire management field. This is especially necessary with the number of retirements in the community. It provides a method to capture the tacit knowledge of the individual to pass on to participants entering the field. Another body of information being gathered and made available through the LLC website are the reports from formal investigations and reviews. The knowledge obtained can be designed as case studies or other products to use in various training settings. This capture of implicit knowledge will show a

savings to the fire community as the archive is increased and new methods are found to incorporate it into training programs.

The final manner in which past experiences are used in wildland fire management training is through staff rides. Significant, water-shed events from the past are analyzed and developed into a learning exercise at the actual location of the event. The goal is to “relive” the event in a facilitated manner which emphasizes the knowledge gained and changes in the community as a result of the actions taken in the past. Although not used on a consistent basis, the staff rides have brought a new learning dimension to the participants and a better understanding of some of the causal affects of events in the past. These experiential activities literally bring the past alive with learning as the goal, rather than fault finding, to ensure past actions are not repeated with the same negative outcomes. This will then bring savings in terms of property and lives lost, as well as cost efficiencies in the learning process.

Experiment with new knowledge applications

This component of a learning organization is one the wildland fire community has not fully embraced. Few projects are initiated that look at doing things in new ways through experimentation outside of the technology arena. Technologies, such as fire behavior modeling, have been integrated into training as tools for use by fire managers, but the idea of experimentation is rarely used outside the research community. One organizational experiment that is currently active is the use of permanent, rather than collateral duty, incident management teams. Two of these National Incident Management Organization (NIMO) teams have been stood up since October 2006. Roles, responsibilities, and interactions with the other national incident management teams and normal operations are being developed. Cost savings are being tracked and in the future decisions will be made concerning bringing additional teams on board. The use of exploration and hypothesis testing experiments (Garvin 2000) is an area the wildland fire community should expand upon in order to fully become a learning organization and realize benefits in more effective operations and in cost efficiencies.

Community of practice problem solving in a systematic way

The Lessons Learned Center has brought the community of practice (CoP) philosophy into wildland fire in the U.S. Through the LLC’s Community Center website, participants can independently set up areas which can be used by those with common interests to dialogue and pass information. At the current time, there are over 200 CoP neighborhoods in place for communication by wildland fire personnel internationally. The Team Center is a unique feature built specifically for incident management teams’ communications with additional team-related tools. The continued use of these tools will increase the cost efficiencies, some which have already been realized by specific communities.

In the training arena, communities of practice have integrated in several ways. Course steering groups and faculty use the forum to pass course development and delivery information and for decision-making during the preparation process. Fewer face-to-face meetings and postal mailings are needed when the site is used; savings in expenditures and personnel time are a tangible result. In addition, monitoring of other communities keeps the faculty abreast of issues of interest and concern across wildland fire to incorporate into the course materials.

The most effective result of the Community Center’s development has been in preparing participants for courses by pre-study materials being provided and

discussion forums being held prior to the course and by the ability to use the neighborhoods for post-course follow-up with the alumni. One specific example is the Advanced Incident Management course.

Historically, the Advanced Incident Management course (S-520) has been a 14 day session for 12 incident management teams taught every other year. The course involved preparation activities for the team members, including pre-work assignments, interaction with an assigned mentor, and experience gained as a trainee on one or more incidents using the Position Task Book process. At the actual training session, teams were assigned, lectures given on new materials, functional break-outs and tutelage, team building training and exercises, and a final six-hour simulation for each team. No significant follow-up was done with successful graduates, other than monitoring at the local area to ensure requirements for those passing with specific follow-up conditions were completed. The most recent session in March 2007 instituted significant changes partly due to the availability of the CoP neighborhoods through the Lessons Learned Center.

In 2005 it was decided this course should be taught every year for six teams which would pare the course down to seven and one-half days. The teams were formed several months prior to the course which allowed virtual training with a contractor on individual and team skills and the teams to start building their bond. A CoP neighborhood was set up for each team to communicate prior to the training session. Three of the teams used the tool consistently, which appeared to the evaluators, to enable them to work together more effectively during the actual training session and six-hour assessment. The other teams also communicated with each other in varying methods and quantity. There was not an obvious cost savings this first year, but it is believed the communications facilitated by the CoPs were effective in the learning process.

As a continuation of the S-520 course, a Community of Practice will be set up for the alumni. The steering group and faculty plan to send updates on course materials, changes made in the curriculum for 2008 and other information which will assist the graduates as they become part of existing incident management teams. This will be the first time extensive follow-up will be done for this training group. It is hoped these activities will provide cost efficiencies in operations and improve actions as the new members integrate into current teams.

The use of the Communities of Practice is increasing. The increased ability to communicate within special interest groups and, particularly within incident management teams using the Team Center, provides the opportunity for more effective decision-making and actions within the fire management community. Additional courses should begin to use the CoP neighborhoods for communication during the development and delivery process for the training specialists, as well as pre- and post-course interaction with the participants.

Measurements of the effects of these tools need to be put into place, including technological monitoring of site use. The Lessons Learned Center currently evaluates activities through surveys to fire management personnel and is beginning a metrics system in 2007. This needs to be expanded to include information gathering on participation in communities of practice and the application of this tool in field operations.

Transfer knowledge through multiple venues

As previously outlined, the wildland fire community in the U.S. is striving to move from a traditional training paradigm to one of a learning organization. A key element is transferring knowledge through multiple venues. The model of lecture-based training is still the primary method to transfer knowledge in the wildland fire community. Courses are taught at the local level, the geographic area, and national level courses are taught at the National Advanced Fire and Resource Institute in Tucson, Arizona. Courses at NAFRI are updated on a yearly or semi-yearly basis. Updates for the other curriculum are done on a 5 to 7 year basis, depending upon the information to be integrated or on funding and resources available to do the revisions. In order to see appreciable cost savings, improvements in the process need to be implemented to provide a more comprehensive integration of learning versus training methodologies and to shorten the course revision time of the latter courses.

Distance learning is currently being integrated into the National Wildfire Coordinating Group (NWCG) curriculum. Although there is often a high investment in the beginning, efficiencies should be realized in long-term implementation. Metrics on this process will identify these savings. Due to the nature of the wildland fire business, training will always play a major role in transferring knowledge to participants.

The Lessons Learned Center has been the primary proponent for a change in the wildland fire community to a learning organization. One of the primary methods is through the internationally available website (<http://www.wildfirelessons.net>). This site has provided the opportunity for more collaboration and transfer of knowledge. The website components include:

Community Center

Team Center

Advances in Fire Practice

Center Library—Browse by Topic, Case Studies, Forms and Examples, ICS Search, Presentations

Hot Tips

Information Collection Teams

Portal Experiences

Reviews and Investigations

Incident Toolbox

Newsletters—The Learning Curve and Scratchline

Organizational Learning—High Reliability Organization, AARs, Leadership Support, Sparks, Surveys

The LLC has become the collection point for knowledge management and aids the wildland fire management community in accessing this information. Two newsletters are published on a regular basis concerning current issues in fire management and disseminated to all levels of the organization. The site also provides searchable data derived from the Information Collection Teams, reviews and investigations. This is the first time all this type of information has been put into a central repository for easy access by the wildland fire management community.

The use of websites is fast becoming the preferred method to transfer knowledge to the wildland fire community. Some are for specific purposes or audiences, while others are set up to transfer official policies, procedures, or information. Better decision-making and improved communication around work processes should enable higher quality of performance and cost efficiencies.

The LLC has also been the leader in moving the community toward high reliability organizing (HRO) through workshops, a seminar and incorporation into staff rides and training programs. The goal is to institutionalize HRO principles in the wildland fire community to more readily identify unexpected events, put practices into place to contain unexpected events, and develop the ability to recover from the consequences in a timelier manner. (Weick and Sutcliff, 2001) These improvements in performance will bring about efficiencies in operations and expenditures.

Many venues to transfer knowledge within the fire management are in place or underway, but improvements can always be instituted to realize more cost efficient ways to proceed with the business.

Conclusion

The U.S. wildland fire training community has made excellent progress in standardizing training, but the concepts of organizational learning have not been fully embraced. The training paradigm needs to shift to one of learning.

“Transactional training processes of the past can become transformational learning opportunities. People will see the organization's investment in tangible ways and respond with commitment because the focus has changed from seat hours in training to real impacts on job performance and individual goal setting due to a focus on learning.” (Greeno 2006)

“Employees who are in a continuous learning mode are constantly searching for new ideas, trying new methods, sharing ideas and learning with others, and learning from others. These are all forms of learning. Some of it comes from formal classroom instruction. Other parts come from formal, self-directed and independent learning activities, such as reading, taking computer based training or other media-based instruction, or other activities that we generally deem to be in the category of learning and self-study. But most true learning comes not from studying, but from applying new ideas to your work, finding out what works and what doesn't, and searching for even minor improvements in results. And even more learning takes place when employees share their learning with others and in turn, learn from others to help them improve their own results.” (Tobin, 2000)

The wildland fire training programs are a model that has worked for us in the past and is actually a benchmark for others in the emergency response arena. This being said, the fire training community should not rest on its laurels, but strive for increased excellence in the training program and in the measurement of its cost efficiency to the wildland fire community.

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