Community of Practice

A workplace safety case study

By David Machles, Ed Bonkemeyer and Jackie McMichael

WHEN PEOPLE THINK OF LEARNING opportunities, they often think of training or formal teaching. Most people envision instructors (or, more recently, computers) providing information or knowledge to receptive students. This model exemplifies a transmission style of teaching where the learning process is similar to playing catch with a ball. The instructor throws the knowledge (training) and the employee or student catches it (learning). Both must be in sync for the knowledge to be successfully gained. The trainer's objective is to provide the best possible "throw," while the learner must be prepared, ready and willing to "catch" it.

Understanding a learner's ability to receive the lesson is often the focus of adult learning principles, although usually not the central focus. Safety trainers and educators seek to improve the delivery of knowledge by making the class or training fun, exciting and interesting. They also develop objectives to provide a target at which to aim. These techniques may improve the likelihood that the knowledge is received, but that does not mean the students will use it. Estimates suggest that only 10% to 15% of the content from training conducted in the workplace is transferred or used and retained after 1 year (Broad & Newstrom, 1992, p. 7).

Situated Learning: Learning in Context

While training and teaching often provide an adequate avenue for increasing safety knowledge, learning also occurs through other, less obvious methods. Research has shown that much human knowledge is passed along through participation with coworkers in everyday activities (Brown, Collins & Duguid, 1989; Machles, 2004). In fact, much of what is known by humans is learned this way. People learn how to speak, eat, dress, ride a bicycle, drive a car and behave through this context-based learning process, sometimes known as situated learning.

For example, most SH&E professionals have attended classes and training for safety, yet in reality much knowledge about the profession is learned through this social learning process. Although often marginalized, educators and trainers formally recognize this type of learning as apprenticeship. Informally, this learning process occurs all the time despite being largely unnoticed by learners as they go about daily life.

In situated learning, people learn through observation and interaction with others in social settings (Meriam, Caffarella & Baumgartner, 2007, p. 178). As people interact with others who share a common enterprise such as work, they develop concepts and schema that they piece together to make up their knowledge about the world. A schema is defined as a mental codification of experience that includes a particular organized way of perceiving cognitively and responding to a complex situation or set of stimuli.

Initially, people have simplified schemas that become more complex as they learn through social interactions. Learning through informal interactions with other knowledgeable, trusted coworkers and peers allows employees to build schemas regarding workplace safety, values and culture. This group of coworkers and peers with which this shared knowl-

David Machles, Ed.D, M.P.H., COHN-S, *is a safety and health coach/consultant with Dimensions in Occupational Health and Safety in Raleigh, NC. He has worked in occupational safety and health since 1987 and focuses on helping organizations establish safety and health management systems. Machles holds an M.P.H. from University of North Carolina, Chapel Hill, and an Ed.D. in Adult Education/Organizational Learning from North Carolina State University. He is a professional member of ASSE's North Carolina Chapter.*

Ed Bonkemeyer, CSP, CPCU, ALCM, *is a risk performance specialist with Scott Risk Services in Greensboro, NC. He has more than 30 years' experience as a safety professional and is a professional member of ASSE's Triad Chapter. His educational background includes a B.S. in Industrial Technology from East Carolina University.*

Jackie McMichael, M.Ed., *holds an M.Ed. from North Carolina State University and has worked as a training consultant in the warehouse integration field, providing training on warehouse technology and safety. In 2003, she joined Allscripts (formerly Misys Healthcare Systems) as a training manager for the field engineering team. Her primary focus is continuous employee career development and safety education.*

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A community of practice (COP) is any group of people whose members have a common interest in a subject, problem or goal; through collaboration, negotiation and sharing of ideas, they find solutions and new ideas (Wenger, 1998). In addition, they usually develop common language and jargon, concepts or tools that are typically understood just by the members.

This provides a foundation for social identity and development of the culture that becomes the communal property and product of COP members. A COP can be almost any social group, ranging from a softball team, to a church group, professional organization, or department or employee group within a company.

A Case Study

The case study presented here involves Misys, a global software company with more than 4,500 employees around the world. The healthcare systems division has 140 field engineers. Historically, the firm's workers' compensation losses have been favorable. Before 2002, most loss control efforts were focused on traditional work areas and were related primarily to office ergonomics, a significant exposure. An aggressive ergonomics program including education, early detection and intervention greatly reduced most repetitive strain injuries in the office setting.

In fall 2002, the organization opted to become self-insured and joined an insurance group captive. In addition to saving money, this move created a more direct correlation between claims and dollars spent, which gave upper management another incentive to continue to reduce injuries and lower workers' compensation costs. Like most well-performing companies, Misys also wanted to identify opportunities for continuous improvement. Management recognized that safety was a never-ending endeavor. Since it was already doing an outstanding job, the challenge was to continue to improve performance.

Field Engineers as a Community of Practice

Misys field engineers are spread across the country and only occasionally were brought together in small groups for training on new equipment. Some engineers knew each other, but many did not. However, characteristic of a COP, they all shared the joint subject and enterprise of installing or repairing computer equipment and software. With this as a primary goal, they all worked in a similar manner to accomplish that goal and experienced similar problems and issues.

Typical of a COP, the field engineers had developed a common language and jargon (related to the equipment), used similar tools, had common forms and procedures, and developed somewhat common concepts and schemas. What they lacked was a structure that allowed and encouraged them to get together to share these ideas.

Although COP members may have little interaction with each other regarding their work, as in the case of field engineers working alone, their work experiences, issues, concerns and concepts are similar. These similarities and the ability to discuss them empathetically with comembers create a sense of camaraderie that cannot be fully appreciated by someone who is not a member of that particular COP. This camaraderie creates the foundation of their shared knowledge, identity and culture.

In turn, it can be difficult for anyone who is not an accepted part of a COP to attempt to mandate changes in that culture. Many managers fail to effectively change or affect a culture by assuming, believing or pretending that they know more about the COP than its members and trying to force those beliefs on the COP (Machles, 2008). A critical component in successfully dealing with a COP is to understand that one cannot demand acceptance into it. Membership is established through trust and by invitation only (Wenger, 1998, p. 100). This is how new employees enter and gain access to a COP's shared knowledge. Access occurs only as they are accepted into the group.

Similarly, the COP will only embrace new ideas if it has accepted them. Controls and mandates can be put into place by an external source, such as upper management, and observable behaviors, such as completing a new form, may take place, but the practices may never truly be accepted as part of the repertoire and become a part of the culture without the COP's trust and acceptance. In some instances, mandating control can often create feelings of resentment and a greater unwillingness among employees to cooperate.

This was the case at one company trying to improve its safety record. Following an electrical incident, management decided that all service technicians conducting repairs on electrical equipment would have special electrical safety tools. Facing the challenge of equipping service technicians scattered around the country, management decided to purchase the tools without technician input. As a result, the ex-

Abstract: *Establishing and providing safety services for field staff is a challenge. Employees working alone in the field often have their own way of doing things and are difficult to audit or monitor. This article discusses the community of practice approach to developing an effective, sustainable safety program for field staff.*

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pensive tools purchased were not practical for the work being performed so the technicians did not use them. Management saw this as employees' unwillingness to cooperate with safety regulations, which, in turn, only increased the tension and widened the gap between management and service technicians.

Identifying the Community's Needs

To identify worthwhile opportunities for improvement, Misys management reviewed the firm's loss history for areas of focus. This revealed that most injuries were arising from issues with field employees. This group consisted primarily of a sales force and the field engineers who were installing hardware and software at customer sites. A multiyear loss analysis revealed that remote employees experienced a much higher loss rate than on-site employees. Furthermore, among remote employees, field engineers accounted for the majority of the work-related injuries.

This simple loss analysis reflected the theory of Pareto's Principle or the 80:20 rule (Juran, 1975). The work performed by field engineers accounted for a disproportionate number of work-related injuries and the cost associated with them. At the same time, these employees represented a rather small group within the total operation.

Given these results, management decided to target field engineers as the top safety initiative. However, the direction of that initiative remained unclear. The field engineers posed a challenge because they often worked alone, developed their own methods for dealing with problems, and did not routinely report near-hits or minor injuries. In fact, injuries often went unreported until they became significant enough to warrant lost time or a workers' compensation claim.

Since this group's work practices and behaviors were not easy to observe, it was difficult to determine whether the safety issues were related to engineering controls, work practices, attitudes or a host of other work performance issues. While easy for an outsider to speculate about the causes, the real issues remained unclear. A job safety analysis that had been conducted early on with a local field engineer provided some insight, but that single sample could not necessarily be generalized to the rest of the COP.

The fact that field work is not always predictable or similar from job to job presented another barrier to identifying root causes. Without a clear understanding of the particular problems for each field engineer, management-recommended solutions may not work in each setting.

This became apparent during an early focus group discussion when the possible solution of carrying a small stepladder was suggested. While the Nevada field engineer who drove a van to his sites thought it was an excellent idea, the engineer from Manhattan traveling by crowded subway saw it as impossible. Similar variations in work conditions made a one-size-fits-all approach to safety impractical. These variations, nuances and practical familiarity of the work make the COP knowledge valuable, yet largely inaccessible to anyone outside the group.

Involving the Field Engineers

Based on this understanding, management realized that field engineers had to be involved in the decision-making process. Recognizing and approaching the collective group of field engineers as a COP and working with that community was clearly the best way to address the identified safety issues. In fact, the community members were vital in driving the process.

The goal was to establish trust and negotiate solutions with the COP while offering viable ideas, rather than to mandate or control. Management's role was to present the problem, stimulate thought, gather information, discuss solutions, and provide needed resources and support. Giving this level of decision-making control to employees may make some managers nervous, but most groups of employees see themselves as part of the larger organization and easily understand that not all solutions are feasible but depend on various factors, including cost and time.

This approach also required adjustments to the conventional role of safety management. A lighter grip was needed. Managers needed to manage the process first and the outcomes second.

While focusing on managing a system that relied heavily on employee involvement and expertise, management developed a traditional action plan to identify and address the safety issues. This plan included several steps.

- Define the problem.
- Analyze the hazards.
- Identify and implement hazard controls (control measures and corrective actions).
- Measure results.

Define the Problem

The original loss analysis pointed in the right direction, but it did not adequately define the problem. The SH&E team was aware of the potential dangers of assuming that it knew the underlying problem; once into the process, it was obvious that the best decision the team made was to involve those with the most to gain: the field engineers. With no preconceived conclusions, the safety team sought input from the field engineers at every opportunity. This included jobsite visits, group focus meetings, interviews and discussions.

Jobsite visits provided an opportunity to observe work being performed and to conduct job hazard analyses (JHAs). These created a deeper understanding and appreciation for the nature of the work. Also, since field engineers were not trained in hazard recognition, potential problems that had not yet surfaced were also identified. Employees being observed were told that the purpose was to assess the nature of the work, not to judge or be critical of work performance. Letting employees know in a noncondescending, nonthreatening manner why they were selected helped create an atmosphere of trust. As noted, while JHAs provided a good overview of the nature of field engineer work, the variations from job to job made it difficult to generalize this information to all jobsites.

In the end, focus group activities provided the most beneficial information. During these activities, the work with the COP came to fruition. The SH&E team was able to capture information from a large population and field engineers were given an opportunity to discuss their concerns and compare issues in an open, nonthreatening environment.

To strengthen this perception, sessions were held during lunch, which was provided, and while managers were not present. While field engineers were allowed to vent, it was made clear that the primary purpose of the focus group was not to become a gripe session or an opportunity for management to hear complaints. Instead, the safety team was trying to establish best practices.

Analyze the Hazards

Although statistical data demonstrated the types and magnitude of injuries occurring, the root causes were not fully understood. The focus groups were able to provide this missing information.

When conducting the focus groups, the safety team first reviewed past injury reports. The team then attempted to identify all possible ways a field engineer could be injured on the job. Once the ice was broken and a level of trust was established, the SH&E team began to supplement the data with employee feedback. This proved to be valuable as the team explored underlying causes of injuries and near-hits, and identified potential hazards that had not yet shown up on injury reports.

Although the names of the employees who had experienced injuries remained confidential and field engineers often worked in different parts of the country, once the group began describing injuries, it was clear that many field engineers were familiar with various incidents and knew of injured coworkers. This shows how rapidly information can spread within a COP (Machles, 2004).

Many community members reported being in similar situations so they knew precisely what work was being performed, knowledge that management often lacked. Field engineers were able to describe and provide details about the difficulty, peculiarities and nuances in moving a certain piece of equipment or manipulating it into proper position. Feedback included detailed descriptions of the types of circumstances and environments in which they work each day, which typically varies for every client. The primary safety concern involved lifting large, heavy or awkward materials and equipment. Clients often have small, cramped rooms where equipment must be placed on racks, causing awkward lifting scenarios. Clients in more urban locations have no elevators, requiring stairs to be climbed with boxes in hand.

Field engineers also knew what assistance was available from clients and the reliability of that assistance. They knew the type of customers they worked with (often doctors, nurses and office managers) and those customers' expectations in relation to their patients. All of the detail not normally described on an incident report was gathered in a way that allowed management and the safety team to begin to understand the work expectations and concerns of field engineers.

The focus groups allowed the SH&E team to not only understand the mechanism of injury, but also develop a deeper understanding of the environment in which field engineers work, both physically and socially. With such understanding and insight, management was motivated to provide safety expertise on a more pragmatic level.

Rather than simply prescribe rules, mandate training, and expect employees to incorporate those rules and knowledge into their work, management and the SH&E team took the opportunity to work with field engineers as members of a community, to assess problems and develop creative solutions. The key was making sure everyone realized the importance of this community perspective.

Identify & Implement Hazard Controls

Once an extensive list of hazards was identified, the COP continued to use open dialogue to gain insight into practical control measures. The group explored new ideas through unrestricted brainstorming. Field engineers were challenged to be creative and they responded with many ideas, all of which were given proper consideration. There was no such thing as a bad idea and the group enjoyed this freedom to explore out-of-the-box ideas.

Community members discussed the viability of solutions, supporting or dismissing several ideas along the way. Members seemed receptive to feedback from each other as ideas were explored. Knowing the nuances of the work provided a level of understanding and authenticity that would not have been clear to anyone who had not actually performed this work, including the safety staff. As a result, the ideas developed were quite creative.

Many of the ideas required participation and contribution from other departments. Initially, some were concerned that other departments would not embrace the ideas. However, these groups were approached with the same level of openness, which seemed to expand the sense of community.

In some cases, the corrective actions explored and tried lacked practical application. For example, the COP considered sending small hand trucks to jobsites along with the computer equipment being installed. Since the computers and servers were sent from a cen-

Field Engineer Injuries & Solutions—Employee Brainstorming Results

Injuries

Predominantly strain injuries related to the manual handling of computer equipment at installation sites. Also experienced other injuries, such as slips, trips and falls; struck by/against; and cuts, all related to the manual handling of equipment.

Solutions

1) New equipment and tools
- dollies/handtrucks
- detachable wheels/casters
- slide/glide pads
- tool belts

2) Improved internal communications and coordination
- distribution center
- sales
- delivery services
- customers

3) Outsourced labor
- hired helpers on site for physical labor

4) Job preplanning
- preinstallation site checks

Outcomes can be measured by the frequency and severity of work injuries experienced by field engineers. Table 1 shows the number of workers' compensation claims through late 2007 when the data were collected. The COP approach began in mid-2006. Table 2 shows the average cost per workers' compensation claim for the field engineer group.

Table 1

Number of WC Claims

Year	No. of field engineer WC claims
2002 to 2005	4-5 average
2006	2
2007	0

Table 2

Cost of WC Claims

Year	Cost per field engineer WC claim
2002 to 2005	$10,225 average
2006	$110
2007	$0

tral distribution center, it would be easy to ship the hand truck as well. According to the plan, once the equipment was moved and installed, the hand truck would be shipped back to the distribution center. While this idea was viable, the distribution center could not find hand trucks that would be cost effective and still meet the requirements of the field engineers.

Another idea was to employ temporary staff to help move and place equipment—essentially this would turn what had been a one-person lift into a two-person lift. This turned out to be one of the best solutions. Now, when difficult or heavy installs are required, temporary employees are hired to help with lifting and other manual tasks. This corrective action has helped reduce the number of back injuries among field engineers.

Other multifaceted corrective actions were taken as well. Many were best practices identified during the focus groups. Employees sharing best practice ideas provided a framework that was more genuine and credible than would exist had management simply implemented these solutions.

The role of the SH&E team was to keep communications open and ideas flowing, and to provide consultation if an idea did not meet the spirit of an appropriate safety requirement, such as when a solution might create a new hazard or was not in line with OSHA requirements. In this role, SH&E team members were essentially coaches, guiding field engineers through a self-directed group learning process. Ideas emerged that addressed communications, equipment, job assessment, planning, hiring practices and task performance. In general, the safety team tried to ensure that all outcomes were measurable, practical and positive. The focus was on what to do, rather than on what not to do. Over the months that followed, many solutions were implemented and management could begin to evaluate the results.

Measure Results

The effectiveness of learning through the COP approach was determined using multiple levels of evaluation. These included evaluating perception or reaction, learning, behavior or actual application, and results or business impact (Kirkpatrick, 1998, p. 88). Some researchers believe a fifth level, return on investment (ROI), should also be included (Phillips, 1997, p. 45; Machles, 2003, p. 61).

Getting reactions or perception feedback from the field engineers (level one, reaction) provided some information regarding the program's success. Since the COP approach was not a traditional training session, a standard reaction or perception survey or quiz was not conducted at the end of each session.

Evaluating actual behaviors or job application (level three) is typically achieved by observing workers and determining whether the best practice behaviors are being implemented. Unfortunately, it is difficult to directly observe field engineer behaviors and practices (in fact, it was this challenge that led to the initial root-cause and need analysis). Instead, management had to rely on observing job application results, such as whether the change in communications took place, the temporary staff solution was implemented or the newly revised forms were used.

Those involved decided that a more accurate means of evaluation was to actually measure outcomes. Actual outcome (level four) evaluation (Kirkpatrick, 1998, p. 59) is a more reliable method of measurement. Interestingly, in traditional transmission training, it is common to conduct perception (survey) and learning (quiz) evaluations since they are easy to capture and to ignore outcomes and application evaluations since these are considered difficult to measure (Kirkpatrick, 1998; Phillips, 1997).

However, having workers' compensation and injury data up front proved to be the driving factor in deciding that an intervention was needed. Because no other real interventions or variables could confound the results, measuring outcomes was the easiest way to assess the effectiveness of the COP approach. Having these data also allowed management to evaluate ROI. The company was self-insured and knew the direct cost of the workers' compensation savings.

The results are a reflection of direct costs only. At the time of the program, indirect costs were not included. Those involved believe an even greater ROI would be realized if indirect costs were included since these costs are often substantial (e.g., costs to train and provide an engineer to replace the injured one).

On the other hand, the indirect cost of COP meetings was minimal. Sessions were conducted during the lunch breaks of technical training sessions held annually at the main facility, so no other time was needed. This was done primarily because it is the only opportunity for all field engineers to get together.

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In addition to lower workers' compensation costs, human resources gained some beneficial insights. For example, it was discovered that the culture of this COP caused a stigma to be attached to filing a workers' compensation claim. Some suggested that admitting an injury was a sign of personal weakness and would cause them to be vulnerable as an employee. As a result, all managers received training on policy clarification and best practices to better assist in addressing these concerns.

The team also discovered that several claims resulted from previous on-the-job injuries had not been properly reported. The education program focused on prevention as well as early reporting. The new message was that the number of claims is not the primary

focus, but that an employee should immediately report an injury before it escalates to a major health risk. The policy and procedures for reporting incidents were reiterated and clarified as well. This helped field engineers and managers develop a better understanding of the expectations and guidelines for preventing and reporting work-related injuries.

The COP work resulted in several changes in the overall safety program for field engineers:

1) Prior to the meetings, every installation required that a site check document be completed. A section on safety was added, prompting the field engineer to identify in advance any safety concerns. This document is completed, given to the client and sent to the management team for review. Per the information provided, management requests assistance from another field engineer or a third-party organization that provides manual labor. This became standard operating procedure. In cases that require heavy or awkward lifting, the field engineer cannot perform these tasks alone. Based on the type of install, a two-person lift is predetermined.

2) Every class facilitated, no matter the topic, has a safety briefing or update as a part of the agenda.

3) All field engineers are expected to complete a customer service certification that includes a safety component.

4) Hand carts were issued to all field engineers for use in transporting boxes and equipment to the client's office.

5) As mentioned, the company worked with a third-party organization that provided manual labor assistance in areas with few field engineers. These workers help with lifting and other manual tasks, which streamlines the entire install process.

Conclusion

Much knowledge exists within any workgroup. Approaching such a group as a community of practice, then helping that community tap its knowledge is a way to build trust, creativity and strength. A dynamic organization takes full advantage of these informal communities and leverages their power to build a sustainable safety program. While this case study focused on field engineers, the same principles can be applied to all workgroups. The fact that this intervention involved field engineers helped justify use of a nontraditional approach to a problem that may otherwise be ignored because it is difficult to manage.

Gaining insight from employees who actually perform the work and must adapt to changes being implemented is a tremendous way to build a sustainable system. However, in today's high-speed world, this approach is rare.

When making changes, SH&E professionals and management must include the employees who will ultimately be affected, particularly if it is the employees' outcomes that are being measured. Second, applying these ideas to any organization with field staff is not only an effective way to "get your arms around" an elusive group of employees, it also provides a vehicle for improving safety and production, and opens new avenues of communication. When considering a COP approach, SH&E professionals should focus on some key points (Wenger, 1996).

- **View work or practice as learning.** See the learning opportunities within the work being performed and find a way to keep workers connected with each other.
- **Focus on the informal opportunities for learning.** This is where most of the learning occurs.
- **Keep learning as close to practice as possible.** Be hesitant with any process that tries to pull the knowledge out of the COP where it is kept alive, and make it into a curriculum, and to deliver it from outside of the practice.
- **Find the COPs in the workplace and treat them as an asset.** Recognize the boundaries between COPs as opportunities for learning. In this case study, the boundary between the field engineers and the distribution center provided an opportunity for learning.
- **Manage a COP like one would tend a garden, not fix a machine.** While addressing the knowledge that resides in the workplace may appear to be simple and easy, it is not. Addressing and nurturing COP knowledge requires perseverance and patience. It requires a shift in perspective from teaching and managing to guided learning and coaching.

A high level of trust must be established between management, SH&E professionals, masters and other employees. This requires overcoming any distrust that has developed over time. Issues regarding shiftwork, power, status, seniority and other cultural imbalances must be confronted. By addressing these issues, employees will gain leadership and communication skills, and grow more cohesive as a community. Ultimately, SH&E professionals can cultivate sustainable cultures within the workplace community of practice. ■

After the Merger

Since the writing of this article, Misys Healthcare Systems has gone through a merger and reorganization. The healthcare division discussed in this article is now Allscripts. It continues to focus on employee safety and well-being, and has continued to implement the strategies discussed in this article.

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