RELEASING THE ENERGY OF WORKERS TO CREATE A SAFER WORKPLACE: THE VALUE OF USING MENTORS TO ENHANCE SAFETY TRAINING

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ABSTRACT

The mentor/learner model is a time-honored approach to teaching, including within the mining industry. Miners know when they see excellence and have a deep respect for experts in their field. By using expert miners as mentors to other, less-experienced miners, training programs can be developed that will have a legitimacy and credibility that resonates with those being trained. Building upon concepts in current theories of adult education, this paper highlights the unique advantages of using mentoring as a teaching method that can make the educational experience both interesting and effective. Current NIOSH safety training materials use these concepts to deliver effective adult learning experiences for workers in the mining industry.

INTRODUCTION

"We are what we repeatedly do. Excellence then, is not an act, but a habit."—Aristotle

When discussing worker safety training, a logical starting point is to ask the question: What is the goal of the training? Is it merely to satisfy regulatory requirements? Or is the goal to facilitate true learning about working safely? Asking what is the goal of the training is not a trivial question, for it determines the underlying philosophy of the entire safety training program.

For a significant proportion of workers, most formal training has taken place in school in grades K-12. For many, memories of school and sitting in a classroom are memories of boredom and tedious exercises with little relevance to real life. The idea of sitting through a lecture with a test at the end does not stir pleasant emotions. Most of the models we have for teaching are based on teaching school children. When we consider the experiences most blue-collar workers had in school, it is no surprise that their reaction to these traditional learning settings tends toward ambivalence, reluctance, or even hostility. Yet, this is still the most common approach used for training adults in a work setting.

There are, however, alternatives that can make training sessions more than a tedious chore that must be endured to meet regulatory requirements. By using concepts from current adult learning theory, and as a particular example focusing on the dynamics of a mentoring approach to training, the goal of safety training can be moved from just trying to meet regulatory requirements to a goal of facilitating true learning that has a lasting impact on helping workers to stay safe. Referred to in many ways (master/apprentice, teacher/protégé, trainer/trainee, old hand/new recruit), the mentor/learner concept provides an effective approach to safety training.

ADULT LEARNING THEORY

"Learn the fundamentals of the game and stick to them. Band-Aid remedies never last."— Jack Nicklaus

When discussing training in the workplace, we are talking about adult learners. Andragogy, the "art and science of helping adults learn" (Knowles, 1980, p. 43), has a different emphasis than pedagogy, the art and science of helping children learn (Knowles, 1980; Merriam, 1993). According to Knowles, pedagogy-andragogy represent a continuum ranging from teacher-directed to student-directed, with both approaches appropriate for children and adults depending on the circumstances (Merriam, 1993, p. 8). The important distinction is the preference of adults in most circumstances to be more self-directed in their learning.

Another component of adult learning that distinguishes it from pre-adult learning is addressed by Mezirow's theory of perspective transformation (Mezirow, 1990). Perspective transformation involves reformulating our assumptions to have a more inclusive, discriminating, permeable, and integrative perspective and to understand why we attach the meanings we

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do to reality (Merriam, 1993). According to Mezirow, the hallmark of adult learning is becoming aware of how our presuppositions constrain how we see things and then reformulating these assumptions for a better understanding of the world. When safe working practices and a philosophy of working safely become a part of workers' basic assumptions about how to do their jobs, safety training becomes relevant to their lives and not just another required chore to endure. Adults are more likely to achieve this transformation if they can see it modeled in peers that they admire or trust.

"Learning is not compulsory. . .neither is survival."—W. Edwards Deming, American statistician and quality-control expert

The challenge for safety trainers is that an adult can be required to attend safety training, but they cannot be compelled to learn while they are there. Perhaps more importantly, they cannot be compelled to internalize and accept what is taught as part of their own belief system or way of working.

"Bodily exercise, when compulsory, does no harm to the body; but knowledge which is acquired under compulsion obtains no hold on the mind."—Plato

EVALUATING LEARNING

According to Caldwell (1999), the following questions should be asked when evaluating training for adult learners. Is it—

- Meaningful?
- Socially responsible?
- Multicultural?
- Reflective? That is, is some critical analysis used in development?
- Holistic?
- Global?
- Open-ended?
- Goal based?

Traditionally, students were raised to do "seat work" when they were in the classroom, with most, if not all, of the class time spent with a teacher in front of the room lecturing to the students. The current generation of students has been taught using a variety of techniques, with a significant focus on accomplishing tasks and working cooperatively in teams.

TRAINING METHODS

Common contemporary training methods include a combination of tools and delivery techniques.

- Lectures
- Videos
- Computer (CD, DVD, Internet)
- Simulation
- Hands-on
- Mentors
- Task training

According to Knowles (1980), the essence of teaching adults lies not in the approach as much as in the relationship that exists between learner and teacher. To emphasize this point, Knowles often refers to the teacher as a facilitator, focusing on the concept that adults prefer a learning environment in which they can participate.

THE ADULT LEARNER

"Researchers…have verified that a significant number of adults learn a great deal outside the control and confines of formal educational institutions."—Caffarella, 1993, p. 27

Workers learn most of what they need to know on the job (Wiehagen et al., 1994). Relationships with fellow workers will affect not only their attitude toward work, but also their attitude toward safety and training.

Adults seek autonomy characterized by three major elements:

- Independence,
- Ability to make choices, and
- Capacity to articulate the norms and limits of their society (Chene, quoted in Caffarella, 1983, p. 29).

Adults need information and involvement before learning and tend to ask three questions—How? What? Why?

Current adult learning theory addresses the following characteristics of adult learners (Knowles et al., 1998).

- A need to know why
- Self-directed
- Prior experience
- Readiness to learn
- Motivation
- Orientation to learning and problem solving

Self-Directed Learning. Providing a certain degree of self-direction in the training process is more likely to allow a trainee to follow his or her individual learning style. Most people learn best when a variety of learning methods is offered, but each person typically has a learning-style preference. Some learn best visually, others by hearing/audio, and still others with hands-on (tactile) training. A self-directed learning environment provides the opportunity to bring the previous experience of each worker to bear on the subject matter. Previous learning socialization and social orientation of the group can add to the efficiency of training and keep the locus of control with workers. "Adults have a deep psychological need to be generally self-directing" (Knowles, 1980, p. 43).

Prior Experience of the Learner. Prior experience shapes our reality. Taking advantage of the wide range of individual differences among workers being trained adds a rich resource for learning. One advantage of using a worker's prior knowledge during training is the opportunity it provides for the workers to feel a sense of ownership in the training and enhance

their own sense of worth by making a positive contribution to the experience. A possible disadvantage of using prior experience is that unwanted biases may be presented that inhibit or shape new learning.

Readiness To Learn. Adults are most ready to learn things that will help them cope with existing situations. Particularly relevant are tasks associated with moving from one developmental stage to another. An effective technique to induce readiness is through exposure to role models who excel in the skill or knowledge to be taught (Knowles et al., p. 67).

Motivation To Learn. Wlodowski (1985) suggests that adult motivation to learn includes four desires: (1) success—to be a successful learner; (2) volition—to feel a sense of choice in learning; (3) value—to learn something of value; and (4) enjoyment—to experience learning as pleasant. Adults are motivated to engage in learning experiences they see as practical and relevant to their lives, which either help them solve problems in their lives or that have internal payoffs.

Orientation to Learning: Problem Solving.

"*Adults are motivated to learn to the extent that they perceive that learning will help them perform tasks or deal with problems that they confront in their life situations. Furthermore, they learn new knowledge, understandings, skills, values, and attitudes most effectively when they are presented in the context of application to real-life situations."—Knowles et al., 1998, p. 67*

SOCIAL LEARNING THEORY

Social learning theory has been around for over 60 years, incorporating the learning principles of reinforcement, punishment, extinction, and imitation of models. There are currently several versions of social learning theory, but three basic ideas are common to all versions. (1) Response consequences (rewards, punishments) influence the likelihood that a particular behavior will be performed again in a given situation, (2) vicarious learning—learning by observing others—will take place in addition to learning by doing, and (3) learners are most likely to model behavior they observe in those with whom they identify (Stone, 1998).

Two of these three ideas are relevant to the mentoring that takes place in mining. The first suggests that vicarious learning, or learning by watching others, is common, particularly when people participate directly in the observed act. The second says that people are more likely to pay attention to those with whom they identify or those to whom they are emotionally attached. In the mining industry, it is quite common to see new hires working with older, more successful miners. These older miners become role models and are effective teachers because their "students" identify with them and are willing to watch what they do and model it. This type of training is much more successful than trying to teach a new miner in a classroom.

MENTORS OR COACHES

Coaching: "[T]he process of equipping people with the tools, knowledge, and opportunities they need to develop themselves and become successful."—Hughes et al.

The mining industry has historically depended heavily on the mentor/learner (master/apprentice) relationship to train new miners. Young or new hires are paired with older experienced hands (mentors) who teach them many things, including the art of staying alive. Billett (1994) suggests that this relationship is key to learning in skilled vocational jobs and that it is not only the activities that are important, but guidance and exposure to the work culture that makes up the learning experience. In his opinion, mentors (master miners) provide three essential attributes.

- Knowledge about what is important.
- Knowledge about how to do things right.
- Knowledge about the culture, including the values and attitudes that the learner must have to be successful in the current environment.

The questions one must ask are "Why do learners pay attention?" "What motivates them to listen to another miner?" Pegg (1999) would respond that mentors have credibility that has been gained in a variety of ways. It may have come through success as a miner, perceived "street-smarts," acknowledged expertise in a given area, personal presence or magnetism, or merely from age or experience. In any case, the learner sees a coach who has "been there-done that" and who could help them learn the ropes. This is a critical element in the relationship. For a successful learning experience, the learner must be willing to learn from the mentor.

THE ART OF MENTORING

So what happens in a mentoring relationship? Pegg (1999) argues that truly great mentors are those who help people find their own way to achieve success. Mentors teach the knowledge and skills the learner will need by helping them through the cycle of—

- Challenges faced,
- Choices available,
- Consequences of available options,
- Creative solutions, and
- Results.

The art of allowing the learner to fail in a safe environment is crucial to the learning process. The trainee must eventually be able to perform without the support of the mentor to become an effective or safe worker. A successful mentor will fade out after

making sure that the learner has the skills needed to perform. This process is included in the model suggested by Billett (1994) in his apprenticeship method of instruction. It involves four phases.

- *Modeling*, where the expert performs the task and discusses why it is done "this way."
- *Coaching,* where the mentor watches and monitors the learner, providing tips and feedback on how to improve. Coaching may also include performing the task again to reinforce modeling it.
- *Scaffolding*, in which the learner performs the task while the mentor is at a distance and not directly involved. The mentor may, however, have to do part of the task that the learner is not yet ready to perform. This phase primarily involves support.
- *Fading*, which is the gradual removal of support until the learner can operate without assistance or guidance.

Mentoring in the mining environment is often an informal relationship. A young miner (the learner) looks around and identifies a more experienced miner who appears to be successful and approaches him to see if he is interested in teaching a new hand (become his mentor). This format is very common in Western noncoal mines. In many cases, the mentor initiates the relationship, recognizing the opportunity (or even the obligation) to give back to the younger generation, to "take someone under their wing" to ensure they learn to do things the right way. The mentor will coach the learner until he feels either that the trainee is wasting his (the mentor's) time or he has taught him enough to make him a valuable hand. If the learner does not believe the mentor is credible, however, very little learning will take place. In this training environment, the actual teaching is an on-going, constant interaction, rather than an isolated incident restricted to a training room.

One of the most important concepts in a mentor/learner learning environment is identified by Billett (1994). "Developing learners' conceptual understanding of why things are done a certain way, and what will happen if they were not, is a key role for the expert." In other words, why should they care if things are done this way? Expert mentors must not only teach how to do things, they must clearly teach why and what will happen if things are not done in the proper manner. Becoming a master miner cannot be accomplished by classroom training alone. The skills to become a truly good miner are learned over many years and are the result of acquiring wisdom as much as skill and knowledge. Being a master becomes a part of who they are. Robert Pirsig, in his book *Zen and the Art of Motorcycle Maintenance* (1974, p. 148), describes it this way:

> Sometime look at a novice workman or a bad workman and compare his expression with that of a craftsman whose work you know is excellent and you'll see the difference. The craftsman isn't ever following a single line of instruction. He's making decisions as he goes along. For that reason he'll be absorbed and attentive to what he's doing even though he doesn't deliberately contrive this. His motions and the machine are in a kind of harmony. He isn't following any set of written instructions...it is art.

An apprentice does not learn this easily. It is a lesson that is taught by the master in a mentoring relationship, in a learning environment honed by experience and reinforced by the culture. When the teaching relationship is successful, the learner is on the way to becoming a mentor for the next learner.

REFERENCES

Billett, S. 1994. Situating learning in the workplace: Having another look at apprenticeships. *Industrial and Commercial Training*, vol. 26, no. 11, pp. 9-16.

Caffarella, R.S. 1993. Self-directed learning. In *An Update on Adult Learning Theory,* S.B. Merriam, ed. San Francisco: Jossey-Bass. Pp. 25-35.

Caldwell, K.M. 1999. Curriculum development: Adult learners. Paper submitted for Doctoral Studies in Leadership class, Gonzaga University, Spokane, WA.

Knowles, M.S. 1980. *The Modern Practice of Adult Education: From Pedagogy to Andragogy,* 2nd ed. New York: Cambridge.

Knowles, M.S., E.F. Holton, III, and R.A. Swanson. 1998. *The Adult Learner*, 5th ed. Woburn, MA: Butterworth-Heinemann.

Merriam, S.B. 1993. Adult learning: Where have we come from? Where are we headed? In *An Update on Adult Learning Theory,* S.B. Merriam, ed. San Francisco: Jossey-Bass. Pp. 5-14.

Mezirow, J. 1990. *Fostering Critical Reflection in Adulthood: A Guide to Transformative and Emancipatory Learning.* San Francisco: Jossey-Bass.

Pegg, M. 1999. The art of mentoring. *Industrial and Commercial Training*, vol. 31, no. 4, pp. 136-141.

Pirsig, R.M. 1974. *Zen and the Art of Motorcycle Maintenance.* New York: Bantam Books.

Pratt, D.D. 1993. Andragogy after twenty-five years. In *An Update on Adult Learning Theory,* S.B. Merriam, ed. San Francisco: Jossey-Bass. Pp. 25-35.

Stone, D. 1998. Social cognitive theory. http://www.med.usf.edu/%7Ekmbrown/Social_Cognitive_Theory_Overview.htm . Univ. of South Florida, Dept. Community and Family Health. Retrieved May 28, 2002.

Wiehagen, W.J., G.T. Lineberry, W.E. Lacefield, M.J. Brnich, and L.L. Rethi. 1994. The work crew performance model: A method for evaluating training and performance in the mining industry. U.S. Bureau of Mines Information Circular 9394.

Wlodowski, R.J. 1985. *Enhancing Adult Motivation To Learn.* San Francisco: Jossey-Bass.

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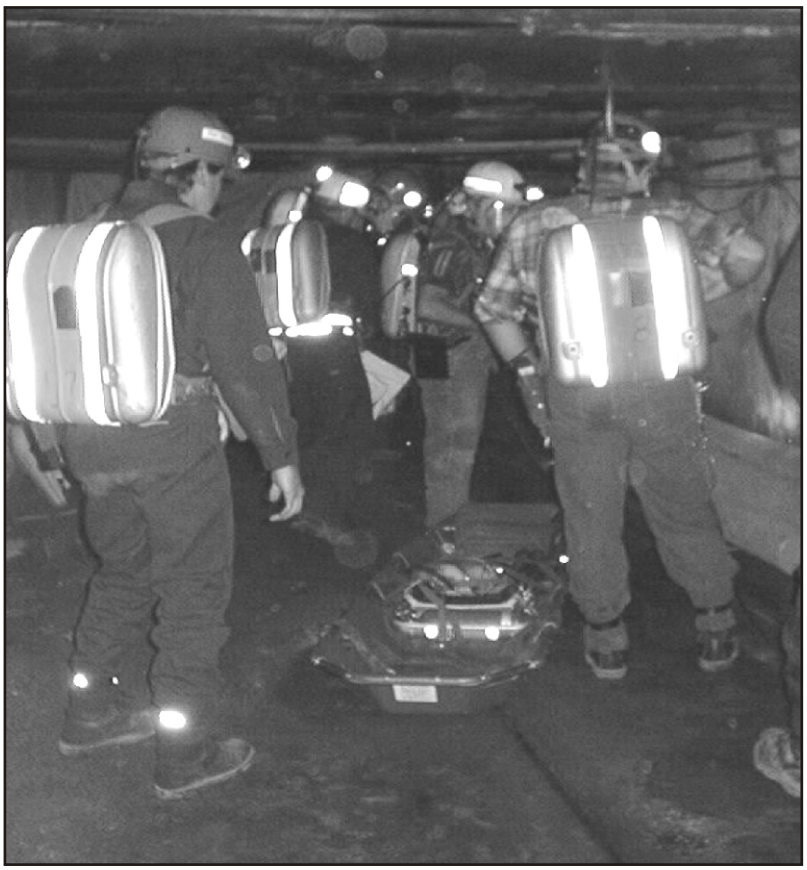

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