Effective Use of E-Learning in Manufacturing

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Rapid changes in technology will greatly impact training strategies for manufacturing workers. Employers must identify a solid business reason for choosing technology-based training alone or in combination with classroom training, which focuses on rich-skills development, collaborative exercises, and peer interaction building upon the information received online.

WHY USE E-LEARNING IN MANUFACTURING?

Rapid changes in technology are affecting every aspect of a person's life, with the most dramatic changes taking place in the workplace. To train employees to work with new technology in automated manufacturing facilities, employers must effectively use the same technology in their training programs. The use of new technology, such as computers and the Internet, to provide instruction began the "e-learning" revolution. Previously, employer-provided training programs used leader-led group or classroom instruction, one-on-one instruction (commonly referred to as on-the-job-training), and individual self-study instruction to train manufacturing workers. Employers realize that new technology will have a great impact on their training strategies and want to use the new technology to create an optimal training program for their manufacturing workers.

Recent training and development journals and magazines reveal strong reviews about positive and negative experiences using e-learning. Some employers have replaced more costly training delivery methods, such as classroom courses or seminars, with online courses that can be completed at an employee's desk. Other employers have incorporated e-learning into their
current training strategy in addition to traditional delivery methods. The intent is to develop a training program which benefits from instructor-led, one-on-one, self-study, and electronic training programs.

**Advantages of E-Learning**

Technology is changing so rapidly that employers do not have time to design and schedule formal training sessions for their employees. Using computers and the Internet to deliver instruction allows employers to provide instruction to employees as it is needed and in brief increments to make them value-adding members of the team sooner. At the same time, the use of e-learning decreases course development time and expenses, travel expenses, and time away from the work area. (12)

Employees need to be in charge of their own learning because they know what is required to do their job. As employees seek out instruction on their own, they make learning and work synonymous. Web-based training allows employees to seek instruction on an individual basis, eliminating the need to wait for an instructor-led group session to be conducted. (6)

A company's intranet can be used to provide a comprehensive new employee orientation program. It provides a consistent and easily accessed and maintained vehicle to introduce new employees to the workplace and to allow all employees to answer their human resources-related questions. (9)

E-learning techniques (online and distance-learning programs) can be used to improve productivity. The advantages of e-learning over traditional classroom training programs include lower costs, rapid dissemination and revision of instructional materials, mechanisms for feedback, and opportunities for active learning through computer simulations. E-learning can upgrade skills while reducing the time, travel, and delivery expenses of training. (12)
Success Stories Using E-Learning

Automobile manufacturer, Ford Motor Company and software manufacturer, Adobe Systems have already initiated employee training via the Internet. Ford replaced its 12-course, instructor-led dealership certification program with an online version of the program. Adobe teaches its 750-person sales force about new technologies and products via the Internet. On the other hand, regional brokerage firm, J.C. Bradford uses online training to supplement classroom training rather than replacing it because they feel some people learn better in a classroom setting where they can interact with peers. (2)

Alex Pass, project manager for Motorola's education-assistance program, was mandated to provide 35 percent of the company's education and training via "alternative means", concentrating on the use of the Internet. Motorola had traditionally relied on classroom training, but chose to seek new ways to provide workplace education in response to clients' and employees' thirst for new technology. The Internet allowed Motorola to deliver specific content to workers who could apply it immediately. (2)

KPMG, an international accounting consultancy, realized that the rapidly-changing workplace simply does not allow workers the time it takes to receive training in the classroom. Workers must be trained quickly and become a value-added resource almost immediately to meet the challenges of the workplace. Still, KPMG understands that some instruction should be conducted face-to-face and continues to conduct new employee orientation programs with live instructors because of the importance of networking, meeting people, and learning the office culture for new employees. (2)

Honeywell International, Inc. has a web site called MyPlant.com that offers training software for manufacturing plants that simulates plant operations. This training allows
employees to experience a variety of scenarios to teach them how to respond to plant problems
before actually working on the plant floor. (7) Similarly, Drake Beam Morin incorporated
sophisticated simulation into 70 percent of each subject to immerse students in interactive, real-
life work situations. (12)

To reinforce learning, most web-based training environments incorporate interactive
exercises, drill and practice, questions and answers, hypertext, and hypermedia to actively
engage learners in the course content. However, just-in-time training can benefit from a linear
organization and minimal interaction by providing the exact content the learner needs, delivered
at the time it is needed. Ease of navigation becomes more important than interactivity. In the
case of a maintenance technician who needs to access a precise procedure before performing an
operation, the technician may select the procedure from a web-based menu, which initiates the
display of instructional information supported by a demonstration of the operation in the form of
a video-clip. Quizzes and exercises are not necessary because the knowledge will be put to use
as soon as the training session ends. (8)

Astronauts were trained for operations on the international space station using web
technology to show them precisely what to do at a moment's notice in a linear fashion.
Supplemental information in pop-up text, audio, or video had to be easily accessible from the
primary lesson page to avoid the possibility of wandering so far from the primary lesson page
using hyperlinks that the learner cannot find their way back. A lesson map was created to be
readily available so that astronauts could select any topic or operation without having to view
unnecessary information or backtrack through previously viewed information, except by choice.
Having a linear organization structure and minimal interactivity does not diminish the
effectiveness of just-in-time training as long as it is accurate and presented clearly. Learners are
empowered to assume control of the training outcome by choosing what content is needed and when it is delivered. (8)

**Disadvantages of E-Learning**

Many employers have invested heavily in computer- and web-based training courses only to find that large numbers of employees are not completing the courses. Some of the reasons suspected for the high drop-out rate include learners being put off by poor incentives to learn, lack of accountability for completing courses, problems with technology, and the inability of poorly-designed courseware to hold learners' attention. The role of incentives is being explored to increase participation, because without a compelling incentive to complete a self-paced training course, time-strapped employees have a hard time staying committed. It is a good idea to keep "nice-to-have" training off-line because it is unrealistic to expect employees to complete "nice-to-have" job-related training on their own time. (14)

The environment where students are expected to complete the online training may also cause students to lose interest. A dedicated web-based learning lab would allow students to concentrate on learning in a more comfortable environment rather than trying to train at the same desk and computer where the work is piling up and the phone is ringing. (14)
Stories of Failure Using E-Learning

Sarah Boehle, associate editor of Training magazine, wrote an article describing her experiences in locating and completing an online training course via the Internet. While trying to locate a suitable course, she found that course descriptions lacked sufficient information for the student to make effective decisions, such as accurate descriptions of the course's structure and objectives, length, cost, and time commitment of the student. After selecting and beginning an online course, Boehle experienced difficulties in navigating the course web site and encountering technical difficulties, such as software bugs and broken hyper links. When Boehle expressed her dissatisfaction to the instructor of the online course, she received a response explaining that online learning was never meant to be equivalent to the classroom. It was explained by the instructor that online learning via the Internet is one of the most powerful distance-education tools available to provide educational opportunities when the classroom is not an option. (1)

The Future of E-learning

Analysts predict the online employee training market, which has doubled since 1998, will continue to increase. Online training is predicted to steal away the business training market using teachers and classrooms, even though only an estimated 11 percent of corporate training is currently conducted through online means. Still, analysts do not believe online training will ever fully replace instruction by live teachers in classrooms. (13)

The rapidly expanding market for online employee-training courses caused Ernst & Young to spin-off its online corporate training operations to create a new company, Intellinex L.L.C., as part of its strategy to become a dominate player in the online corporate training industry, of which there are believed to be currently approximately 5,000 players. (13)
Introducing E-Learning to an Organization

According to John Cone, vice president of Dell Learning at Dell Computer Corporation, the first rule of thumb for successfully introducing e-learning into an organization is to fully engage the learner. The learner must embrace the change to technology-enabled learning in order for the program to succeed. This may be accomplished by making e-learning as similar to the traditional learning program as possible. This includes recreating some of the benefits of classroom learning, such as getting away from the familiar workspace, meeting and interacting with new people, taking frequent breaks, influencing the learning event, and acknowledging successful completion of the training. (3)

All learning is self-directed because each individual decides what he or she is going to learn whether from reading a book, attending a seminar, or completing a college course. The pace of business puts pressure on workers to get things done immediately requiring workers to be learning everyday as part of the job. Training and performance professionals can become blinded by the glitz of technology and forget the basic principles of instructional design. Rather than rushing to provide technology-based training programs because they will be cheaper, easier to distribute, or won't require employees to take time off the job, employers must identify a learning need and decide whether to meet the need with technology-based or instructor-led training programs. (11)

Focusing on learning preferences may be the answer to deploying new technology-enhanced learning successfully. Learners may embrace training if they are offered choices and allowed to decide how and what they learn. Multimedia has the unique power of giving designers and learners choices and in an ideal training world, offering a wide range of options to learners. Online learning is still new and frustrates learners with long download waits, choppy
video, confusing navigation, and endless text screens. In response, IBM found a hybrid model of the best of online training combined with the best of classroom training worked best. (5)

The most difficult thing about incorporating e-learning into a company's training strategy is simply getting started. There should be a solid business reason for preferring e-learning rather than simply hopping aboard the e-learning train. A few of the reasons for embracing e-learning include availability (e-learning can be available 24 hours a day, 365 days a year), affinity (some people want to experiment with new technology as soon as it is available), relevance (information and knowledge can be provided to people just-in-time based on their job function), efficiency (some tasks are completed more efficiently when aided by technology), involvement (learners must be involved to retain the information), and reduced cost (technology-enabled transactions are cheaper than people-enabled transactions and have less travel expenses and time away from job). (4)

CONCLUSION

Online training should supplement rather than replace classroom training. Many people learn best in a classroom setting and enjoy the interaction of other students. Because of this reason, classroom training will never completely disappear. However, remote students who cannot travel to attend the training may receive training on the same topics through online classes. The classroom training sessions may be used to promote the use of online training materials. (10)

The advantages of innovation must be viewed in terms of potential positive outcomes, such as profitability, speed, social prestige, or effectiveness. The biggest advantage of online learning may be just-in-time access to information and being able to focus on a need for a particular skill instead of attending an entire class covering a broad set of skills. Another
advantage of classroom learning may be incidental learning that happens through the interaction of the participants. Combining online training with classroom training combines the best of both worlds where the web may present valuable information in online training modules and instructors in the classroom may focus on rich-skills development, collaborative exercises, and peer interaction building upon the information received via the web. (5)
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