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Safeguards In Security

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Web-Based Training Applications
In
Safeguards & Security

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ABSTRACT

The U.S. Department of Energy (DOE) requires all employees who hold a security clearance and have access to classified information and/or special nuclear material to be trained in the area of Safeguards & Security. Since the advent of the World Wide Web, personnel who are responsible for training have capitalized on this communication medium to develop and deliver Web-based training. Unlike traditional computer based training where the student was required to find a workstation where the training program resided, one of Web-based training strongest advantage is that the training can be delivered right to the workers desk top computer.

This paper will address reasons for the driving forces behind the utilization of Web-based training at the Laboratory with a brief explanation of the different types of training conducted. Also discussed briefly is the different types of distance learning used in conjunction with Web-based training. The implementation strategy will be addressed and how the Laboratory utilized a Web-Based Standards Committee to develop standards for Web-based training applications. Web-based problems resulting from little or no communication between training personnel across the Laboratory will be touched on and how this was solved. Also discussed is the development of a “Virtual Training Center” where personnel can shop on-line for their training needs.

Web-based training programs within the Safeguards & Security arena will be briefly discussed. Specifically, Web-based training in the area of Materials Control & Accountability will be explored. A Web-based example of what a student would experience during a training session is also discussed. A short closing statement of what the future of Web-based Training holds in the future is offered.

INTRODUCTION

The final objective of any training program manager is to assure that the organization’s employees obtain the knowledge, skills and abilities required to support the organization’s mission. Several methodologies and tools have been used throughout history in the quest to transfer knowledge or skills from the subject-matter expert to the end user – the student. The last revolutionary training tool to be developed in decades past was the use of motion picture and later video technologies. Students could actually experience sight and sound in the comfort and safety of their chairs in the classroom.
Recently the latest technology that has revolutionized not only the training environment, but the way we communicate with the world is the World Wide Web.

The Web has opened up learning opportunities never dreamed about only a decade earlier. Information is at the fingertips of just about anyone who wishes to learn. Personnel who develop training quickly saw the Web as a tool to solve training issues within the research and development scientific community. Within the last few years, Department of Energy compliance training requirements have significantly increased within the areas of environment, safety and health. The same pressure has been placed on the security and safeguards community. Consequently, the researcher has seen a considerable erosion of his/her time to actually do research. Training personnel have been challenged to solve the problem of providing "just-in-time" training where students complete their training at their workstation. If allowed, workers may test-out and demonstrate competency. The Web is the perfect solution as a delivery medium for the computer literate or even the semi-literate computer user. Web-based training allows the student to focus on specific training (e.g., learn a procedures) and concurrently have the ability to reach out into Siberia-space and read or watch external related media from other organizations by a simple click of a button.

Although Los Alamos National Laboratory is currently placing emphasis in Web delivery of training as a primary medium, we continue to pursue other avenues of distance learning technologies in conjunction with Web-based training which include:

- Correspondence courses
- Computer-Based Training (CBT)
- Video
- Interactive Video Broadcasts

Of course, traditional live classroom training has its place within the training paradigm and will never be replaced regardless of technological advances. The live human interaction is not only necessary, but critical in certain training applications - especially in introductory level courses or in on-the-job training settings. Good live presentation and podium skills will forever be required regardless of technological advances.

Web-delivered applications does fill a need within the realm of training, but one is cautioned that there are several factors that must explored prior to embarking with this technology. This paper will explore several of the issues that should not be over-looked. Again, we as training professionals must always keep our key objective in perspective, "providing a solid delivery mechanism to insure the knowledge, skills and abilities are transferred between knowledge holder and the knowledge seekers". A training delivery system should never become an obstacle. Sometimes, the best tool in training is a high-tech Web-based delivery system - sometimes not. It's up to training professionals and managers to weigh the options and choose appropriately.

LOS ALAMOS TRAINING PROGRAMS
The Laboratory provides a plethora of training opportunities to meet either compliance mandates, operational needs or career development. Training is offered in the following areas:

- Safeguards & Security
- Environmental, Health & Safety (ES&H)
- Computational
- Technical
- Business
- Human Resources

The majority of Web-based training programs are concentrated within the Safeguards & Security Training Program and to some extent within the ES&H arena. The reason for this has been the overwhelming requests from the worker population to complete their initial and annual requalification training on-line at their work station for the reason stated earlier. Within the Safeguards & Security arena, it is our goal to offer the majority of our training via the distance learning approach with emphasis on Web-based technologies. Again, there exists several courses that will never be conducted anywhere but the classroom or as on-the-job training because the human element is essential.

WEB-BASED TRAINING IMPLEMENTATION & STUDENT DEMOGRAPHICS

Web-based training efforts at the Laboratory has it’s roots with traditional computer-based training. Computer-based training significantly differs from Web-based training in one very important factor – it’s primarily a stand-alone system and “typically” does not connect with other external resources. Web-based technology is capable of literally reaching out to the library of the world and capitalizing on the wealth of information residing on the World Wide Web. One of the basic problems with computer-based training (CBT) was students had to locate a computer where the program resided. Some training centers existed and successfully utilized CBT technology specifically where they had a captured audiences (e.g., Plutonium Facility Training Center). Unfortunately, the main draw-back was still a matter of convenience. Students were still required to physically go to where the training was offered rather than having the training come to them at their office or workstation.

Training management was pressured to come up with training paradigms that made better use of employee training time. Because the Laboratory is spread out over 43 square kilometers, employees could possibly be located several kilometers from where training sessions were held. Web-base application enable training to be delivered anywhere, anytime to anyone who had access to the Web. Web-based applications begin using the HTML programming language, connected with some testing applications. Once the student completed the on-line training and/or testing, an electronic email was sent to the
training sponsor informing them of a student completion. Servers were located throughout the laboratory holding various training applications, primarily with the sponsor of the training program.

Training programs and information were surfacing from several organizations in an unorganized, unstructured and sometime confusing manner. Several of the newly created programs, were developed without thought to screen size, color or navigation standards. Some programs were developed could be used only with specific browser applications. If the student viewed a program with the wrong browser (Net-Scape vs. Explore), formats were compromised, tables and lines did not show up where they were supposed to, etc. Basically, Web-based training in the early days was a “free-for-all”.

Laboratory training management took action in two ways. The first was to charter a “Web-Based Training Committee” that addressed the issues of standardization of web-based training. The committee settled on one Web-based authoring program that would be purchased and used by all training entities at the Laboratory. The software purchased was ToolBook - II version 6.1 with 2 levels of programming advanced and beginners. In addition, the committee felt in order to assure standardized Web-based training became a reality and solved the Laboratory the “free-for-all” syndrome, standardized templates were developed so that all training at the Laboratory has the same look and feel. This will enable Laboratory workers to take Web-based training in any area without having to be subjected to different formats, navigation schemes or other amusing programming quarks a training designer might wish to impose on the learner.

Training is a decentralized activity at the Laboratory. There is no centralized training organization at the Laboratory with the exception of a coordination/policy organization. Training programs are administered and managed from the cognizant and responsible department. The second initiative Laboratory training management took was to develop a “Virtual Training Center” on the Web for the entire Laboratory. The purpose of this online Virtual Training Center provides a central location where employees can go on-line to access Web-based training, live training schedules, training points of contacts, and other widely used training resources such as the Nonproliferation & National Security Institute (NNSI). The Virtual Training Center gives the look and feel of centralized training in a de-centralized environment. It provides a “training shopping center” for the workforce where they can find solve their training needs.

The success of Web-based training is directly correlated with the user population. The more computer literate the population, the more likely Web-based training will be successful. The Laboratory enjoys a high computer literacy rate. The majority of the population has access to computers and a Web connection. One might characterize the population as ripe for Web-based technology. In several areas, personnel are renowned in their areas of expertise and training in some subjects can be waived by testing out via our on-line testing system. An audience analysis is critical before Web-based application are implemented. One must assure the technology, the target population and the computer hardware of the end user is compatible. Many computer related training projects have
not succeeded because the technology and user populations were not commensurate with each other.

Currently the Laboratory is investigating the use of digitized video delivery to any computer workstation for the purpose of training. The technology has already been proven, but the logistics and audience analysis has not been complete. The Laboratory is confident, it’s just a matter of time when training with digitized video will become a viable option for everyone. When coupled with Web-based training, this will be a powerful medium that will revolutionize training as regular video did decades ago.

WEB-BASED TRAINING PROGRAMS IN SAFEGUARDS

Several Web-based training courses have been developed and implemented in the area of Safeguards & Security. Primarily this training is compliance oriented and required by the Department of Energy for those holding security clearances and have access to classified information or special nuclear materials. Training is provided in the following areas:

- Materials Control And Accountability,
- Information Security,
- Computer Security,
- Personnel Security,

Specifically in the area of Materials Control & Accountability (MC&A), the Laboratory has identified 4 categories of personnel that are required to complete MC&A training. They include:

- General Employee Training (awareness level training),
- Nuclear Material Handlers,
- Nuclear Material Custodians,
- Safeguards Specialists

Each category of worker requires a different level of training. The depth and scope of the training is directly proportional to the level of risk associated with the job assignment. Web-based training is used extensively in awareness level training and refresher/requalification training. Initial or orientation training is performed via the traditional stand-up classroom environment. The reason for this decision is primarily logistical in nature. Several thousand employees require annual refresher training and Web-based training provides the most cost effective delivery paradigm with which to reach the masses. Web-delivered training is also the preferred training delivery system as indicated via student training evaluation feedback received and needs analysis.

Topical areas within MC&A where Web-based training is offered to employees include:

- Nuclear Material Handler Awareness
• Nuclear Material Custodian Annual Refresher
• Tamper Indicating Devices (TID) Requalification

Several newly design MC&A training courses will be forthcoming via the Web-based training medium within the coming year.

A typical Web-based training experience can be characterized in the following manner:

1. As an employee is assigned to one of various safeguards or security position, they are instructed to access and complete the on-line training via the “Virtual Training Center” from their computer workstation.

2. Once in the Virtual Training Center, the employee selects the appropriate training and begins the training session. The training may or may not have a test associated with the course. At minimum, all courses have a quiz or some sort of self-assessment questions that must be answered correctly in order for the student to successfully pass the course and obtain training credit. Formal validated testing is also possible when required. The validated testing system is used when a program administrator wants to be assured the student is indeed the person who should be taking the test.

3. Upon successful completion of the course, an electronic mail message is sent to the program administrator who updates the employee’s official training record. The system then provides the student verification that the training is complete with a training receipt.

4. Annually or biennially, workers will be required to complete refresher training. They and their supervisors are reminded with an electronic mail message. This training covers new issues, regulations, polices, changes, etc.

The attached exhibits provide a visual reference of what a student would see from their workstation beginning with the Laboratory’s Home Page and moving on to the Virtual Training Center to the Safeguards & Security page to the Materials Control & Accountability course menu. Lastly two pages from the actually training are provided.

THE FUTURE OF WEB-BASED TRAINING

Computer technology advances are so rapid, it’s almost impossible to predict where Web-based training will be in the next decade or even in the next few years. What is new today, is obsolete next week. Web-based training looks very bright. As more software companies compete to develop newer and faster applications, the training specialist will have a plethora of options. The only limitation will be with the designers creative ability and hardware limitation at the student user level. Today even a the Los Alamos National Laboratory which is considered to be on the cutting edge of technology can not fully implement some of the latest Web-based technologies due to several reasons which are
beyond the scope of this paper. In short, these reasons include some technical, political and organizations obstacles. It would be safe to assume that most highly technical organization can not fully reap the benefits of current Web-based training technology. As such, the technological advances with Web-based training will surely always out-pace the ability to implement them. Much fertile ground is yet to be plowed in this area.