Deliver the lesson now: Just-in-time training

By Argie Leach, MHS, MT(ASCP)SH; and Daniel E. Haun, MT(ASCP)SH

In April 1979, Medical Laboratory Observer published a paper by Dr. Charles H. Altschuler, describing Accessible Information for Diagnosis and Evaluation (AIDE), a microfiche-based system that provided “on-the-spot” education to physicians. AIDE was also used for giving competency examinations and for disseminating teaching materials to other professionals. With AIDE, educational materials were formatted to microfiche and then placed at reading stations within the hospital for ready reference at the time of need.

Dr. Altschuler noted the effectiveness and economy of the microfiche system. He also cited numerous studies on the problems of classroom-based instruction and the frequency of thinking and remembering errors measured in medical practice. He concluded that — for the health practitioner — the most effective education was problem-oriented and that lectures were relatively ineffective for continuing education.

Now, 24-years later, when more mandatory training, policies and posters exist than ever before, healthcare workers still fail to adequately communicate and/or grasp ongoing learning. Last spring, after publishing a new post-bloodyborne pathogen exposure protocol, our team documented nearly a dozen failures, in spite of a significant in-service education effort, complete with posters and brochures. The failures were easy to understand, given the complexity of the protocol (Table 1).

Why do in-services fail?

Studies show that adults will not learn unless they are highly motivated — and they are not motivated if they think they will not need the information. Even an average, motivated adult learner retains only 20% to 25% of the material presented in a typical training day. Traditionally, we have used instructor-based learning sessions, which are very expensive (figuring in the cost of facilitators’ and employees’ time). Training costs are escalating, and the estimated cost of annual training in private industry is a whopping $210 billion.

If studies prove that adults only retain one quarter of what is taught, and if training is so expensive, why do we still rely heavily on this method of training? By training in the classroom (or by using videos or film), we manage to meet accreditation standards, but what about meeting our training objectives? Our team was looking for a better way and found that the literature supported the idea of computer-based training, taking the 1979 microfiche idea to the next level.

Just-in-time (JIT) vs. just-in-case training

By targeting training to motivated people, their quality of learning can be improved. Spitzer advocates training people when they are most interested in learning. This idea is called “just-in-time” training as opposed to “just-in-case” training, which up until now, has been the traditional method of in-servicing. The idea is especially appealing to rarely needed, complex topics or those topics that only few people need to reference. The post-bloodyborne pathogen exposure procedures are a good example, because they are complicated and change frequently. Additionally, most healthcare workers do not really think that they will ever get exposed to bloodyborne pathogens and, therefore, their motivation to study these procedures is low. Suppose, however, the training could be targeted just after a person was exposed, a point at which he is then highly motivated and likely to learn and execute the required procedures properly.

The just-in-time philosophy was originally developed as a business inventory strategy to improve productivity and eliminate waste. The process was easily adapted to employee training. Why accrue unnecessary training dollars when a technology-delivered learning module, continues on page 44.
such as Electronic Performance Support Systems (EPSS), could be more cost effective. The EPSS learning models were first developed in 1991 by Gloria Gery in order to "individualize online access to a full range of information to permit job performance with minimal support and intervention by others." The method uses a computer to deliver information and resources to many learners, in a modular format, on a one-to-one basis, focusing on what a trainee needs to know to perform a certain task. The training modules are made up of an electronic set of puzzle pieces pertinent to the client's situation, tailored to meet his specific need at the most crucial time, and designed to be user-friendly, accessible and easy to understand. The bottom line is that an EPSS can reduce the cost of training for an organization, while improving productivity and performance. In 1979, Dr. Alshuler spoke to the mechanics and economy of the microfiche system, but how can we develop this electronic resource in 2003?

How did we do it?
Our team does not consist of Web designers; we do not have any special training, equipment or software. We used a Pentium I-based desktop computer running Microsoft Windows 95 and Microsoft Office applications. For reference, we used consumer-grade, entry-level text (e.g., HTML, for Dummies), and we also accessed free Web-based instruction on website design (e.g., http://hotwired.lycos.com/webmonkey/).

To build most training modules, our team used presentation software, incorporating digital images with bulleted text. Presentation software, readily available and relatively inexpensive, has the applications to produce the training content; it is designed to communicate and offers output that can be shared in a network or as a Web page. Many different types of presentation software are available today, with Microsoft's PowerPoint application being one of the most popular.

In his monograph, H.E. Pence discusses the great educational advantage of presentation software: its ability to easily incorporate the use of images into the learning process. The human visual system plays a major role in the learning process — supplying the brain with about three-quarters of all sensory input. Images are especially important to training because they can improve learning by 400%. Humans process pictures 60,000 times faster than text, which verifies the old cliché that "a picture is worth a thousand words." Educational research suggests that approximately 83% of humans learn visually. Color also plays a major role in the success of any imagery, having been shown to improve retention, and enhance learning and willingness to read by more than 75%.

Interestingly enough, three days after a lecture, a person retains only 10% of what he heard from an oral presentation, while visual presentation alone yielded 35% retention. Retention of a presentation which uses both oral and visual methods increased up to 65%. Pence's surveys confirm that students use the projected images, along with the text, both
to understand the concept of the material and to recall the information.  

Most of our training modules are short slide shows that take a user through a process in a stepwise fashion (Figure 1). Within the presentations, we provide links to forms and related presentations and documents. Once finalized, we save the presentations as Web documents in HTML (hypertext markup language), using the "save as" option. By saving the file as HTML, PowerPoint automatically adds the navigation buttons necessary to negotiate the module. We then post the modules to our website and build index pages (using Microsoft FrontPage Editor) to provide access to the modules. We also add pages for frequently asked questions and links to external reference websites, such as those of the Occupational Safety and Health Administration or the Centers for Disease Control and Prevention. 

Most word-processing programs will generate HTML code and can be used in place of the FrontPage application—just use the "save as HTML" or "save as Web page" options in the file-saving menu. Forms are provided by converting word-processing documents to portable document format (pdf) by using software, such as Adobe Acrobat, or by scanning and then converting.

With these resources in place and our computers networked and Internet-capable, any staff member on any shift, at any site, can access the most up-to-date training, just when he needs it most. The usefulness of Web documents and these training modules is not limited to World-Wide Web applications. Documents in the HTML format can run from a local hard drive, from a CD-ROM drive or from a local network. The Internet allows broad access to the site from remote locations and gives users the ability to link to other websites that may provide additional information and references.

Other applications

Our JIT prototype interface was posted to our website early in 2002 and covered topics ranging from chemical storage to packaging and shipping samples. We were able to use the interface during our College of American Pathologists (CAP) accreditation visit by developing a special index tailored to the CAP general checklist. Our various managers were able to access documents and policies electronically. The format of the JIT modules allows for multiple users to access the same information at the same time.
Table 2. Opinion survey on the application of just-in-time training to the laboratory environment.

<table>
<thead>
<tr>
<th>STATEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRONGLY AGREE</td>
</tr>
<tr>
<td>&quot;JIT modules communicate more effectively than policies.&quot;</td>
</tr>
<tr>
<td>&quot;JIT resources are easier to understand than written text.&quot;</td>
</tr>
<tr>
<td>&quot;I prefer this type of training to the traditional classroom setting.&quot;</td>
</tr>
</tbody>
</table>

JIT, Just-in-time. n=31.

The module format allows the use of one tutorial or resource in many applications that share a task or function. Take the task of completing an incident report or accident report. Once developed, this module can be linked to other tutorials where incident reporting, like chemical spill or needlestick, is required. The module can be used to explain policies and procedures to inspectors and accrediting agencies. Now, anyone in our department can explain reporting to their clients and patient specimen collection (Figure 2).

When our laboratory sought to reduce the amount of nonproductive time, we identified as opportunities the use of compensatory leave and of unplanned sick leave. We determined that our policies were adequate for the management of nonproductive time, but we found that few supervisors were knowledgeable enough to manage the leave. We created an online resource, which interpreted the policies into simple language with examples, demonstrating easily what the policy could not. We have sustained reduction in both indicators – 25% in compensatory leave and 19% in unplanned sick leave. On our management support pages, we have recently added a site on sexual harassment to support the policy and to facilitate reporting and training (http://155.58.143.40/harassment).

Will online resources be accepted by employees?
We surveyed our employees and concluded that they would welcome the further development of this JIT training-support system. They agreed that the modules communicated more effectively than written policies and were preferred to classroom instruction (Table 2). The acceptance and use of the JIT modules by employees are key to any improvements and we are increasingly mindful of maintaining lean but meaningful content. We are now working to give "site priority," or direct access from the major indexes, to our most important topics.

This online method of support has the potential to boost performance in complicated tasks that are infrequently performed. Further, JIT training is cost-effective. Its nonlinear learning can be easily accessed and understood, without participation in any former component. It is nonthreatening; employees can access information without depending upon co-workers or supervisors for assistance. It also provides up-to-date, complete information.

This concept can also fulfill, or at least supplement, requirements for safety inservices without compromising workflow. Numerous studies support the idea that computer-based training is at least as effective as that of the classroom. It certainly fits well into our daily routine where some random downtime can be anticipated. We are currently developing short, online digital movies to enhance our arsenal of training tools beyond static images. The growth and acceptance of the JIT tools will ultimately depend on the wisdom of our planners and the skill of our designers. This training approach, however, is one method of combating our medical personnel shortage problem. We embrace any method that improves our performance, while freeing our workforce to address patient care.

Argie Leach, MHS, MTA(ASCP), and Daniel E. Hahn, MTA(ASCP), introduced JIT training modules at the department of pathology, Medical Center of Louisiana at New Orleans.

Reference