Paper Session I-B - Using Computer-Based Training (CBT) for Recertification

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Using computer-based training (CBT) for recertification.

Catherine A. Eadens  
Lockheed Space Operations Company

Using CBT to deliver both entire training courses and individual segments to meet worker recertification requirements is a viable option in today's business environment. Shrinking instructor work forces make it difficult to maintain a high level of quality in our training efforts. This session discusses: 1) identification of segments for conversion to CBT 2) use of existing hardware and software to deliver CBT 3) automated student data record keeping 4) creation of courseware using a derivative of standardized Instructional System Design (ISD) methods 5) some solutions to learner challenges.

'Due to shrinking budgets, we must become more efficient' or 'Do more with less' are words we hear on a daily basis. What are we doing about it? Are we teaching more classes, spending less time reviewing material and spending more of our own time catching up on industry trends? Can we schedule students more efficiently into existing classes? Can we make management understand that no-shows decrease our productivity? Can management make us understand that production outranks training classes? However, "Employment for many people, currently and in the future, has translated into a commitment (whether embraced by the employee or imposed by the employer) to life-long learning" (Scales and Yang, February 1993). In order to achieve life-long learning with fewer budget resources, we have to design training to use existing technology with tomorrow's technology upgrades in mind.

In a large industrial environment where training must continue while redesigns are performed, the first overall task to be performed is to determine which of the existing training modules should be converted to make use of today's computer technology. The steps to be used in this process are:

1. Conduct a review of existing training.
   a. Create a survey instruments such as shown in Figures 1 and 2.
   b. Send the survey instruments to the training instructor staff.
   c. Analyze the instructor survey(Figure 1) resultant data for
      1. Course stability
      2. Redundancy among courses
      3. Media requirements
      4. Frequency taught
      5. Number of students taught
      6. Criticality of subject to the business
   d. Analyze the user survey(Figure 2) resultant data for
      1. Continuing need for the course
      2. Content deficits
      3. Criticality of subject to the business

2-20
<table>
<thead>
<tr>
<th>Instructor Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Number</strong></td>
</tr>
<tr>
<td><strong>Course Title</strong></td>
</tr>
<tr>
<td><strong>Instructor Name</strong></td>
</tr>
</tbody>
</table>

1. Circle the word that best describes the rate of change in course content.
   - Monthly
   - Quarterly
   - Semi-Annually
   - Yearly

2. Check the items that match the type of media you use for presentation of this course.
   - White/Chalk Board
   - Overhead Transparencies
   - 35 mm Slides
   - Video
   - Computer

3. This course is taught ____ times per year.

4. The number of students per class taught is ____.

5. The total number of students taught per year is ____.

6. Attach a current course approval sheet, outline and lesson plan.

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<table>
<thead>
<tr>
<th>Post-Training Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong> __________</td>
</tr>
<tr>
<td><strong>Dept.:</strong> __________</td>
</tr>
<tr>
<td><strong>Phone:</strong> __________</td>
</tr>
<tr>
<td><strong>Job Title:</strong> _______</td>
</tr>
</tbody>
</table>

1. The product contained information well suited to my job.
   - 0
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6
   - No
   - Strongly Disagree
   - Slightly Disagree
   - Slightly Agree
   - Agree
   - Strongly Agree

2. The presentation of information contained in the lesson was easy to understand.
   - 0
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6
   - No
   - Strongly Disagree
   - Slightly Disagree
   - Slightly Agree
   - Agree
   - Strongly Agree

3. The questions contained in the lesson were helpful in reinforcing the task to be performed.
   - 0
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6
   - No
   - Strongly Disagree
   - Slightly Disagree
   - Slightly Agree
   - Agree
   - Strongly Agree

4. Viewing this product just prior to performing the job would be very helpful.
   - 0
   - 1
   - 2
   - 3
   - 4
   - 5
   - 6
   - No
   - Strongly Disagree
   - Slightly Disagree
   - Slightly Agree
   - Agree
   - Strongly Agree

5. On the back of the page, list any other procedures that could be added to this product to enhance its usefulness.

6. On the back of the page, write any additional comments that you feel could help us better this product.

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*Figure 1*

*Figure 2*
In most cases, the training courses suited for conversion to computer based training for worker recertification are those that have high student numbers and content stability such as recurring safety training courses.

2 -- Categorize analyzed training
   a. Safety
   b. Skills
   c. Systems

3 -- Prioritize within categories for development

   Using the motto 'More with Less' means trying to use as much existing computer hardware and software as possible in your conversion effort. A separate but parallel effort to the courseware review is the organization hardware/software review. A person well versed in today's rapidly changing computer product arena should undertake this task. The review should result in the following information:
   1 -- Location and types of various computer models
   2 -- Software loaded on each model
   3 -- Level of use of each model

Models targeted for upgrades should be swapped for older models for lower level use such as basic word processing and small spreadsheet applications. Courses not requiring multimedia (audio and video) can use lower class machines (386 types) as long as no complex graphic animations are planned. Multimedia and complex graphic animations require a higher class machine (486 and above with specific add-ons according to the level of courseware design). Purchasing upgrades for your existing hardware or buying new equipment is dependent upon your budget allocations.

Collection of student data from the courseware is a primary design (or buy) concern. Data to be collected into a data base for reporting and statistical purposes are:
   1 -- Student identification data
   2 -- Answers to all questions asked in the course
   3 -- Pass, Fail or Grade
   4 -- Timing data

   Bookmarking is also a feature to look for when buying or designing courseware. Bookmarking is the ability of the courseware to 'mark' a student's place so the student can return to finish the course at a later time. There are many good commercially available products on the market at this time well suited for industrial training needs.

If you decide to build your courseware in-house, you will need several personnel trained in the following disciplines:
   1 -- Instructional Design
   2 -- Video/Photography/Graphics
   3 -- Programming/Authoring
   4 -- Project Management

   Courseware development follows the instructional system design procedure such as:
1 -- Task Analysis
2 -- Writing of the objectives and evaluation items
3 -- Content Development
4 -- Story Board Development
5 -- Program Development
6 -- Validation of the Program
7 -- Implementation of the Program
8 -- Evaluation (occurs throughout the courseware build process)

It is critical to the success of the product to have subject matter expert evaluation and approval for every stage of the process. You must provide written reports for every stage. Careful proofreading of the story boards is essential to program development. It is much easier to change paper than a computer program.

Examples of courseware delivery and data collection are shown in figures 3, 4 and 5. In figure 3, a mainframe computer is shown as a courseware and data repository. However, a LAN server or a standalone PC with suitable software can be used to deliver courseware and collect data.

Figure 4 represents a subset of the courseware data tables and a generic SQL (Structured Query Language) query that could be used to retrieve data from the data tables for reporting purposes. "One goal of schema design is to minimize the storage space that the base relations(files) occupy" (Elmasri and Navathe, 1989). Data tables should use relational technology to minimize redundancy in data storage. Figure 5 represents a portion of a data set as would be retrieved by the query shown in figure 4.

While in the validation phase of your process, you will encounter learner 'challenges'. A few of these challenges are learner literacy level, computer literacy level and negative attitudes. Even though you design your computer course to be suitable for the majority of your audience, there will be those learners who are not capable of functional literacy at that level. You will also see distinct differences in their level of computer literacy. For some learners, using a computer to achieve educational goals will be a new experience; using a computer in itself will be new to some learners. Some learners will arrive for training with negative attitudes toward training, computers or their job in general. It will be your task to sort these types of challenges from problems with your computer courseware itself.

Helping today's workers meet their continuing educational goals is a tremendous task when faced with daily budget changes and technology advances. "It is essential to provide information and training on demand that employees require in order to do their jobs" (Murphy, May 1992). Using computer based training or interactive video instruction (IVI) is appealing from many standpoints. "It would appear that IVI is equally effective for all learning styles, that students of any learning style find it to their liking, and that IVI can and should be used precisely because instruction is individualized to every student's needs" (Larsen, Winter 1992).
References


About the Author

The author is Catherine A. Eadens, Trainer, Sr. for Lockheed Space Operations Company at Kennedy Space Center, FL. You may contact her at 407-861-1104. In the last 13 years, Cathy has taught students employed in the military and the aerospace industry. She has developed training materials and taught:

1) Wideband Communications theory to recruits in the USAF
2) Space Shuttle Orbiter Communications Systems theory to NASA-contracted engineers
3) Mainframe and PC operating systems and applications to NASA-contracted employees

She has spent the past two years in the design and implementation of computer based training systems at Kennedy Space Center and in making industry conference presentations on the same subject.