



Best Practices of
Leading Training Programs
(Task 2)
for
**Environmental Protection Agency
Air Pollution Training Institute**

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I. Introduction

BACKGROUND

In May 2004, the Education and Outreach Group (EOG) of the Environmental Protection Agency (EPA) contracted with the Hay Group to conduct a Benchmarking Study of its Air Pollution Training program. The ultimate goal of the project is to provide options for improving the current Air Pollution Training program, and ultimately, EOG's business performance. The following three tasks are aimed at accomplishing this goal:

- Evaluate the current Air Pollution Training program (Task 1)
- Identify best practices of leading training programs (Task 2)
- Develop a plan of action for improving the current Air Pollution Training program (Task 3)

This report summarizes our findings from Task 2 – identify best practices of leading training programs. The findings in this report provide a summary of the practices, procedures and processes used by industry leaders in training. In this report, we focus on these best practices and how the Air Pollution Training Institute (APTI) may incorporate some of these practices into its current training program.

In the final report (Task 3), we will present our specific conclusions regarding the direction that we believe the Air Pollution Training program should take.

METHODOLOGY

This section summarizes the methodology used to identify the best practices of industry leaders in training and distance learning. The primary methods used to identify the best practices were: 1) site visits with public and private sector organizations that are recognized as industry leaders in training; and 2) literature review on innovative ways other organizations are delivering training, particularly distance learning.

Site Visits

Hay conducted site visits with five organizations to identify industry best practices in training, particularly distance learning. Below, we describe the methodology used to conduct the site visits.

Select organizations for site visits and elicit participation. The first step was to select a list of potential organizations to participate in site visits. Through reviews of published sources and the Internet, we developed a list of organizations considered leaders in technical training and distance learning by professional organizations (e.g., American Society for Training and Development, ASTD; American Productivity and Quality Center, APQC), publications (e.g., Training Magazine), and academic and professional experts. We based our selection on awards (e.g., Training Magazine's Top 100 list, ASTD BEST Award, Government e-learning award); accolades, participation in other

training benchmarking studies (e.g., Society for Human Resource Management Consortium Benchmarking Study on Training and Development), and expert recommendations. We particularly looked for organizations that use innovative e-learning and distance learning training delivery methods.

We then contacted each of the organizations to determine whether they would be an appropriate benchmark organization and interested in participating in the study. We sent potential organizations a short description of the benchmarking study and the level of effort required to participate. We then qualified each organization through a short conference call and cut the initial list down to a select group of organizations. Table 1 shows the five organizations that agreed to participate in the benchmarking study and our rationale for selecting each of them as a benchmarking partner. We refer to these five organizations throughout the study as a “benchmarking partner”.

Table 1: Participating Organizations in the Site Visits

Organization	Rationale for Selection as a Benchmarking Partner
Occupational Safety and Health Administration (OSHA), Office of Training and Education	<ul style="list-style-type: none"> ➤ Provides technical training to a large, geographically-dispersed population ➤ Blends Web-based training and live satellite broadcasts with more traditional classroom instruction (uses innovative distance learning training media)
Center for Disease Control (CDC), Public Health Training Network (PHTN)	<ul style="list-style-type: none"> ➤ Provides technical training to a large, geographically-dispersed population ➤ Provides diverse training delivery methods, including distance learning ➤ Has state-of-the-art training facilities
Georgia Tech University, Distance Learning and Professional Education Department (DLPE)	<ul style="list-style-type: none"> ➤ Trains professionals in engineering, business, and other hard sciences ➤ Recognized as providing an exceptional distance learning program and successfully incorporating an interactive component into distance learning ➤ Has state-of-the-art training facilities
SAS Institute (SAS)	<ul style="list-style-type: none"> ➤ Provides extensive technical training to customers around the world ➤ Blends e-learning with more traditional classroom training (uses innovative e-learning training media)
GMAC Commercial Mortgage (GMAC), Staff Development Division	<ul style="list-style-type: none"> ➤ Delivers training primarily via e-learning methodologies, including videoconferencing, live Webcasts, videotapes and C-ROMs/DVDs

Prepare for site visits. Hay designed a site visit protocol (based on the evaluation criteria used in Task 1) to capture the best practices of industry leaders in training. The protocol included an introductory paragraph to read to participants at the beginning of the site visits and interview questions. A copy of the site visit protocol is presented in Appendix A.

Hay worked with a point of contact at each participating organization to identify appropriate individuals to interview about the training program. An effort was made to interview a diverse group of individuals who have a good understanding of the training program, its objectives and desired results, its future direction, and its overall effectiveness. We typically spoke to 3 – 10 individuals (e.g., training director, training content developers, graphics specialists, studio staff) from each participating organization.

Conduct site visits. We conducted site visits with five organizations recognized as industry leaders in training. An experienced Hay facilitator conducted all the site visits using the standardized protocol. An EPA representative also attended all site visits. The site visits focused on identifying best practices around:

- The needs assessment process (e.g., how decisions are made about course content and delivery methods)
- Course design and content (e.g., process for designing/updating courses)
- Training delivery methods, with a special emphasis on distance learning methods (e.g., live Webcasts, self-paced Web courses, satellite broadcasts)
- Strategies for incorporating an interactive component into distance learning
- Training evaluation process

During site visits, we reviewed training program documentation and materials, observed training facilities and training programs (e.g., a live Webcast; an interactive Web-based course), and conducted interviews with members of the training group. Each site visit lasted two to six hours.

Extensive notes were taken during the site visits. Information collected from the site visits was reviewed, and we identified existing training best practices. These best practices are presented throughout this report.

Literature Review

In addition to conducting site visits, Hay reviewed several reports, articles, books and web sites to identify best practices in e-learning and distance learning. The primary documents/web sites that were reviewed are shown in Table 2.

Table 2: Primary Documents/Web Sites Reviewed for the Benchmarking Study

- American Society for Training and Development (ASTD). State of the Industry Report (2004).
- American Society for Training and Development (ASTD). State of the Industry Report (2003).
- American Society for Training and Development. E-Learning Handbook: Best Practices, Strategies, and Case Studies for an Emerging Field (2002).
- Bersin and Associates. Blended Learning: What Works (May 2003).
- Bersin, Josh. The Blended Learning Book: Best Practices, Proven Methodologies, and Lessons Learned (2004).
- Daly, David, and Scott, Amy. Best Practices for Advanced Distributed Learning. www.jointadlcolab.org.
- Galagan, Patricia A. Mission E-Possible, the Cisco E-Learning Story. *Training and Development* (February 2001).
- Galvin, Tammy. Training Magazine. The 22nd Annual Industry Report (October, 2003).
- General Accounting Office. Human Capital: A Guide for Assessing Strategic Training and Development Efforts in the Federal Government (March 2004).
- General Accounting Office. Information Technology Training: Practices of Leading Public Sector Companies (2003).
- Hall, Brandon. Six Steps to Developing a Successful E-Learning Initiative (2001).
- Hall, Brandon and LeCavalier, Jacques. E-Learning across the Enterprise: The Benchmarking Study of Best Practices (2000).
- Hequet, Marc. Training Magazine. The State of E-Learning (September, 2003).
- Hofman, Jennifer. Blended Learning Case Study. *Learning Circuits* (2001).
- Johnson, Gail. Training Magazine. Blended Learning: How to Brew the Perfect Blend (December, 2003).
- Kilpatrick, D. (1994). Evaluating training programs: The four levels. San Francisco: Berrett-Koehler.
- Kiser, Kim. E-learning Evangelism. *Online Learning* (2001).
- Singh, Henry. Building Effective Blended Learning Programs. *Educational Technology* (November/December 2003).

REPORT OVERVIEW

In this report, we summarize our findings from the site visits and literature review to identify trends and best practices of industry leaders in training. We provide an assessment of the training best practices in each of the following areas:

- Training Needs Assessment Process
- Course Design and Content
- Training Delivery Methods and Ways to Incorporate Interaction into Distance Learning
- Training Evaluation Process

Summary of the findings from each of the five site visits is presented in Appendix B. Appendix B also includes a short description of the characteristics of the training groups that participated in the site visits (e.g., size of staff, facilities, mission).

We conclude the report with a discussion of our main conclusions about best practices in the training industry and how they may be incorporated into APTI's training program.

II. Training Needs Assessment Process

Our research shows that conducting a needs assessment is often the first, and possibly the most important, step in developing an effective training course or an entire training program. Training needs assessments provide information about the types of training courses needed by potential participants and the manner in which training should be delivered. More specifically, training needs assessments help determine, among other things:

- Types of training programs that participants want and need
- Gaps in current and needed course offerings and participant skill sets
- Goals and objectives for training programs
- Steps needed to achieve training objectives
- Training areas in need of additional resources
- Best methods for delivering training courses (e.g., classroom, self-paced Web, satellite)

Our benchmarking research shows that training needs assessments are being conducted at some level by most training programs. However, across the broad range of organizations that conduct training programs, the overall status and effectiveness of the needs assessments are not consistent. Some organizations conduct systematic needs assessments for both overall training programs and individual courses, while others appear to make somewhat haphazard attempts at determining what potential participants want and need. What is clear, however, is that training experts agree that conducting systematic needs assessments is an important contributor to the overall effectiveness of training programs (the extent to which they ultimately improve trainee performance and overall organizational effectiveness).

TYPES OF NEEDS ASSESSMENTS CONDUCTED BY INDUSTRY LEADERS

We found through our benchmarking research that there are different types of needs assessments that training organizations conduct: 1) overall training needs assessment; 2) market needs for a specific course; and 3) content design and delivery needs assessment. Each of these needs assessments has different objectives and processes.

Overall training needs assessment. Overall training needs assessments are conducted by most of the benchmarking partners and other training industry leaders. These assessments examine the courses that current, former, and potential training participants think they will need over a one- or two-year time period. This type of needs assessment typically involves an annual survey of the trainee population (and sometimes, supervisors of trainees). In the best cases, the training group (or the organization as a whole) has identified a set of overall objectives that the trainee population should achieve over the specified time period (e.g., employees should develop a specific set of IT skills). These objectives then form the basis of the needs assessment. For example, a needs assessment

may provide the trainee population with the list of objectives and ask them to list courses they think are needed to meet the objectives (e.g., which courses will help them develop the specific set of IT skills required for future success on the job?). Regardless of the actual approach, overall training needs assessments attempt to determine programmatic needs over a one- or two-year period.

Example of Overall Training Needs Assessment

SAS conducts an extensive annual needs assessment survey to assess what courses should be offered to customers in the upcoming year. The survey consists of approximately 400 items designed to determine whether and how customers use software (importance), when they last used specific software (recency), and how often they use the software (frequency).

Market needs for a specific course. Some organizations develop particular training courses on an ad-hoc basis; that is, courses are developed to meet specific needs or at the specific request of a participant, a customer, or even an internal subject matter expert. Because these courses are not often identified during the overall needs assessment process, some training programs will conduct a course-specific needs assessment to determine whether the “market” will support them. For example, an internal subject matter expert may want to provide a training course for a specific topic that was not identified as a need during the overall needs assessment. Before taking the time to develop the course, a market needs assessment is conducted for the course to determine whether participants believe there is a need for the training and whether they are likely to attend.

Some of the questions that market needs assessments typically ask are:

- Is there a need in the industry or organization for the specific course?
- Does this course fit in within the organization’s overall programmatic goals?
- Are participants likely to attend?

Example of a Market Needs Assessment for Individual Courses

Georgia Tech develops courses that are requested by several sources including customers, professors, and other internal or external subject matter experts. Georgia Tech subsequently conducts a market needs assessment for selected courses to make sure that a similar course does not already exist and that potential participants feel there is a need for the course.

Content design and delivery needs assessment. Content design and delivery needs assessments are typically conducted as part of either an overall or market needs assessment. Because distance learning is a rapidly developing field, content design and delivery needs assessments help determine not only what types of delivery methods are being used by the industry but also what types of delivery methods potential participants need and expect. For example, SAS found that customers were less willing to travel to training sites after September 11, 2001. A content design and delivery needs assessments was used to determine the types of training delivery methods that could supplement

classroom training in light of a reduced willingness to travel on the part of customers. This type of needs assessment may also be used to determine the best methods to reach participants in remote locations, or the extent to which participants are willing to watch satellite broadcasts, participate in live Webcasts, complete a self-paced Web course, and so forth.

NEEDS ASSESSMENT BEST PRACTICES

Through our site visits and literature review, we identified several best practices in conducting needs assessments.

1. Incorporate skill/competency assessments into the needs assessment process. Industry leaders go beyond simply asking trainees to evaluate their need for future training courses or their desire for different delivery methods by incorporating skill or competency assessments into the needs assessment process. For example, trainees may be asked to indicate, from a list of skills, knowledge, and competencies, those they feel are necessary for future success on the job, and to rate their current level of proficiency with those knowledge/skills/competencies. The training group would then develop training courses aimed at teaching the critical skills, knowledge, and competencies needed by trainees (those that are important to future success and need further development). As another example, some organizations have developed competency models for certain positions which outline the key competencies required for the job. Training courses are then reviewed to determine whether they develop/teach the competencies required for success on the job, and determinations are made about the need for updating current courses or developing new ones.

Example of Incorporating a Competency Assessment into the Needs Assessment Process

OSHA recently developed a competency model for its compliance officers (to determine the competencies required for success on the job). A consultant was then hired to perform a gap analysis to determine the gaps between the current training curriculum and the competency model. As a result of this analysis, OSHA made decisions to update current courses and develop new courses to ensure that its training program was teaching the competencies required for success on the compliance officer job.

2. Encourage trainees to participate in the needs assessment process. For training needs assessment data to be useful for making decisions about training courses and programs, it is critical to obtain feedback from a representative sample of current and potential trainees. To enhance response rates, industry leaders publicize the needs assessment approximately 30 days in advance using a variety of outlets (e.g., newsletters, the Intranet, supervisors, flyers posted on walls throughout an organization, message boards, e-mail).

It is also helpful to send potential participants an introductory letter (often in conjunction with a paper or Web survey) from an organizational leader explaining the importance of the needs assessment process. Additional follow-ups further help to ensure that as many participants as possible complete the needs assessment.

3. Collect data from multiple sources. In addition to collecting information from trainees about their specific training needs, industry leaders also seek input from other sources that may have insight into the needs of the trainee population. For example, some training programs conduct surveys of supervisors to obtain their feedback on the types of skills and knowledge their employees will need in the upcoming year to be successful on the job. Additionally, course instructors or developers are often included in the needs assessment process. Through their experience with trainees, course instructors and developers often have a good understanding of the types of courses that will be needed in the future.
4. Use several data collection methods. A needs assessment does not have to be conducted solely as a paper-and-pencil or an on-line survey. Other data collection methods used by industry leaders are information interviews, focus groups, and comment cards. The more data collection methods that are used, the more likely a representative sample of participants will respond. For example, conducting only on-line needs assessment surveys may limit the participant sample to those most comfortable with the Internet. Using additional methods also results in more insightful and actionable data. While surveys provide objective data about who is likely to participate in a particular training course, focus groups or interviews provide more qualitative information about why they are likely to participate.
5. Use consistent methods and processes. Needs assessment methods and questions should remain stable, to the extent possible, over time. The ultimate goal of a needs assessment is to determine what training and skills are needed to meet specific organizational goals. To measure progress and training gaps over time, the methods and questions should be consistent. For example, asking participants to simply list courses they need in the future may provide different results than offering a list of courses and asking participants to rate the importance of each course.
6. Use the needs assessment results during the course development process. Industry leaders consistently monitor the data collected from needs assessments and make decisions about training content and delivery methods based on these data. Training needs assessment data provide valuable input into whether the “right” courses are currently available to meet trainee needs, whether there is a need to update current courses or transfer them to other delivery methods, or whether new courses should be developed. Using needs assessment data shows that the process is taken seriously and helps in planning how training resources will be used in the future.
7. Provide feedback about results. Participants take the time to complete needs assessments and expect to learn about the results and decisions about training courses that are made based on these results. Industry leaders publicize the results of training needs assessments (and decisions made based on these results) to all participants. As a result, participants gain an understanding of how training decisions are made (e.g., why a particular course was eliminated or why a classroom course was translated to a live Web course). Also, participants may be willing to provide additional insights

into the needs assessment results, which may add another level of understanding to their needs. For example, participants may find the needs assessment results surprising and following up on this may reveal that they did not understand certain questions or that the results were misinterpreted.

SUMMARY

The needs assessment process is one of the first steps to developing an excellent training program or course. The value of the needs assessment is that it allows an organization to discover where the gaps are in terms of courses offered, delivery methods used, and the skill sets required for the trainee population to be effective in their jobs. Industry leaders regularly conduct needs assessments which incorporate skill/competency assessments into the process, and solicit input from multiple sources such as potential trainees, industry leaders, and supervisors. Most importantly, needs assessment data are used to modify existing training courses, develop new courses, and eliminate courses that do not add value.

III. Course Design and Content

The content of a training course is the most important determinant of its effectiveness. Regardless of how training programs are delivered, they are not valuable unless participants learn and take away something that can be applied to their day-to-day jobs. Even the most sophisticated delivery method will not teach trainees if the content is of little value, outdated, or not appropriate for the intended audience.

The benchmarking partners and other industry leaders place a great deal of emphasis on developing training content and keeping it up-to-date and of the highest quality. Several use internal and external subject matter experts (SMEs) to develop course content, expend considerable resources developing programs, and conduct systematic course reviews to ensure that content is up-to-date.

The benchmarking partners agree that developing high-quality courses takes time and resources. For example, Georgia Tech estimates that three hours of post-production time are required for each hour of instruction. The CDC estimates that a self-paced Web course consisting of 120 pages can take about 3-5 months and \$120,000 to develop from scratch.

SAS: Estimated Time to Complete Training

SAS indicated that one of the biggest lessons it has learned is that good training takes time to develop. It takes:

12 hours to develop 1 hour of classroom delivery content

20 hours to develop 1 hour of live Web delivery content

60 hours to develop 1 hour of self-paced Web delivery content

In this section we present best practices around course development and updating that we identified during the site visits and literature review.

COURSE DEVELOPMENT

Most of the benchmarking partners use a systematic process for designing new courses or converting existing courses to a different medium (e.g., a classroom course to a live Webcast; a paper self-study course to a self-paced Web course). There is wide variety in the number of new courses developed each year by the benchmarking partners (and number converted to other media). For example, on average, OSHA designs only two new courses per year and transforms an additional 12 courses from the classroom to a Web-based format. CDC develops approximately 30 to 40 new courses (satellite and Web-based) per year, while Georgia Tech developed over 100 courses in 2004.

We found that initial ideas for new courses or new course delivery methods come from a variety of sources including reviews of needs assessments and industry trends, subject matter experts, external clients, and organizational leaders. Additionally, we discovered

that some organizations have a specific training philosophy or specific resources that guide their course development process. For example, SAS follows at least four rules each time it develops a Web-based course, and Georgia Tech has enormous academic resources at its disposal to assist with course development (e.g., SMEs/faculty, libraries, students).

Regardless of where the course ideas originate or the planned delivery method (e.g., live Web, satellite, classroom), we identified several best practices for developing training courses.

1. Form a course development team. The benchmarking partners indicated that each course development project requires an experienced team covering a variety of roles including, program manager, project manager, instructional designer, subject matter expert, technical experts, technical review team, editor, and producer. Table 3 describes the basic roles that should be filled for each course development project; some of these roles may overlap and be completed by one person, and additional roles may be required for specific courses.

Table 3: Roles of the Content Development Team

<ul style="list-style-type: none">➤ Program manager – Develops the budget and plans the overall course; takes responsibility for the course and interfaces with executives; promotes and evaluates the program➤ Project manager – Reviews plans and oversees day-to-day work and goals (may also be the program manager for larger projects)➤ Instructional designer – Creates the training objectives and the overall framework, and the look and feel of the course➤ Subject matter expert – Understands the subject and drafts the technical aspects of the course➤ Technical experts – Understand the technology to deliver the course (e.g., Web developers, camera crews, satellite technicians)➤ Technical review team – Reviews the technical aspects of the course including delivery methods, training/teaching techniques, and the feasibility of the overall design➤ Editor – Makes sure content is clear and accurate➤ Producer – Produces the course and makes sure it is incorporated into the overall training program <p><i>Primarily taken from Bersin, Josh. The Blended Learning Book: Best Practices, Proven Methodologies, and Lessons Learned (2004).</i></p>

Example of Course Development Process

The CDC typically initiates course development at an internal request. It provides instructional design expertise and expects that content will be developed by an external subject matter expert. Subject matter experts provide content information including an outline of the course so that CDC can review and make changes. Then, depending on the type of delivery method, the content development process follows a specific path.

Web-based Development

CDC provides a Web developer (usually a contractor) with the course outline and content. The Web developer takes the content and develops a course based on it and other design specifications. CDC staff review the process along the way and conduct pilot tests to ensure the effectiveness of the course.

Satellite Broadcast Development

CDC uses the following process to develop its satellite broadcasts: 1) subject matter experts create an outline of the material to be covered by the broadcast (the CDC asks to see the script at least a few days in advance); and 2) a hired script writer takes the information provided by the subject matter experts and writes a full script for the broadcast (to make the material conversational). Because subject matter experts are just that, the script writers help create more conversational programs out of the technical information provided by the SMEs. CDC then requires an extensive practice session (full script and use of teleprompters) as a final check for glitches or inaccuracies before the broadcast is delivered live.

2. Work with subject matter experts. Our benchmarking research suggests that most courses require SMEs to develop technical content. Subject matter experts can be anyone with special expertise and may include, among others, internal specialists, professors, or external consultants. For example, Georgia Tech often uses professors, and GMAC has brought in experts from financial ratings agencies such as Moodys to help develop course content. Although SMEs are excellent resources, they are often very busy people and working with them can prove to be one of the biggest challenges to completing course content design in a timely fashion. Through the site visits and literature review, we identified the following guidelines for working with SMEs.
 - *Ask questions*. Asking specific questions about how a SME develops courses, and about his/her philosophy and time constraints, may help determine whether or not the SME is a good match for the course design project.
 - *Provide SMEs with information about plans for the course*. SMEs are often brought into a course design project after plans for the course have been discussed. The benchmarking partners recommend providing SMEs with specific details about the course including overall objectives; intended delivery methods; time, resource, and technological constraints; and audience characteristics. Unless SMEs are provided with information about the course up-front, they may develop content that does not meet the stated objectives

- *Review SMEs work.* Although most SMEs have extensive knowledge of the course subject matter, they may not have a good understanding of the intended audience or even the course objectives. Therefore, it is important to review the SMEs work to ensure it fits the intended audience and meets course objectives.
- 3. Decide whether to outsource. Many of the benchmarking partners and other industry leaders are not able to perform all of the course development roles and must outsource certain tasks. Most often these are technical tasks such as Web development. Although outsourcing is often a good short-term solution, it can also be more expensive. For example, the CDC contracts with Web developers to help design Web-based courses. They have found that contracting out this work is more expensive than hiring a full-time Web developer. On the other hand, Georgia Tech provides a full range of content development services and many organizations contract with them to develop and conduct their training.
- 4. Conduct a pilot test before courses go live. The benchmarking partners stressed the importance of pilot testing courses before they are delivered to the entire trainee population. Pilot testing is particularly important for self-study Web-based courses, where there is a need to not only determine whether the content of the course is clear, easy to understand, and meets training objectives, but whether the technology itself is easy to navigate, provides sufficient opportunities for interaction, etc.

Example of Course Pilot Test

CDC pilot tests all its asynchronous Web-based courses before they are delivered to the trainee population. The purpose of the pilot test is to ensure that the course content and design are appropriate for the intended audience. Pilot test participants (potential training participants, training coordinators, site facilitators) are asked to review the Web-based course and provide feedback about the length of the course (which determines the number of continuing education credits), degree to which they understand the course content, whether the technology is easy to navigate, extent to which the Web is the best method for delivering the specific training, and so forth. Feedback from pilot test participants is incorporated into the final version of the Web training.

Example of Course Pilot Test

OSHA conducts an extensive pilot test of its Web courses before going live. Volunteers take a pre-test (to determine their knowledge/skill level before taking the course), complete the Web course, and then take a post-test to evaluate whether they learned required knowledge/skills by completing the course. Additionally, participants fill out an evaluation form to provide their feedback on any concerns or errors with the training, questions, and so forth. OSHA also holds a one-hour conference call with the pilot test participants to go over their evaluations and gather additional information. An evaluation report is then developed and required changes are made to the Web course before it goes live.

Special Considerations for Designing Self-Study Web Courses. We found through the site visits and literature review that designing self-study Web courses present additional challenges. To be effective, these courses must be designed to facilitate self-learning (i.e., keep participants involved and engaged; monitor participant progress in completing the course). Best practices in designing self-study Web courses include:

1. Organize courses into learning modules. Industry leaders agree that self-study Web courses should be organized into learning modules or “learning chunks” based on major topic areas. A specific module includes similar content items, practice items, and quizzes. Modules should take 20 minutes or less to complete. The American Society for Training and Development suggests that the benefits of learning modules is that they allow trainees to learn small sections of content at a time, learn skills on an as-needed basis, and skip modules that they have already mastered (cited in ASTD E-learning Handbook). Learning modules also cut down development costs and allow organizations to personalize training for employees.

Example of Learning Modules

When Oracle designs Web-based courses, the company breaks the course content into segments (or modules). Each segment includes pre-recorded streaming video lecture, demonstrations, exercises, and quizzes, all focused on a similar topic or learning objective. Each segment takes trainees 10 – 15 minutes to complete.

Taken from: Kiser, Kim. E-Learning Evangelism. *Online Learning* (2001).

2. Provide learning objectives at the beginning of each session or module. Effective self-study Web sessions begin with an overview of the purpose of the session and the learning goals. Trainees must see the course as relevant or they will not complete it.
3. Re-package course materials when converting to self-study Web medium. One of the biggest challenges faced by the benchmarking partners and other industry leaders is converting classroom courses (or paper-based self-study courses) to effective Web-based courses. Converting classroom courses to the Web involves much more than simply cutting and pasting an existing classroom course onto the Web. A large percentage of development time is spent transferring classroom content to more visually stimulating material and incorporating opportunities for student-to-instructor, student-to-student, and student-to-technology interaction into the Web-based training course. For example, the American Society for Training and Development recommended in its E-Learning Handbook that content transferred from classroom courses to the Web must be reorganized and packaged for flow. For example:
 - Graphics must be recreated (versus simply using existing Power Point slides) to visually represent or enhance the content of Web courses
 - Exercises, case studies, simulations, quizzes and other opportunities for interaction should be incorporated into the Web course

REVIEWING AND UPDATING COURSE CONTENT

The benchmarking partners have an extensive process for continually reviewing and updating training courses to ensure that they are up-to-date and of the highest quality. For example, Georgia Tech reviews and updates all its courses at least on an annual basis. OSHA uses course chairs to monitor courses and make sure they are up-to-date. The course chair typically reviews the courses approximately every three years to ensure they are up-to-date, and makes changes as needed.

It should be noted that some training delivery methods are easier to update than others. For example, updating self-paced Web courses may simply require removing the out-of-date material and replacing it (e.g., with a new set of Power Point slides). Live Web-based courses, on the other hand, may be more difficult to update because the process often requires re-taping the entire episode or trying to synch-up the new information with the old.

The following are best practices in reviewing and updating training courses:

1. Update continuously and periodically. Updating course content can be a timely process, which is a very important reason for updating as often as possible. Much like cleaning a house, it is easier to update (or clean) periodically than wait until the course is such a mess that it needs a complete overhaul (i.e., extensive “spring” cleaning). However, there may be a point where a course does need a complete overhaul and not just periodic updates. For example, a new methodology or policy may be developed that completely changes an industry. Rather than update the course content, it may make more sense to develop a brand new course based on the new methodology/policy.

Examples of Content Update Tools

- OSHA uses special software (Workforce Connections) that allows Web-based courses to be updated and changed “just-in-time”.
- Cisco has a system in place to alert SMEs or training designers when the content of Web-based courses is aging or becoming out-of-date.

2. Plan for updates. Rather than waiting until course content is old or outdated, industry leaders plan ahead for updates. For example, it may be necessary to plan a systematic review every 6 or 12 months to ensure that the content is appropriate for the intended trainee audience. Also, because course updates take time and resources, it is important, when developing a course, to consider how much time and money will be needed to update the course, and plan resources accordingly.
3. Explain updates. The benchmarking partners make it a point to communicate to trainees why and how course content is updated. Some trainees may not agree that content should be updated, so it is important to explain to them why the content has changed (e.g., a new method has been developed).

4. Use updates as teaching points. Course updates can be used as a learning opportunity for trainees. For example, some benchmarking partners indicated that they use the content updates as a teaching point by detailing why the previous content is outdated. They compare and contrast the new and old information and explain how the information has progressed.

SUMMARY

The content of a course is the most important determinant of its effectiveness. Regardless of how sophisticated the delivery method, a course that has out-of-date content or is inappropriate for a specific audience will not teach trainees skills that they can apply to their day-to-day jobs. We found that our benchmarking partners and other industry leaders use systematic processes to develop course content, and rely on subject matter experts to provide the foundation for the course content. They pilot test the majority of their courses before they go live to ensure that the content is up-to-date and appropriate, interactive exercises and simulations are effective, and the delivery method is appropriate for the course content. Most importantly, industry leaders regularly monitor the quality of their training courses and update courses when necessary.

IV. Training Delivery Methods

All of the benchmarking partners we visited are challenged with providing effective training to large populations of individuals who are geographically dispersed. Although classroom-based courses continue to play a very large role in training programs, these organizations realize that they can no longer rely on the classroom as their primary training delivery method. Instead, they are using innovative distance learning training methods to ensure that they reach a diverse audience, and more importantly, provide stimulating learning opportunities for those they train. As further evidence of the increased reliance on distance learning training methods, ASTD cited in its 2003 State of the Industry Report that classroom training (as a percentage of delivery methods) has decreased over the past four years and is projected to continue to decline.

Training Magazine's 22nd Annual Industry Report (2003) stated that 72% of organizations surveyed had training budgets in 2003 that were similar to or greater than 2002 budgets. This report also noted other training trends from 2002 to 2003, including:

- Instructor-led classroom accounted for 74% of all training in 2002, but dropped to 69% in 2003
- Computer-delivered training with no instructor rose from 12% of all training provided in 2002 to 16% in 2003
- Instructor-led training from a remote location rose from 7% of all training provided in 2002 to 10% in 2003
- Separate technology-based training budgets rose from 24% of responding organizations in 2002 to 29% in 2003

While the Web is a powerful distance learning tool and is the primary distance learning medium used by industry leaders, it is by no means the sole medium used to deliver distance learning programs. In fact, distance learning programs can range from highly interactive videoconferences to programs that require students to review PowerPoint slides that are delivered by inserting a CD-Rom into one's personal computer.

The biggest challenge in distance learning is to incorporate both interpersonal and person-to-technology interactions into training delivery methods. These interactions are critical to ensuring that trainees actually complete the training, and more importantly, learn required knowledge and skills. Not unexpectedly, a common theme among the benchmarking partners was this very concern: how to integrate effective interactions into the various media employed in distance learning. During our site visits, we discovered that the benchmarking partners are using cutting-edge techniques to foster interaction, which is seen as a critical component of an effective training program.

In this section, we summarize training delivery trends and best practices, particularly those used to promote distance learning. Although each program delivers, and most experts agree there will always be a place for classroom-based training, we focus on the distance learning delivery methods because they represent the direction the industry is

headed. The best practices summarized below can be adapted for classroom-based courses.

DISTANCE LEARNING DELIVERY CATEGORIES

Most experts categorize distance learning delivery methods as either synchronous or asynchronous. Synchronous training methods are conducted live and delivered real-time in a classroom setting, over the Web, or through a video (typically satellite) broadcast. Asynchronous training methods are sometimes referred to as self-study methods because they are delivered “flat” (i.e., not live) and participants can access them at any time. Table 4 presents a brief overview of the pros and cons of synchronous and asynchronous delivery methods

Table 4: Pros and Cons of Synchronous and Asynchronous Delivery Methods

	Pros	Cons
Synchronous Training	<ul style="list-style-type: none"> ➤ Can be highly interactive; promotes relationships and students gain from live discussions and feedback ➤ Easier to evaluate whether learning occurred ➤ The speaker’s tone and style come through well ➤ Often easier to develop 	<ul style="list-style-type: none"> ➤ Can be very expensive to deliver ➤ Scheduling is difficult and may take several sessions to reach everyone ➤ Can require complex technologies such as satellite receivers and may require large bandwidth
Asynchronous Training	<ul style="list-style-type: none"> ➤ Easier to distribute to large audiences ➤ “Desktop, anytime”; students can access where and when they want ➤ Conveys a standard message ➤ Ability to skip topics that are already understood or mastered 	<ul style="list-style-type: none"> ➤ Lacks inherent interactions ➤ Can have a high dropout rate ➤ Can be difficult to evaluate learning/monitor trainee’s progress ➤ Can be costly to develop

The benchmarking partners we spoke with, and other training industry leaders, tend to use a variety of synchronous and asynchronous methods to deliver distance learning programs to trainees (classroom training is not the focus of this report). Synchronous methods include live Webcasts, Webinars, satellite broadcasts, and videoconferences. We found that the industry trend is towards Web-based courses (Webcasts and Webinars). Asynchronous methods include self-paced Web courses, CD-Rom/DVD self-study courses, and paper-based self-study courses. Similar to synchronous courses, we found that Web-based courses are quickly replacing paper-based self-study courses.

SELECTING TRAINING DELIVERY METHODS

The benchmarking partners we spoke with do not have hard and fast rules for making decisions about which training delivery media to use. Often the decision is a pragmatic one that is based on the time available and money or other resources needed to develop and deliver the training program. Some benchmarking partners, however, did use some rules-of-thumb to guide them in selecting a training delivery method:

- ***Complexity of the material*** – For example, more complex material is better taught in the classroom (e.g., laboratory) or through interactive synchronous training methods. For less complex material, it may not be worth the cost to use synchronous training delivery methods; a self-paced course may be sufficient. For example, self-paced courses work well for the delivery of information, while the classroom or interactive Webcasts or Webinars work well when discussion is needed.
- ***Need for interaction*** -- Training content that requires student interactions is better taught via synchronous training methods (e.g., classroom; Webinars; Webcasts that incorporate methods for interaction).
- ***Requirements for validation and/or certification*** – Classroom training and other synchronous training methods that can track student progress and incorporate quizzes and tests work best for courses that require certification. Certification programs require that participants meet some industry or test standard, have strict score reporting protocols, and often have expiration dates. It is difficult to meet these standards with an asynchronous program because it is not always possible to determine who took the test, participants cannot be expected to report their own results, and certification courses may expire but still be available in Web or paper format.
- ***Training audience*** – Participants skill levels may impact the effectiveness of different training delivery methods. For example, trainees may not all have the same understanding or experience with certain technologies. If the audience is likely to have lower technological savvy, it makes more sense to use less technologically advanced delivery methods. The size of the audience should also impact decisions about training delivery methods. As a rule of thumb, larger audiences (>3000) are more suited for asynchronous methods or live Webcasts (versus classroom training, Webinars, etc.). Finally, if the audience has a varied background, this is an area where asynchronous training could be used to provide a common foundation of knowledge prior to the synchronous portion of a course (i.e., a blended learning approach).
- ***Goals of the program*** – Programs that are designed to foster culture-building, such as orientation programs, are best delivered using synchronous methods. Training programs that focus on delivering instructions or an introduction to a task may best be suited to an asynchronous method.

- ***Budget and time*** – Training programs with smaller budgets need to think about how best to use their limited resources in delivering training. While synchronous methods may require a lot of personnel resources, asynchronous courses can often require a lot of up-front time and money to develop. Additionally, asynchronous courses often take a long time to develop and are not the best method to use when a course has a rapid window between design, development, and delivery unless appropriate technology is available.

In sum, when the outcomes of training are to analyze, synthesize, or evaluate, or when poorly defined problems are the focus, more synchronous delivery methods work best. When the outcomes of training are to provide procedural or well-defined information, or when providing regulation updates, the training methods should be more asynchronous.

TRAINING DELIVERY METHODS USED BY BENCHMARKING PARTNERS

It is clear that several delivery methods have been developed for distance learning training programs. The term blended learning is often used to define the combined use of two or more delivery methods, and is becoming the approach of choice for many organizations (discussed later in this section). While many of the benchmarking partners use and recommend the blended learning approach, we provide here an overview of each method as if it is the sole delivery method. At the end of this Training Delivery section, we will discuss ways benchmarking partners and other training leaders are using blended learning to increase the effectiveness of their training programs.

Synchronous Delivery Methods

Most of the benchmarking partners agree that synchronous training delivery methods should be used when live interpersonal interactions are necessary. These methods, when done “right”, provide participants with the opportunity to have real-time interactions with instructors, other participants, and the technology (e.g., simulations, quizzes). All of the benchmarking partners and many industry leaders in training use non-classroom-based synchronous training delivery methods, in addition to classroom courses. The most commonly used, and preferred, non-classroom-based synchronous training medium is the Web (e.g., live Webcasts and Webinars), followed by satellite broadcasts and videoconferences.

Satellite broadcasts and live Webcasts are often similar in design and course developers face many of the same challenges with the two methods. The primary challenge shared by the two methods is incorporating interactivity into courses. In fact, all of the benchmarking partners stressed the importance of integrating interactivity into training programs. Integrating interactivity into live Web courses seems to be the focus of most of the benchmarking partners because many have already or are beginning to move away from satellite broadcasts.

There are several reasons why organizations are focusing on live Web training (e.g., Webcasts) rather than satellite broadcasts. First, as training staff at SAS indicated, people tend to physiologically tune out during training, and the Web offers exciting and varied

opportunities to enhance learning programs. Additionally, busy professionals often do not have the time or the ability to travel to a satellite-equipped site for training, and the Web offers training that can be accessed on one's desktop.

For the remainder of this section, we present our findings on the primary synchronous delivery methods (non-classroom) used by the benchmarking partners: Live Webcasts, Webinars, Satellite Broadcasts, and Videoconferences. Because our research shows that the trend in synchronous delivery is toward live Web-based delivery methods, we focus on this medium when describing the best practices. However, because there are some similarities between the functionality and challenges faced for each delivery medium, many of the best practices described for the Web-based medium may be applicable to other synchronous training methods. For example, the benchmarking partners are using question monitors for both live Webcasts and satellite broadcasts, but we focus on how this is being adapted for Web use.

Live Webcasts. As indicated previously, our research shows that synchronous distance learning programs are moving toward the Web. Several of the benchmarking partners are conducting live Webcast programs over the Internet (or Intranet). Through these programs, participants can hear and see instructors on-line, in real-time. Live Webcasts allow participants to interact with each other and can be programmed to work with simulations and other interactive media. Also, the benchmarking partners strongly believe that these programs have proven effective, particularly when opportunities for interaction are provided to participants.

The benchmarking partners have spent considerable time and resources to make live Webcasts interactive, interesting, and effective at training individuals to be more productive in their jobs. For example, SAS began delivering live Web courses in July, 2001. But before SAS would deliver a live Web course, the training staff made certain that they could incorporate and encourage interactions without interrupting the overall flow of the program. SAS created a set of rules they follow when developing any live Webcast course to ensure they meet their initial program goals.

SAS Live Webcast Rules

- 1) Participants must be given the opportunity to interact at least every 10 minutes.
- 2) Instructors must have specific training.
- 3) Instructors must have two rehearsals before they can teach a course.
- 4) Moderators must be present for each course session.

Through our site visits and benchmarking research, we identified several best practices for delivering live Webcasts, which are highlighted throughout this section.

1. Record all live Webcasts. The benchmarking partners recognize that not all individuals can watch the Webcast when it is delivered live (e.g., have scheduling conflicts). As a result, they record all the live sessions and place links for these sessions on their Web sites (or Intranets) so that individuals can watch the Webcast at their own time and location (essentially transforming into asynchronous delivery). Additionally,

this allows new employees to complete needed training whenever they are able, rather than waiting for the next live session.

Example of Recording Webcasts

Most of GMAC's programs are broadcast live and taped using Windows Media Encoder for later viewing. The training staff found that live audiences were often smaller than anticipated and decided that taping and re-broadcasting the sessions would allow them to reach more people. The programs are posted to the Intranet and employees can access them at their leisure.

2. Incorporate opportunities for interaction into the Webcast. The benchmarking partners recognize that for successful learning to occur, participants must have the opportunity to ask questions and discuss the broadcast with others (e.g., instructor, moderator, other participants). Simply watching a "talking head" or an electronic "page turner" does not engage participants; many participants will simply tune out. To promote interactions between participants and instructors during live Webcasts, many benchmarking partners give participants the opportunity to ask questions during the session. We found that the most common methods used to elicit questions include:

- Call-in questions (e.g., participants call in to a centralized 800 number that is publicized before the Webcast)
- Fax-in questions
- E-mail questions
- Voice Over Internet Protocol (VOIP) (VOIP is a technology that allows participants to make telephone calls using a broadband Internet connection instead of a regular phone line - our partners disagree as to whether VOIP technology is reliable enough for most training purposes)

For these interactive methods to be effective, there must be communication to participants before the broadcast about the process for asking questions (e.g., fax-in, telephone) and participants must be encouraged to do so. The above processes have proven relatively effective in enhancing interactions during Webcasts. However, the benchmarking partners have experienced some challenges, which are discussed below along with strategies that have been used to overcome them.

- *Many participant questions go unanswered during the Webcast* - To overcome this challenge, most of the benchmarking partners capture all the participant questions during a Webcast and post them to an asynchronous site. Although all questions are not answered live, all questions are acknowledged and participants have access to the answers (participants are provided links to the site).

- ***Participants do not always ask questions during the Webcast*** – Many benchmarking partners develop a set of approximately 10 questions prior to the Webcast in the event that participants do not ask questions during the broadcast. For example, if participants are not asking questions, a member of the broadcast team can act as a participant and ask one of the pre-set questions. This helps to fill the time and often initiates participant interactions.
- ***Participants do not follow proper “netiquette”*** -- Finally, to overcome the third challenge, benchmarking partners such as SAS have developed “netiquette” rules that are provided to all participants prior to and at the beginning of each session. For example, because there is limited time, questions should be asked only if they help clarify a point or continue discussion. Questions about scheduling should be taken off-line.

Another strategy used by benchmarking partners to enhance interactions during Webcasts is the incorporation of audio and visual means of communication into the training delivery method. Audio communications typically take place over two-way telephone lines (e.g., an open telephone line where participants in the Webcast can ask questions during the session), but some benchmarking partners are also using VOIP to provide for total communication over one’s personal computer. Video communication can also occur over personal computers by mounting a small video camera on the computer (often used during Webinars). Larger video cameras can be effective when a group of people are gathered in one location, but for more individualized locations, the smaller PC-mounted cameras work best.

3. Use screeners to review participant questions. Some of the benchmarking partners find that instructors receive too many questions to respond to during the Webcasts and that reading each question individually takes time away from teaching. To meet this challenge, a form of question screening and monitoring has been incorporated where one or more individuals are available to receive, read, and review questions to determine whether the instructor should respond to them during the live Webcast. For example, Georgia Tech pairs a screener with an instructor and uses the screener to monitor the questions and pass along to the instructor those questions that will improve the training and help students to learn.

SAS also uses technology to help monitor and review questions. Through Microsoft Live Meeting, participants are able to “raise their hands” when they have a question. The program indicates a potential question by changing a participant’s “seat” color on the on-line screen visible to the instructor and screener. In addition, the screener is able to mute one or all participants if the conversation gets out of control.

4. Use technology monitors. The benchmarking partners have found that many participants and instructors have trouble with and questions about the technology used during the live Webcasts. Because providing technology assistance to participants is not the role of the instructor and can take away from other participants’

experiences, Georgia Tech provides each instructor with a technology expert. The technology expert is there to:

- Respond to questions about technology
- Troubleshoot technology challenges
- Operate technologies for instructors

Example of Question Screeners and Technology Monitors

Georgia Tech provides at least one question screener and one technology monitor for each live Webcast. The question screener can focus on receiving and determining which questions are suitable to be addressed during the live Webcast. The technology monitor makes sure that the instructor can focus on teaching the course rather than worrying about whether internal or participant technologies are working. Each member of the presentation team has a specific role that serves to provide an uninterrupted training session to participants.

5. Ensure that individuals who deliver the Webcast have teaching abilities. The benchmarking partners that use live Webcasts indicate that not all instructors are effective at delivering training using this medium. For example, GMAC hired a university professor as the subject matter expert to deliver a live Webcast training session. Although the information he presented was very well received, he was unable to stay within range of the camera and would walk in-and-out of view at a rapid rate. As mentioned earlier, SAS will not allow an instructor to teach a live Webcast course until he/she has received specific training and conducted two rehearsals before the first session. In fact, SAS has 77 instructors, with only 20 qualified to teach live Webcasts.
6. Publicize broadcasts. Because live Webcasts can be difficult to schedule and the training will not be effective if there is no one participating in the session, publicizing them is very important. A rule-of-thumb is to begin publicizing each Webcast approximately 30 days in advance by using a variety of media. These may include newsletters, the Internet, the Intranet, and supervisors who can help remind the participants of the training.
7. Limit the length of programs. People tend to get bored and physiologically tune out during long training sessions, especially when opportunities for interaction are limited. A key recommendation by our benchmarking partners is to limit the amount of time spent in any one Webcast training session. One benchmarking partner suggested that individual training sessions should be scheduled for no longer than a half-day, and the training session should be broken-up into 1-2 hour segments.
8. Make informed decisions about technology. The benchmarking partners use a range of software programs for their courses including Microsoft Live Meeting through PlaceWhere, WebEx, and Microsoft Windows Media Encoder. Each partner considered using several programs before deciding on one of those listed above. For example, GMAC has used WebEx but has had difficulty recording and synchronizing

both audio and video communications. Media Encoder is now used to record programs. SAS makes the assumption that most of the top products have similar capabilities and makes decisions primarily based on cost and whether the vendor will be around in a few years. The assumptions made by SAS is that each top product will have:

- Application sharing
- PowerPoint capabilities
- Chat capabilities
- Registration capabilities

Webinars. Webinars are another method of synchronous Web-based training delivery that is being used by several benchmarking partners and industry leaders in training. Some experts use the terms Webcast and Webinar interchangeably. For this report, we refer to Webinars as live, synchronous Web broadcasts that add a degree of complexity and interactivity beyond that offered by Webcasts. In contrast to Webcasts, which are more like Web-based lectures, Webinars take the form of Web-based seminars. For example, while a Webcast focuses predominantly on the instructor, Webinars have a greater capacity to focus both audio and visual communications on all participants.

Live Webinars are useful for providing informational training and for situations that require more the feel of a classroom-based seminar. Similar to Webcasts, they can be taped for later asynchronous viewing and can be used to provide training even when a participant cannot attend the original session. Many of the best practices that we identified for Webinars are similar to those presented in the live Webcast section:

- Record all Webinar sessions
- Make technology assistants available to help participants during the session
- Ensure that instructors have Web-based teaching experience
- Publicize Webinars

Additionally, we found that Webinars have the capability to better incorporate two-way interactions by creating the feeling that the training is a seminar rather than primarily a lecture. Highly interactive Webinars are most useful when there are a limited number of participants such as with a round-table or face-to-face seminar. The current Webinar technology and software packages provide the capability to create even more interactive trainings through the Web.

Satellite Broadcasts. Satellite broadcasts were not the focal point of any benchmarking partner's training program, although some benchmarking partners are using the technology effectively to disseminate critical information and train geographically dispersed individuals. As indicated previously, our research shows that most training programs are moving toward more live Web-based delivery methods that share many of the benefits of satellite broadcasts. One benchmarking partner explained the shift by saying that satellite courses do not meet the "my desktop, at my time" needs of most busy

professionals. Another benchmarking partner indicated that “live Web courses have taken over satellite courses because people have better access to them.”

We discovered during the site visits some definite downsides of using satellite broadcasts to deliver training programs, which are presented in table 5.

Table 5: Limitations of Satellite Broadcast

<ul style="list-style-type: none">➤ Facilities – Satellite broadcasts require facilities that have video production and broadcasting capabilities, and training sites to have satellite reception capabilities.➤ Location – Satellite broadcasts require participants to travel to specific locations (with satellite downlinks) to participate in the training session.➤ Scheduling – Satellite courses are difficult to schedule -- courses must be scheduled when the infrastructure and all participants are available.➤ Personnel – Significant personnel is required to maintain the facilities, troubleshoot technical problems, and schedule and conduct courses.➤ Cost – The overall cost of satellite programs can be high. Additional costs can include infrastructure purchase and maintenance, instructor and participant travel, and personnel.➤ Interactions – Satellite broadcasts are typically one-way communications from the instructor with limited opportunities for participant interactions.

Despite the downsides to using satellite broadcasts, we did find that two of our benchmarking partners, the CDC and Georgia Tech, use satellite broadcasts (typically recorded live) effectively for certain types of material. One reason they are able to use the satellite technology successfully for training is that both sites have an extensive satellite broadcast capability and maintain a relatively large staff that can develop training programs using various media. For example, the CDC has a staff of 50 professionals dedicated to maintaining its training programs and Georgia Tech has three satellite dishes and nine satellite capable classrooms. OSHA is using satellite broadcast minimally for outreach or just-in-time updates.

Through the site visits and benchmarking research, we identified several best practices in the delivery of satellite broadcasts. Because satellite broadcasts and live Web-based courses have similar designs, capabilities, and challenges, many of the satellite best practices are similar to those discussed previously in the Webcast and Webinar training delivery sections. We present each best practice briefly and expand only on those practices that are unique to satellite broadcasts.

1. Training goals and content should dictate the use of satellite broadcasts. Many experts and the benchmarking partners agree that satellite broadcasts are most effective for delivering informational programs to a geographically dispersed population. Satellite broadcasts are also effective for providing just-in-time information and can be used to deliver technical programs that are broken up into short courses. For example, the CDC uses the satellite broadcast to disseminate critical information in a timely manner (i.e., in less than 48 hours). Some rapid turn-

around satellite broadcasts sponsored by the CDC have focused on smallpox, bioterrorism, and SARS.

2. Record satellite broadcasts. When possible, our benchmarking partners suggest recording at least the instructor in a live satellite broadcasts. One of the challenges of satellite broadcasts is scheduling them so that all interested parties can participate. Recorded broadcasts can be placed on asynchronous sites for later use, which is especially helpful for rapid turn-around programs such as the CDC conducts. The benchmarking partners stress that there are two important points to remember when recording satellite broadcasts: 1) video broadcast require a lot of bandwidth and may be difficult to store on some sites or send out as a CD-Rom; and 2) synching video and audio can be difficult.
3. Incorporate opportunities for interaction into the satellite broadcast. Similar to the live Webcasts, our benchmarking partners recognize that for successful learning to occur, participants in a satellite broadcast must have the opportunity to ask questions and discuss the broadcast with others. To promote interactions between participants and instructors during satellite broadcasts, many benchmarking partners give participants the opportunity to ask questions during the broadcast. Similar to the Webcasts, we found that the most common methods used to elicit questions include:
 - Call-in questions
 - Fax-in questions
 - E-mail questions
4. Use screeners to review participant questions. Some of the benchmarking partners find that instructors receive too many questions to respond to during the satellite broadcasts and that reading each question individually takes time away from teaching. To meet this challenge, a form of question screening and monitoring has been incorporated where one or more individuals are available to receive, read, and review questions to determine whether the instructor should respond to them during the live broadcast.

Example of Question Screening During Satellite Broadcasts

The CDC maintains a call center staffed with 4 to 5 individuals that accept and monitor phone-in questions during satellite broadcasts. Their job is to evaluate questions before deciding whether to patch them into the live broadcast. Questions that do not promote topical discussions are saved and later posted to an asynchronous site, while those that do promote the discussion are patched in live to the instructor. By using the telephone monitors, the instructor is free to teach the course without interrupting the flow to wait for questions.

5. Publicize broadcasts. Because satellite broadcasts can be difficult to schedule, publicizing them is very important. A rule-of-thumb is to begin publicizing each broadcast approximately 30 days in advance by using a variety of media (e.g.,

Intranet, newsletters, supervisor communications). The CDC has distance learning coordinators in every state to promote the satellite broadcasts (e.g., sending fliers about the broadcast to health care workers) and assist with registration for broadcasts.

6. Ensure potential participants can participate in the satellite broadcast. Before developing a satellite broadcast, it is critical to ensure that all participants will have access to it. Access may be at participants' home office or they may need to travel to a regional center.

Other best practices that apply to both live Web-based training and satellite broadcasts are:

- Train instructors in satellite training methods so they are effective at delivering the broadcast
- Use technology monitors
- Limit the length of broadcasts to 1 – 2 hours per session

Videoconferences. Both the CDC and Georgia Tech have also incorporated videoconference capabilities into their training programs. Videoconferences are similar to satellite broadcasts but have the capability to better incorporate two-way interactions. Instead of a camera focusing primarily on the instructor, videoconferences may have several cameras set up in different locations that are able to show the participants at each of the locations. Videoconferences allow participants to ask questions of the instructor and each other and discuss the training material throughout the session.

Many of the downsides that we found with satellite broadcasts are also associated with videoconferences, and some may be more extreme. One example is that for videoconferences to be a viable training method, training sites must have not only the capability to receive broadcasts but also the capability to send broadcasts. Another example is that recording the sessions is even more difficult because both the audio and visual communications are two-way and capturing this requires an extensive infrastructure that most training programs cannot afford.

Videoconferences are best used when the training must take on the feel of a more intimate meeting and where extensive interactions are required. Because the media is used to promote continuous two-way conversations, the number of participants or participant sites should be limited to a number that is effective for action meetings (i.e., 10 or fewer). In addition to the best practices we identified for satellite broadcasts, we found the following best practices for videoconferences.

1. Establish etiquette. Before beginning a videoconference, all participants should be reminded of proper etiquette. Videoconferences provide all participants the opportunity to see and hear each other, and thus interact in an intimate and possibly informal atmosphere. Unfortunately, participants sometimes forget that and say or do things that would be considered inappropriate in a regular meeting. For example, participants in one site may constantly move around and disrupt the visual

communications for others, and participants in another location may forget to press mute while having discussions amongst themselves about the program, other participants, or even lunch plans.

2. **Contract with a vendor.** Videoconferences often require facilities and technology that most training programs cannot afford and many industry leaders are not sold that the costs outweigh the benefits of videoconferences. One solution is to contract with a vendor such as Georgia Tech that maintains a staff dedicated to maintaining the videoconference facilities. Georgia Tech has, for example, the capability to centralize all communications and can even convert dissimilar videoconference formats into a common one.

Asynchronous Delivery Methods

Asynchronous training does not require live instructors and is commonly referred to as self-paced training. Most of the benchmarking partners agree that asynchronous training delivery methods should be used when live interpersonal interactions are not necessary, when trainings are informational-based or include simulations, and when participants are geographically dispersed. Asynchronous delivery methods provide participants with the opportunity to access training when and where they want. All five of the benchmarking partners use one or more asynchronous training delivery methods, with self-paced Web training being used most frequently, followed by CD-Rom/DVD courses. Paper-based (self-paced) training courses are not as commonly used as other asynchronous training delivery methods.

As with synchronous training methods, the primary challenge faced by organizations that use asynchronous methods is incorporating interactivity into courses. Because there is no live interactions with these methods, this challenge takes on a different meaning for asynchronous courses. Not only must the course provide opportunities for participants to interact with each other, but it must incorporate methods for participants to interact with the technology. Also, while impromptu interactions may be likely in synchronous courses, all interactions must be specifically designed into an asynchronous course.

For the remainder of this section, we present our findings on the best practices and trends associated with asynchronous training delivery methods: Web-based (self-paced), CD-Rom/DVD, and paper-based (self-paced). Similar to the synchronous training delivery methods, we focus on Web-based delivery because we feel this is the direction that most of our benchmarking partners and the industry are moving. However, many of the best practices associated with self-paced Web courses can be applied to other asynchronous training methods.

Self-Paced Web Courses. Industry experts agree that self-paced Web courses are better for some course content than other. For example, Hall (2001) suggests that the Web works best for courses that:

- Focus on content and information and are fact-based
- Do not require experiential learning that closely mirrors job situations

- Require minimal interactions among students and instructors and are not intended to develop interpersonal skills

Through our site visits and benchmarking research, we learned that there is a great deal of variability in the effectiveness of self-paced Web courses. Many organizations are in the rudimentary stages of developing asynchronous Web courses, simply putting PowerPoint slides on the Web site or putting material from written self-study training courses on the Web. Further, the American Society for Training and Development (ASTD) claims that most on-line training lacks interaction and quality instruction (from ASTD E-Learning Handbook). The industry leaders, however, are creating interactive, Web-based courses that engage participants through simulations, quizzes, chat rooms, Web boards, and so forth.

We identified several best practices in self-paced Web courses:

1. Provide opportunities for interactions with other students and instructors. Many of the benchmarking partners and other training industry leaders have incorporated several methods for allowing students to ask an instructor, TA, or other students questions while they are completing a self-paced Web course. Examples of interactive methods used are:
 - Create a link within the Web site where students can email questions to instructors or set up electronic office hours.
 - Create a Web board where students can post questions that are answered by an instructor or other students (also known as threaded discussions). Instructors can also post updates and new slides and materials to the Web board.
 - Incorporate chat rooms where students can discuss course issues and ask questions of each other and the instructor.
 - Encourage cohorts of participants to complete the course together at the same time. It is easier and more efficient to provide interactive opportunities to a group of participants taking a course at the same time. For example Georgia Tech sets up chat rooms and bulletin/Web boards so cohorts can discuss the course and ask each other questions while they are taking the course (e.g., between sessions). Another organization uses a course moderator who introduces the self-paced Web course, asks questions throughout the course to involve students, answers student questions, and facilitates interactions among students taking the course at the same time.
 - Use audioconferences as a de-briefing after students complete the self-paced course. This provides students the opportunity to ask questions about the course and discuss course content with other students.
2. Provide opportunities for interactions with the technology. Asynchronous Web courses do not inherently require interactions. However, interactions are deemed necessary for training to be effective, and advancements in technology have made it easy to incorporate strategies for interacting with the technology. For asynchronous courses, it is critical to keep participants involved in the course so they will actually

complete the course and learn the required skills/knowledge. By incorporating some of these interaction strategies, a self-paced Web course can be an effective method of providing technical types of training. Some examples of how interactions with the technology are incorporated are presented below.

- **Quizzes/assessments** – Some of the benchmarking partners use short quizzes or assessments to foster interactions with the technology. For example, during a Web-based PowerPoint presentation, SAS presents short quizzes (often just one question) every few slides to keep participants interested and engaged with the course. The course then provides feedback to trainees on whether they answered the questions correctly and explanations for those that are answered incorrectly.
- **Simulations** – Some intricate simulations have been developed and used to augment self-based Web training. Effective simulations reflect the real world and allow participants to learn by doing and practice a skill taught in the training session. The primary types of simulations are software application, scenario-based, and business and financial simulations. For example, SAS provides instruction and then has participants practice key tasks before returning to the main training session. Other organizations show actual equipment used on the job and use three dimensional graphics to instruct on correct usage of the equipment.
- **Case studies** – Many industry leaders are incorporating interactive case studies into Web-based training by providing trainees with problems to solve. Case studies serve much the same purpose as simulations; they provide real world examples to augment the training. Interactions with case studies can be enhanced by presenting them as points that cohorts can discuss on a Web board between sessions.

Example of Interactive Quizzes

During a self-paced Web program, SAS often presents quizzes. The quizzes can be programmed so that participants providing wrong answers may be blocked from continuing with the training until a correct answer is provided.

Examples of Interactive Simulation

Bank of America uses streaming video and audio in its self-paced Web training course to allow loan officer trainees to interact with a prospective simulated client. Trainees ask a series of questions to determine whether the client would be eligible for a loan. (Taken from Brandon Hall, *Six Steps to Developing a Successful E-Learning Initiative*, 2001).

Cisco provides on-line access to equipment labs so that the trainee can, for example, try configuring a switch or router before actually doing it on the company site.

3. **Create engaging material.** Although the course content is the most important determinant of the effectiveness of a self-paced Web course, the look and feel of the training (Web site) is a close second. Research cited by David Daly and Amy Scott (*Best Practices Handbook: Best Practices for Advanced Distributed Learning*) shows

that individuals learn 75% of what they know through vision. They indicated that “pictures and words together are six times more effective than words alone.”

Industry leaders use graphics and pictures to make self-paced Web training more interesting. However, graphics and pictures should be relevant to the training and visually represent or enhance the content of the Web course (not just “nice to have”), and be easy to read. Another recommendation made by industry leaders is that presentations should maintain the look and feel of the organization (branding).

4. Make it easy for participants to access the training. Some self-paced Web courses require participants to download programs such as Flash or WebEx, or update their existing Web browsers. However, many organizations limit what employees can download from the Web to maintain security and prevent viruses from entering a network. It is critical for organizations to provide trainees with technical support for accessing Web-based courses. For example, to assist participants, SAS sends CDs with downloading materials to those who are unable to download the materials from the Web.
5. Demonstrate a commitment to Web-based training. Industry leaders demonstrate a strong commitment to Web-based training by encouraging employees to complete the self-paced course on company time. Unlike employees who complete training at a location away from the office, self-paced Web training introduces the challenge of ensuring that employees are free to complete the training without distractions (e.g., supervisors interrupting trainees and asking them to attend a meeting; a customer calling a trainee). For example, at Cisco Systems, employees who are completing an on-line class can put up yellow police tape to signal that they are in the process of completing a Web-based course.
6. Be thorough with content and delivery methods. Because self-paced Web courses are essentially stand-alone programs, it is even more important to make sure that content is up-to-date and that delivery techniques work. While synchronous courses have almost instant feedback loops, asynchronous courses do not. Participants may not be able to access or work within the program and it may take weeks or longer for the training developer to find out that students are having difficulty with the training.

CD-Rom/DVD and paper-based self-paced courses. Completing courses by inserting a CD-Rom/DVD into one’s personal computer and completing a paper-based self-study training course are two other forms of asynchronous learning. None of the benchmarking partners make extensive use of CD-Rom/DVD or paper-based training materials, but some did augment training with these delivery methods. The most common method used was to send already developed training materials to participants (in a CD-Rom/DVD or paper format) who could not access a self-paced Web course. The materials sent are essentially the same as those posted to the Web site. One of the benchmarking partners, OSHA, indicated that it does not use CD-Rom because the data can get outdated easily and there is not a way to update it quickly. OSHA also feels that with CD-Rom, it can lose control of the course content.

However, many organizations we learned about in our literature review are using CD-Rom or DVDs to replace Web-based training when potential trainees are on the road or in foreign countries and do not have Internet access. Other organizations have created electronic libraries with hundreds of CD-Rom and DVDs that were created to capture live satellite broadcasts, classroom courses, or Webcasts. These libraries provide just-in-time training for individuals who missed the live course, new employees, and so forth. For example, Georgia Tech records all videoconferences on CDs and DVDs so that they can be used to train individuals that could not attend the live sessions.

Blended Learning

Another trend we identified through the site visits and benchmarking research is the introduction of blended learning programs. Blended learning programs incorporate two or more training delivery media to provide not only a more holistic learning experience but also multiple learning situations for the busy professional. Many training experts and industry leaders make the claim that blended learning is more effective than any single training delivery method. For example, OSHA is moving toward a blended learning approach. OSHA uses the Web-based portion of a blended course to bring all students up to the same level by the time they get to the classroom.

One interesting trend in blended learning is the shift back to using classroom-based experiences to augment distance learning programs. That is, many organizations are combining classroom and Web-based training. For example, a self-study Web course may be used to provide critical knowledge before the classroom session (as a prerequisite to the course) or as a wrap up after the classroom session. The classroom session then focuses on interactive exercises, discussions, case studies, and simulations versus delivering information in a lecture format. Other organizations are combining self-paced materials with live Webcasts. For example, Stanford University has trainees review regulations in a self-study Web or paper format and then participate in a live moderated Webinar to discuss the implications of the regulation to their jobs, ask questions, and so forth.

Blending learning programs have the opportunity to provide a more exciting and enriching training experience. Rather than being limited to one training medium, blended learning programs utilize the best practices of two or even several training methods. These types of programs also offer greater flexibility to both instructors and participants. Classroom-based or even satellite broadcasts often require that participants travel to a training site. If a training program is scheduled to last five days, participants must travel all five days. However, the blended learning approach can help reduce travel time by presenting day 1 introductory and day 5 wrap-up information over the Web. This reduces travel costs and potentially frees-up participants' time so they can work on other tasks rather than spend all day at a training site.

Some benefits of blended learning programs cited by industry leaders are:

- *Greater flexibility* – instructors and participants are not constrained by a specific delivery method
- *Improved learning effectiveness* – the use of a variety of delivery methods provides a better match between delivery and participant learning styles
- *Greater reach* – training can better reach participants with scheduling or technological constraints
- *More time spent training and less time spent lecturing* – more instructor time can be spent on hands-on training rather than lecturing.
- *Greater opportunities to cut costs* – expensive delivery methods can be replaced or augmented with other methods, rather than eliminating an entire program

Example of Blended Learning Program

One organization recently converted a 5-week long satellite broadcast training program to a blended learning program. Before it is converted to the blended learning course, 20 participants participated in the training watching a satellite broadcast as a cohort (4 training sites with 5 participants per site). Participants watched one satellite broadcast per week for 5 weeks.

The organization decided to convert this course to a blended learning program because conducting training solely through satellite broadcasts required a great deal of scheduling, forced participants to attend pre-set sessions at a site away from their office, and required technical support staff to be available each week. By using the following blended learning approach, the instructor could limit the time he/she and the participants spent in satellite broadcasts while providing a more robust training program for participants:

Week 1 – The instructor presents an introduction to the training program via a satellite broadcast. He/she demonstrates some key tasks that participants need and provides an opportunity for participants to see and meet each other.

Week 2 – Information is delivered via the self-paced Web method. This session is more informational and does not require any demonstrations. However, while participating in the Web session, trainees practice the skills demonstrated in week 1 by completing a short simulation. Participants are free to access this session anytime during the week and are provided a Web board to interact with other participants.

Week 3 – This session is conducted via a live Webcast. Similar to week 1, the instructor demonstrates some skills via a live session. The Webcast is also taped so that participants can access it during the week.

Week 4 – The training is once again conducted via the self-paced Web method. Participants are provided the opportunity to practice the skills demonstrated in week 3.

Week 5 – The wrap-up session is presented via live Webcast. This session is conducted primarily so that the instructor can provide final thoughts and answer any remaining questions that participants have.

Example of Blended Learning Program

Georgia Tech uses a blended learning method for some of its training courses (typically courses that require student interactions and group work). Students complete a self-study Web course and then get together in local classrooms after the course to discuss issues or work in labs.

SUMMARY

Classroom-based delivery methods still account for a large proportion of training programs, and many training experts believe that there will always be a need for these types of programs. However, live Web-based training (e.g., Webcasts) is quickly replacing satellite broadcasts as the primary method for delivering interactive training programs. Satellite broadcasts can be expensive to develop and deliver, difficult to schedule, and require participants to travel to a site with satellite downlink capabilities. Live Webcasts, on the other hand, provide busy professionals with desktop access to courses, and technological advances have led to even greater opportunities for both interpersonal and person-to-technology interactions. Additionally, live Webcasts can be easily recorded and posted to a Web site for later viewing.

Many industry leaders also use a variety of self-paced training methods such as Web-based courses and CDs/DVDs. The trend is toward providing self-paced Web courses because they allow participants to access the materials at “their desktop and their time.”

Incorporating methods for interactions into distance learning training courses is an important best practice for enhancing their effectiveness. Our results show that many organizations are implementing innovative strategies for increasing interactions in both synchronous and asynchronous training courses. Some of the methods include providing opportunities for participants to ask questions during the training session (e.g., live call-in questions, Web boards), providing question screeners, and using simulations, case studies and quizzes.

V. Training Evaluation Process

Industry experts in the training field stress the importance of evaluating training programs to ensure they add value to organizations and training participants. Training evaluation data are critical for determining the extent to which the content of the training program and the way in which the training is delivered results in increased skills and knowledge for trainees, and positively impacts the organization's performance. It is only through this evaluation process that organizations can gain insights into ways to improve training programs, and demonstrate that they get a good return on investment from their training efforts.

TRAINING EVALUATION LEVELS

Our research shows that despite the stated emphasis on evaluating training programs, few organizations actually evaluate their programs beyond the commonly referred to "smile sheets" or level 1 evaluations (see Table 6 for a brief description of commonly cited training evaluation levels). ASTD stated in its 2003 State of the Industry Report that 75% of organizations use "smile sheets" (level 1) to evaluate their training programs. The results from our site visits reveal a similar trend – a few training programs are evaluated at level 2 (learning) but most training programs are not evaluated beyond level 1 (participant reactions). Level 1 evaluations, when done appropriately (e.g., are systematically developed, use standardized questions, include a balance of multiple-choice and open-ended questions), provide information for assessing the structure and content of the course. This type of evaluation typically provides an assessment of the course content, format, teacher effectiveness, delivery method, and course materials. Type 1 evaluations are a necessary but not sufficient component of the overall training evaluation process.

Table 6: Training Evaluation Levels

Evaluation Level	Description
<i>Level 1 – Reactions</i>	Often referred to as “smile sheets”, a level 1 evaluation measures participant reactions and satisfaction with the training course. For example, did trainees like the training program and was it what they expected? While any training program should be evaluated at least at this level, it is rarely a sufficient measure of the training program’s impact or of participants’ learning. For example, although a negative reaction reduces the possibility that the training was effective, a positive reaction in no way guarantees effectiveness.
<i>Level 2 – Learning</i>	A level 2 evaluation moves beyond reactions and attempts to measure changes in knowledge, skills, and attitudes as a result of the training. The most effective way to determine whether learning has occurred is to conduct pre- and post-evaluations to measure absolute change in skills/knowledge.
<i>Level 3 – Transfer</i>	A level 3 evaluation measures not only whether participants have learned but also whether the learned skills are being used (transferred) to everyday work situations. Does the training lead to changes in behavior on the job?
<i>Level 4 – Results</i>	A level 4 evaluation measures the bottom line results; did the training improve quality or increase productivity? These are the results that top line managers and executives understand and are looking for.

See: Kilpatrick, D. (1994). Evaluating training programs: The four levels. San Francisco: Berrett-Koehler.

As indicated previously, a few of the benchmarking partners do evaluate their training using level 2 measures, which assess the extent to which participants have learned required skills/knowledge. Examples of level 2 evaluations used by benchmarking partners include: 1) quizzes or examinations to determine proficiency (many use pre- and post-test exams to measure changes in skills/knowledge due to the training course); and 2) course certification or continuing education units (CEUs) for completing courses.

However, the benchmarking partners have found that providing certifications or CEUs is difficult in a distance learning format because it is often difficult to monitor course attendance. For example, SAS does not conduct any certification programs through distance learning. They believe that there is no way to truly monitor the process unless it is administered through classroom-based training. Georgia Tech has attempted to alleviate this problem by requiring distance learning participants to use registered exam proctors such as work supervisors, managers, or HR representatives. These proctors are responsible for ensuring that the person taking the exam is the same person that is taking the course.

While level 1 and 2 evaluations are important and can help design better training programs, they do not provide any substantive information relating to the ultimate outcomes or value of the program. The evaluations typically take place at the very end of a course when participants are tired and less likely to take the additional time to provide insightful feedback. Also, because they are conducted solely at the end of a course, there are no opportunities to track whether the training has led to any substantive improvements in key organizational metrics

BEST PRACTICES IN TRAINING EVALUATION

In this section, we summarize training evaluation trends and best practices based on the site visits and benchmarking research.

1. Evaluate the impact of training on job and organizational performance. Experts in the field recommend evaluating training programs beyond levels 1 (reactions) and 2 (learning) to demonstrate the overall value of training programs. By showing that participants are able to transfer their newly gained knowledge and skills to everyday work tasks and connecting this knowledge transfer to improved employee and organizational performance, a training department is able to quantify, not just say, why training is important.

While in theory the benchmarking partners understand the importance of evaluating training programs beyond levels 1 and 2, none are systematically measuring the extent to which their training programs impact individual and organizational performance. The benchmarking partners are still focusing on end-of-course evaluations -- they typically ask all trainees to complete a course evaluation form at the end of the training course, satellite broadcast, Webcast, etc. The primary focus of the evaluations seems to be on helping improve the overall design of the training course (e.g., instructor effectiveness, flow of training, training materials).

Most of the benchmarking partners agree that higher level evaluations are very difficult to do because it often takes several months before an organization may see any change in performance and unless the training is focused on a specific skill set, it is often difficult to demonstrate a cause-and-effect relationship between training and performance.

However, through our benchmarking research (e.g., literature review), we identified a few training industry leaders that are conducting level 3 and 4 evaluations of their training programs. Below we describe some of the evaluation practices of these industry leaders.

Example of Level 3 Training Evaluation

One organization has implemented an extensive process for evaluating the impact of its training programs on employee performance. Each month, the training organization selects courses for further evaluation. Training participants receive an electronic survey approximately three months after course completion to assess how well they have applied the training on the job. The participant's supervisor receives a similar survey asking for an assessment of the extent to which the training has improved their employee's performance on the job. These surveys are used to refine and improve training courses.

Example of Level 4 Training Evaluation

Cisco Systems is using several methods to assess the overall effectiveness of its E-Learning efforts. Examples include:

Cisco examined a sample of resellers taking a certification course (1/2 through classroom training and 1/2 through Web-based training). The pass rates for each group were compared, and the e-learners had a 10% better pass rate than the classroom learners.

Cisco also looks at cost savings for e-learning courses. Cisco has found that Web-based training saves millions of dollars per year because it reduces the amount of time employees take to learn a desired skill/knowledge, and ultimately improves their performance on the job. Other cost savings include reduced travel cost to attend classroom training and less time away from the customer (which increases productivity).

Taken from: Mission E-Possible: The Cisco E-Learning Story (Patricia A. Galagan, February 2001).

Training evaluation experts provide a good piece of advice to help move to level 3 and 4 evaluations: begin the planning process early. Organizations must define the desired changes in employee or organizational performance and quantify how they will be measured before developing the training program. These defined changes should help shape the overall evaluation process so that a clear connection can be made between the training program and desired results. Level 3 and 4 evaluations can be accomplished, but they take time and planning.

2. Conduct pre-and post-course evaluations to track learning as a result of the training course. Many of the benchmarking partners conduct pre-course evaluations as a baseline to measure learning throughout the courses. Pre-course evaluations provide an excellent measure of the knowledge, skills, and abilities that participants bring to a course. Understanding what participants bring to a course not only allows instructors to tailor their messages, but it also provides a way to measure change due to the course (a level 2 assessment of the effectiveness of the training),
3. Collect feedback from multiple sources. Industry leaders collect data from multiple sources when evaluating training programs. Sources may include training participants, participants' supervisors, training developers and instructors, site coordinators, and organizational leaders. Taken together, these data can provide a complete picture of the effectiveness of the training content and structure, and most importantly, the impact of the training on participant job performance and overall organizational results.
4. Regularly review and use evaluation data to improve the effectiveness of training courses. Although the benchmarking partners typically focus on level 1 and 2 evaluations, they are taking these evaluations seriously by monitoring the feedback provided by participants in training courses, and most importantly, using the feedback

to make improvements to training materials, the way training is delivered, instructor effectiveness, the technology, and so forth. They are using these data to make decisions about whether to modify or redesign training programs or eliminate ineffective programs.

Example of Using Evaluation Data to Improve Training Programs

SAS has one of the most extensive evaluation procedures of the benchmarking partners, but the evaluation still does not go much beyond a typical “smile sheet.” SAS evaluations occur immediately following a course. Courses that do not meet a minimum average rating of 3.5 out of 4 on key evaluation questions are further examined to assess why the ratings are low. SAS will directly contact customers to elicit further information about why courses were reviewed less favorably than expected.

5. Extend training evaluation beyond classroom courses. Organizations tend to focus on evaluating classroom training and do not conduct extensive evaluations of their Web-based or satellite courses. Industry experts recommend that organizations moving away from classroom training conduct evaluations to ensure that Web-based training: 1) is as effective as classroom training at teaching required skills and knowledge; 2) engages trainees to begin and complete courses; and 3) provides a cost-effective alternative to classroom training.

Examples of Evaluations of Web-based Courses

- In its E-learning Handbook, the American Society for Training and Development recommended the following types of measures for evaluating the effectiveness of self-paced Web training:
- Total number of training hours – to determine whether Web training reduces training time (which saves the organization money)
- Attendance and retention rates (Did employees actually complete the Web-based course?)
- End-of-course questionnaires to obtain participant feedback on the effectiveness of the Web course (Was the Web the best method for teaching the skill/knowledge? Was the Web site easy to access and navigate? Were the quizzes and simulations effective?)
- Pre- and post-tests to determine whether participants increased their knowledge as a result of the Web training course
- Cost reduction – Did the Web course reduce training delivery cost (e.g., travel)?
- Productivity – Did the Web course help to prepare new employees to be productive on their jobs quicker than more traditional training methods?

6. Use standard evaluation procedures. The benchmarking partners revealed that another key area to consider in training evaluation is standardization of evaluation instruments. For example, although the CDC has five standard evaluation questions, its clients are encouraged to include additional questions. While this may help

customize the process, the overall result is a lack of standardization beyond the five questions. Additionally there is a lack of standardization for when evaluations are conducted. While the CDC evaluates most asynchronous courses, it is not standard practice to evaluate synchronous courses.

Without a standard process, it is not only extremely difficult to monitor the overall impact of training courses, but also to develop a common goal for all courses. Standardization of the process will help connect overall training goals and needs by focusing on a core set of measures that are changed only after all training goals have been met.

7. Consider unique ways to evaluate training programs. The benchmarking partners demonstrate some unique methods of evaluating their training programs. Both GMAC and SAS believe if training participants find the courses valuable, they will continue to enroll in, and in SAS' case, purchase the courses. For example, SAS monitors the 18-month re-buy rate of its training programs. SAS believes that a successful training program is one in which 60% or more of customers re-buy training.

SUMMARY

APTI is not alone in the challenge to conduct effective evaluations of its training programs. However, like most of the benchmarking partners, APTI needs to reexamine its training evaluation process to ensure that it is measuring the “right things” – the extent to which the training is adding value to air professionals and their agencies as a whole. To conduct such best practice evaluations, APTI should move its evaluation level up to *transfer* and *results*. That is, focus on evaluating the extent to which training programs affect the performance of air professionals and key organizational metrics.

VI. Conclusions and Next Steps

In this report, we identify best practices of leading training programs, particularly in the areas of needs assessment, course design and content, training delivery methods (specifically distance learning), and training evaluation. The best practices were identified based on site visits with five organizations with innovative training programs, as well as a literature review of current training trends and best practices.

We believe that there are several best practices that APTI should consider incorporating into its Air Pollution Training Program to reduce the gaps that were identified during the evaluation of the current training program (during Task 1). For example, in the Task 1 report, we concluded that APTI's distance learning training courses (e.g., satellite broadcasts, self-paced Web courses) did not include enough opportunities for interactions between participants and instructors, among participants, or with the technology itself.

In this section, we present a high level summary of those best practices that, if adopted, may improve the overall effectiveness of the Air Pollution Training program. The Task 3 report will provide more detailed options for improving the APTI training program and a plan of action for doing so.

Training Needs Assessment

1. Incorporate a skill/competency assessment into the needs assessment process versus simply projecting the number of air professionals likely to attend various classroom training courses. This type of assessment will provide valuable information for determining the gap between the skills/competencies required for success in the job and the levels currently possessed by air professionals. This should be followed by a thorough review of the current APTI training courses to ensure they are meeting the training needs of air professionals.
2. Collect data from multiple sources (e.g., air professionals, supervisors of air professionals, regional consortium members, training instructors and subject matter experts) about the need for different types of air pollution training courses (both course content and delivery methods).
3. Use the results of training needs assessments to design more effective training programs, and communicate decisions about training courses (e.g., eliminating a course, adding a new course, translating a course from the classroom to a Web-based medium) to the air professionals community.

Course Design and Content

4. Conduct regular reviews of training courses (e.g., every 1 – 3 years) and update courses as needs. For example, some updates may require simply replacing content in a self-paced Web course. Others may require major overhauls or total redesign of a course.

5. Incorporate real-world examples, simulations, and case studies into self-study Web courses.
6. Pilot test all courses before they go live. For example, pilot test participants should complete and evaluate all self-paced Web courses (e.g., for content, ease of using the technology, value of interactive exercises) and feedback from participants should be used to improve the Web courses. As another example, live Webcasts and satellite broadcasts should be rehearsed and the scripts reviewed before being delivered to air professionals.

Training Delivery Methods

7. Begin to make more use of live Webcasts (versus satellite broadcasts) to allow air professionals to complete the training at their desktops versus travel to a satellite downlink site.
8. Incorporate methods for interaction into distance learning courses (e.g., self-paced Web courses, live Webcasts, satellite broadcasts) to enhance their effectiveness. For example, provide opportunities for participants to ask questions of the instructor and use question screeners during live Webcasts or satellite broadcasts (e.g., phone or fax in questions). For self-paced Web courses, incorporate methods for: 1) student-to-instructor and student-to-student interactions (e.g., chat rooms, Web boards); and 2) interactions with the technology (e.g., real-world simulations, case studies, quizzes).
9. Ensure that individuals who deliver training (e.g., satellite broadcasts, live Webcasts) not only are subject matter experts but effective at teaching with the delivery medium being used.

Training Evaluation

10. Expand the training evaluation process beyond end-of-course level 1 evaluations (“smile sheets”). Determine the extent to which the training actually helps air professionals to do their jobs effectively and contributes to the mission of their agency. For example, solicit feedback from air professionals and their supervisors 3 – 6 months after the training to determine the extent to which the training helped air professionals to be more effective on their jobs.
11. Monitor and use evaluation data to make improvements to training courses (e.g., training materials, the way training is delivered, effectiveness of simulations or case studies, ease of use of the technology). Decisions about whether to modify, update, redesign, or eliminate training courses should be based on data collected via training evaluations.

Our next step in the benchmarking study is to obtain input from APTI into those best practices that are most cost effective and feasible to implement. We will facilitate a discussion with the APTI team to determine:

- Extent to which the best practices can be incorporated into APTI's culture, processes, and procedures
- Whether APTI has the resources (e.g., dollars, staff) to implement the best practices
- Barriers that may impede successful implementation of the needed changes to the program
- Key accountabilities for needed changes

After these discussions with the APTI team, we will write the final Task 3 report which will provide options for making APTI more successful moving forward, and a plan of action for incorporating relevant best practices into the Air Pollution Training program.

Appendix A: Site Visit Protocol

Questions for Benchmarking Partners who Participate in Site Visits

Environmental Protection Agency Benchmarking Study

Background

1. What is the overall mission of your group?
2. Describe your trainee population.
3. How large is your staff?
4. What is your annual budget?
5. How would you characterize the organization's commitment to your group's mission?

Overview of Training

6. How many courses do you deliver per year?
 - a. By delivery method (e.g., classroom, Web-based, satellite)
 - b. By type of course content
7. Describe the different modes used to deliver training.

Course Design & Content

8. For each type of training (classroom, Web-based, satellite),
 - a. What is the process for course design and development?
 - b. How long does it take to design and develop the course?
 - c. What is the cost to design and develop the course?
9. Within a given year, how many *new* courses would typically be developed?
 - a. Do you primarily develop new courses from scratch or update current courses?
 - b. How do you make decisions about whether to develop a new course or update an existing one?
10. What is the process for developing course content for *new* courses?
11. Describe the process(es) used to *update* courses.
 - a. How often do you *update* courses?
12. What are best practices for the development of content for satellite training courses/programs?
13. What are best practices for the development of content for Web-based training courses?
14. What actions have you taken to incorporate interactive components into the design of distance learning courses?

Needs Assessment

15. How do you determine what type of courses are needed?
16. Do you perform a formal training needs assessment?
 - a. If so, how often? Who is involved?
17. How do you use the needs assessment to make decisions about training content and delivery methods?

Delivery Methods

18. How do you determine what type of delivery method to use? How do you make decisions about the mix of classroom and distance learning courses?
19. In your opinion, what are some of the innovative ways you are currently delivering training?
20. What have you done to ensure that distance learning courses (e.g., satellite, Web-based) are effective?
21. Do your distance learning courses have an interactive component? If so, please describe how you make your distance learning courses more interactive.
22. What do you see as the primary cost-benefit issues for EPA to consider when deciding whether or not to offer course content using delivery modes other than classroom training?
23. How do you ensure that training is delivered in a timely manner to new hires or those who require just-in-time training?
24. Do you believe that modes of delivery *other* than classroom training are as effective at facilitating learning? Why or why not?

Instructors

25. Do you use outside vendors to deliver training courses? If so, what is your process for selecting vendors?
26. Where do the course instructors come from (e.g., university, organizations)?
27. How do you measure the effectiveness of the instructor (for classroom and distance learning courses)?

Course Evaluation

28. How do you ensure course content and delivery are kept to the highest possible standard?
29. What types of training evaluation have you undertaken? Describe the course evaluation process.
30. How do you assess whether your training is effective or that you have received a return on investment from training?
31. How do you use training evaluation data?

Future

32. What have been some of your “lessons learned” with respect to distance learning?
33. What makes some training courses more effective than others?
34. Are you involved in any type of train-the-trainer program (i.e., training outside groups to take over some of the training currently being done by your group)?
35. What do you think the future holds for distance learning training versus classroom training?

Appendix B: Summaries of Individual Site Visits

Site 1: Occupational Safety and Health Administration (OSHA) Office of Training & Education

Site Summary

The OSHA Office of Training and Education (OTE) is responsible for providing occupational safety and health training programs for Federal and State OSHA compliance personnel, consultation staff, other Federal agency personnel, and private sector employers and workers. OSHA training programs emphasize the recognition, avoidance, prevention, and abatement of unsafe and unhealthful working conditions.

With a staff of approximately 50 professionals, eighteen of which are instructors, the OSHA Training Institute focuses on professional development courses that encompass either a classroom or a blended approach (i.e. classroom and Web-based). OSHA offers approximately 80 courses per year and has ten education centers around the U.S. which provide additional training to other federal agencies as well as the private sector. OSHA uses recommendations from staff or changes to regulations in order to determine the needs assessment for new or revised courses. A functional competency model has been developed to help in needs assessments going forward.

Needs Assessment

OSHA uses feedback from instructors, field personnel and changes in regulations to keep up to date on what training is needed.

Course Content, Design, and Training Facilities

The OSHA Training Institute (OTI) will have delivered approximately 90 classroom or blended courses in 2004. To ensure that information is up-to-date, “Course Chairs” are assigned to each course. A “Course Chair” is someone within the department who takes ownership of a course. They are responsible for keeping information current. Typically they review information every three years unless there is an immediate change or need to be addressed.

New courses are rare at OSHA. However, OSHA has developed a seven phase development process to assist Subject Matter Experts in the development of new web-based courses and transferring classroom content onto the web. This is done through utilizing a software package called Workforce Connections. OSHA offers courses both on the road and at their facility. As many courses include some laboratory component and OSHA has many of these labs set up for experimentation, these typically need to be held on-site.

Delivery Methods and Participant Interaction

OSHA employs three primary delivery methods: 1) Classroom, 2) Web-based, and 3) Blended. All three provide specific opportunities for participant interaction. In its Web

Based Training Style Guide, OSHA recognizes four levels of interactivity: passive, limited, complex and real-time.

Classroom. Classroom courses are held either on-site at the OSHA Training Institute or on the road. Classes at OSHA typically include some laboratory portion. These courses provide real-time participation.

Web-based. Internet courses are delivered in a traditional web-based format. Participation levels for web based training must include limited and complex levels.

Blended. Blended courses include a Web-based portion of the course prior to the student coming to the classroom. The Web-based courses include limited and complex participation while the classroom includes hands-on instruction.

Course Evaluations

Evaluations of both course content, and delivery and technology are typically conducted at the end of each course. Evaluations focus primarily on content and teacher instruction. However, Web-based and blended courses include an evaluation in the development stage, prior to going live. Volunteers take a pre-test, the course and a post test. Then they fill out an evaluation including errors, concerns, questions and suggestions. They have a one-hour conference call with all volunteers to review the evaluations and gather additional information. After this is taken into account and any changes are made, this portion of the course goes live.

Lesson Learned/Future Directions

- Blending courses with a web-based component allows students to review general content prior to the class meeting. This also allows all students to come to into this portion of the course with the same level of knowledge and more time for hands-on instruction.
- Workforce Connections has been a significant time and cost savings improvement on web-based course development. It allows subject matter experts to design and maintain the courses in a user friendly manner.
- Some courses can not be solely web-based as they require a hands-on portion.
- Competency-based training is seen as an important initiative.

Site 2: The Centers for Disease Control Public Health Training Network

Site Summary

The CDC Public Health Training Network (PHTN) is a network of public, private, academic, and business organizations with the mission to develop a public health workforce that is able and motivated to apply the current knowledge of disease control to reduce human suffering, improve community health, and control health care costs. The primary CDC customers are public health officials including, among others, physicians, nurses, emergency response personnel, mental health facilities, veterans affairs, and school of public health.

With a staff of approximately 50 professionals, the CDC focuses on programs concerned with all aspects of public health. The CDC has the capacity and ability to deliver long-term courses as well as react to immediate needs and produce an entire course in less than 48 hours. Some examples of rapid turn-around issues are smallpox, bioterrorism, and SARS. CDC programs have reached an estimated audience of 4,806,680 individuals. Finally, the CDC supports the “learner at a distance” by establishing learning communities and self-study group leaders to provide guidance to CDC program participants.

Courses are delivered in both synchronous and asynchronous formats using a variety of media including the Web, satellite, and videoconference. The CDC continuously conducts needs assessments to determine individual course needs and pre-tests Web-based courses to ensure applicability and usability. All courses are evaluated and designed to promote interactions.

Needs Assessment

The CDC currently conducts needs assessments to determine whether a specific course is needed. However, these assessments are not standardized and are not conducted with every course. The CDC is working to become more goal-focused and plan to conduct more needs assessment to ensure that training programs meet stated goals.

Course Content, Design, and Delivery Facilities

The CDC develops approximately 30 – 40 new courses per year and has produced 853 products focused on terrorism and emergency response programming. The technology utilized for these courses includes:

- Internet,
- Satellite transmission,
- Cable TV,
- Audio conferences,
- CD-Rom/DVD,
- Video tape, and
- Print-based self learning.

Course development is primarily initiated by a client outside the CDC, and clients have primary responsibility for updating course content. Clients may also ask the CDC to update the content, which results in a new project rather than a continuation of the existing project. CDC has established relationships with several external distance learning networks that help distribute CDC programs at little or no cost.

A project typically begins when a client (various CDC divisions) contacts the PHTN about developing a course. The CDC typically provides instructional design expertise and expects the client to provide content expertise. Although most projects are initiated by a client, the CDC has established different processes for developing and delivering courses for the different types of media. The different development and delivery processes are described below.

Internet Course Development.

- Course design and the look of the training are developed in-house by an instructional design expert and graphics specialist.
- The CDC provides a web developer (contractor) with a Power Point briefing. The web developer then posts the training to the Internet.
- The CDC found that using a contractor is more expensive than hiring an in-house web developer.
- Courses with continuing education credits are pilot tested to determine length and applicability to assess the number of credits to be offered. Pilot testers are composed of at least five representative of the target audience.
- A clearance process is initiated to finalize the program.
- A web-based training course of 120 pages takes about 3-5 months and \$120,000 to develop.

Satellite Course Development.

- The client and subject matter experts (SMEs) provide the CDC with content information. The CDC requests that clients also provide an outline of course content.
- The CDC hires a script writer to develop a broadcast.
 - SMEs often don't want the entire broadcast to be scripted; however, this is necessary to make certain the broadcast flows as seamlessly as possible.
- A full dress rehearsal is conducted the day before the broadcast.

Online Registration System

CDC has an online registration system that serves as one source for marketing, registration, testing, evaluation, continuing education certificates, and learner transcripts. This system allows students to search and register for courses, complete course evaluations and tests, and view and print transcripts and education certificates.

Delivery Methods and Participant Interaction

The CDC employs two primary training delivery methods: 1) Internet, and 2) Satellite. Each delivery method provides specific opportunities for participant interaction. The methods for interaction are described below.

Internet. Internet courses are delivered in either a traditional web-based (asynchronous) or a Webinar (synchronous) format. Methods of enhancing student interaction are limited and include:

- Web boards and threaded discussions, and
- E-mail links to send instructors questions.

Satellite. Satellite courses include live broadcasts that provide participants the opportunity to interact directly with the instructor. Communication can occur either before or during the broadcast. Methods of interaction include:

- Call-in questions,
- E-mail questions and
- Fax-in questions.

Satellite Course Delivery.

- Distance learning coordinators are available in every state to promote and assist with broadcasts.
- Moderators are available during each broadcast to help maintain flow and screen questions.
- Most broadcasts are done live and the CDC tries to get subject experts to deliver the broadcasts.
- The CDC asks clients to develop at least 10 questions in case there are no audience questions.
- Some broadcasts are also delivered via Webcasts.
- Continuing education credits are often available.
- Some broadcasts are recorded for later delivery via CD-Rom or the Internet.
- Participants are invited to provide comments about the program.

The CDC has a call center used to accept calls through a posted 1-800 number. Four to five individuals are typically used to accept calls and screen questions. If a question is accepted the question can be broadcast live. Questions that are e-mailed may be answered live or posted to an asynchronous web site.

Course Evaluations

Evaluations occur before and during course development and following course delivery. For each web-based course, there is a formal evaluation during the development phase to ensure that the content and design are appropriate for the intended audience. These pilot test evaluations collect important information about the appropriateness of course content and style from those most likely affected by the training; potential participants, training coordinators, and site facilitators. Satellite courses are not subjected to as rigorous of a

pilot test procedure because satellite courses are synchronous, easier to modify, and more difficult to script.

Both synchronous and asynchronous courses are evaluated by participants upon completion for content and delivery. The CDC uses standard level 1 evaluations (“smile sheets”), and has five standard evaluation questions that clients may add to (e.g., Did you learn what you expected? Did the training meet your objectives?). Because clients typically add their own questions the CDC has had difficulty standardizing the entire evaluation process. Satellite courses are not evaluated as regularly as other courses because they are typically one-time sessions. However, many clients will evaluate them to help improve future broadcasts.

Course Examinations

The CDC encourages clients to administer examinations to students in asynchronous courses to help determine whether the entire course was completed by the same individual. Because synchronous courses are typically one-time events, a course evaluation is typically deemed sufficient to track completion. Examinations are further used to award continuing education credits.

Lesson Learned/Future Directions

- It can take a long time to get training content cleared/approved.
- It is best to have one primary client representative.
- “Don’t buy it when you can borrow it.”
- Publish locations of satellite links on your website.
- Hire a script writer to make satellite content more conversational.
- Do a dress rehearsal when possible for satellite broadcasts.
- It is more expensive to hire outside contractors than use internal resources.

Site 3: Georgia Tech Distance Learning and Professional Education Department

Site Summary

The primary mission of the Georgia Tech Distance Learning and Professional Education (DLPE) Department is to provide professional education courses for both internal Georgia Tech and external clients, including both public and private organizations. The Department offers programs that are designed to strengthen and update existing skills and also teach new skills to help individuals achieve their own and organizational goals. The Department further helps to facilitate Georgia Tech's distance learning capabilities by taping conventional Georgia Tech academic courses for use in distance learning.

With a staff of approximately 60 professionals, Georgia Tech focuses on professional development, non-credit courses that range between one and five days in duration. In addition, over 40 Certificate Programs are offered for which participants are eligible to receive Continuing Education Units (CEUs). Finally, Georgia Tech offers conferences and seminars, has the capability to coordinate remote meetings via teleconference, and provides instructional design and consultation.

Courses are delivered in both synchronous and asynchronous formats using a variety of media including the Web, satellite, and videoconference. Georgia Tech continuously conducts needs assessments to determine individual course needs as well as general training needs. All courses are evaluated and designed to promote interactions between participants.

Needs Assessment

Georgia Tech continuously conducts needs assessments to determine the market's needs for proposed courses as well as overall industry training needs.

Course Content, Design, and Training Facilities

Georgia Tech will have delivered 113 courses in the 2004 academic year (about 45 courses per semester plus summer), including 1000 course enrollments, 3000 student credit hours, and 95 faculty members. To ensure that information is up-to-date, productions are updated with each subsequent course. The technology utilized for these courses includes:

- Internet,
- Satellite transmission,
- Cable TV,
- ITFS – “Wireless Cable”,
- MPEG2,
- Voice Over Internet Protocol (VOIP),
- CD-Rom/DVD, and
- Video tape.

Course development is primarily initiated by either a Georgia Tech faculty member or an external customer, and course content is primarily the responsibility of the customer. Georgia Tech will contract with faculty to assist with the development of course content; however, the primary roles of Georgia Tech are course design and delivery. In addition, Georgia Tech assists students with course registration, textbook purchases, and receipt and delivery of homework, reports, and examinations. The services provided by Georgia Tech include:

- Video production. Video production is primarily geared toward producing videotapes for distance learning. Georgia Tech has 9 classroom/studios, each with a high bandwidth Internet connection, computer, four remotely controlled cameras, two front displays, two rear monitors, one portable control panel, and a VHS handheld camera.
- Tape duplication and video editing. Georgia Tech has approximately 80 VHS duplication decks, and linear and non-linear editing capabilities.
- Optical Media duplication. Georgia Tech can duplicate and print labels for up to 1000 CD-Rom and DVDs.
- Teleconferencing/Satellite. Georgia Tech has 9 Tandberg teleconferencing units, a 12-site MCU used to combine dissimilar VTC formats into a common one, and three satellite dishes.
- Streaming video. Georgia Tech can encode video for streaming format at 56kbps or with a DSL, Cable modem, ISDN, or T1 line.

Delivery Methods and Participant Interaction

Georgia Tech employs three primary delivery methods: 1) Internet, 2) Satellite, and 3) Videoconferencing. Each delivery method provides specific opportunities for participant interaction. The methods for interaction are described below.

Internet. Internet courses are delivered in either a traditional web-based or a Webinar format. Methods for incorporating interaction include:

Traditional Web-based

- Web boards and threaded discussions,
- E-mail links to send instructors questions, and
- Face-to-face classroom discussion (when possible);

Webinars

- Chat rooms,
- Voice Over Internet Protocol (VOIP), and
- Web boards and threaded discussions.

Satellite. Satellite courses include live broadcasts that provide participants the opportunity to interact directly with the instructor. Communication can occur either before or during the broadcast. Typically a moderator is available to take and filter questions before giving them to instructor. Methods for incorporating interaction include:

- Call-in questions, and
- Fax-in questions.

Videoconferencing. Videoconferencing provides the best opportunity for direct interactions between instructors and students. Because both parties are able to hear and see each other interactions most typically take place in the form of a continuous discussion.

Course Evaluations

Evaluations of both course content, and delivery and technology are typically conducted at or near the end of each course. Evaluations focus primarily on content and teacher effectiveness and are often referred to as “smile sheets”. However, evaluations of course delivery and technology are also conducted to help Georgia Tech further understand current trends in distance learning. Sample evaluation items include:

- The video signal is clear and easy to see
- The video operator shows what the instructor is pointing at
- Course materials are received in a timely manner
- The website is comprehensive and easy to use

Course Examinations

Georgia Tech encourages the integration of student examinations into all courses. Registered proctors are made available and students are required to select a local proctor for examination administration. One issue with distance learning, because of a lack of oversight, is that it is difficult to ensure that the person taking the exam is the person taking the course. Georgia Tech has attempted to alleviate this problem by using and requiring registered exam proctors. Proctors must be a supervisor, manager, or HR representative.

Lesson Learned/Future Directions

- Distance learning is going desktop, on demand.
- Presenters/instructors must have teaching abilities.
- Just because the capacity to do the biggest and best is available, you don't have to use it. Target your programs to your audience and their needs.
- Make training actionable.
- Make sure people have the resources to receive training (e.g., Internet, satellite receivers, CD players).
- Provide continuous technical support to end users.

- Be aware of firewalls that will prevent end users from accessing the Internet (especially in the government).
- Do your best to make the program interactive.
- Package materials so they are inviting.
- Don't send anything you don't want copied (e.g., CDs).
- It is easier to support class cohorts than individual students.
- For every 1 hour of instruction expect 3 hours of post-production time.

Site 4: GMAC Commercial Mortgage (GMAC) Staff Development Division

Site Summary

GMAC Commercial Mortgage (GMAC) began developing and providing distance learning programs in February, 2002 and considers itself “young at what we do”. The mission of the Division is to provide programs that focus on 1) servicing-based knowledge; 2) the mortgage business in general; and 3) personal and leadership development. GMAC sees its role as not only teaching/training, but as communicating information to employees. The teaching it provides is vendor based, GMAC does not have a large staff.

With a staff of approximately three professionals and one student intern, the Staff Development Division uses the following training delivery methods: Intranet, Videoconferencing, videotapes, and classroom-based courses. The Division is looking to add “the wow factor” to its courses; GMAC agreed to participate in the benchmarking meeting partly as a way to learn from us what others are doing in distance learning. Examples of programs that the Division has provided include book studies, teachings by ratings agencies (e.g., Moodys), and leadership development. Students can earn credit for some GMAC courses.

Courses are delivered in both synchronous and asynchronous formats using a variety of media including the Web and videoconference. GMAC conducts informal needs assessments to determine individual course needs as well as general training needs. All courses are evaluated and designed to promote interactions between participants.

Needs Assessment

GMAC conducts some informal needs assessments to determine what courses are needed and what people like. This is accomplished primarily through talking with employees to determine the types of training they need/the types of training courses GMAC should deliver. The Division has done some needs assessment surveys in the past to determine what types of delivery methods students prefer.

Course Content, Design, and Training Facilities

The GMAC Staff Development Division is relatively young and has done some impressive work with a small staff. It delivers between 20 and 30 courses each year and use Web-based, videoconferencing, videotapes, and classroom-based technologies including the following:

- Intranet,
- Live streaming,
- Webex,
- Windows Media Encode,
- CD-Rom/DVD (non-interactive), and
- Videotape (GMAC has a large library of videotapes).

Course development is primarily initiated by internal GMAC when there is a stated interest in a specific topic. GMAC then either contracts with an outside subject matter expert (e.g., professor) or uses internal staff to develop the course. Courses have been conducted as panel discussions, small group studies, and traditional presentations. Previous courses have covered topics such as real estate, property management, asset management, commercial mortgages, and leadership development.

Delivery Methods and Participant Interaction

GMAC uses two primary delivery media: 1) Web, and 2) Videoconferencing. Most of its programs are broadcast live and taped (audio and video) for later viewing using Windows Media Encoder. GMAC is moving towards doing more videotaping of live sessions because it is finding that live audiences are often smaller than anticipated. Some programs are conducted using Webex; however, GMAC has had trouble recording both audio and video with Webex. Finally, GMAC has the capacity to record programs to CD-Rom/DVD for delivery to individuals who were unable to attend the original broadcast. Each delivery method and methods for interaction are described below.

Web. GMAC uses its Intranet, rather than the Internet, to broadcast courses using Web-based technology. GMAC does not have interactive Web-based (e.g., webinar) courses, but rather use the Intranet as a means to stream live videos (one-way) to participants. Although streaming occurs only one-way, GMAC has developed some methods for participant interaction that include:

- E-mailing questions (that the Division monitors)
- Calling in questions that are answered live (via an open telephone line)

Videoconferencing. Videoconferencing provides the best opportunity for direct interactions between instructors and students. Because both parties are able to hear and see each other, interactions primarily take place in the form of a continuous discussion. Communication can occur either before or during the broadcast. Typically a moderator is available to take and filter questions before giving them to the instructor. Methods for incorporating interaction include:

- Call-in questions
- Fax-in questions

Course Evaluations

Some level 1 evaluations are conducted, but GMAC conducts relatively few evaluations. The Division has the philosophy that “if they find value, they will come.” And, because there is continued enrollment, GMAC believes that the teachings are successful. When the Division does survey, it often uses online survey tools such as Zoomerang.

Course Examinations

GMAC does conduct some quizzes; however, there is little focus on examinations. To prevent participants from simply viewing part of a course the Division has programmed, asynchronous sessions are used so that participants cannot fast-forward through the entire session. Once a student completes the session, they are provided a code and asked to log-in the code as proof they completed the course.

Site 5: SAS Education to Customers

Site Summary

The primary mission of the SAS Education to Customers (SAS) division is to provide technical training to SAS customers. Approximately 90% of the training provided is task-oriented (how to use SAS products) with the remaining 10% focused on technical overviews (why a product is used), often as a precursor to the task-oriented training. All the training provided is fee-based; however, the SAS Education to Customers division is not a profit center. It seeks to cover costs while supporting SAS customers to ensure they are able to effectively use, and continue to purchase, SAS products.

SAS provides classroom-based, live Web, and self-paced (Internet, CD Rom) training. Classroom-based training accounts for about 80% of all training and typically occurs at SAS' 28 training facilities. Thus far in 2004, SAS has provided 120 unique training episodes (courses) and 250 training sessions to about 1500 customers.

SAS conducts an annual needs assessment survey to determine what courses to deliver in the upcoming year. The survey consists of about 400 items designed to determine whether and how customers use software (importance), when they last used the software (recency), and how often they use the software (frequency). In addition, SAS monitors product sales and other data to determine courses that customers are likely to need. All courses are evaluated using "smile sheets" and require an average rating of 3.5 out of 4. SAS also monitors the re-buy rates and believes that customers will not re-buy if they don't feel that training is effective.

As a policy, SAS will only conduct certification programs through classroom-based training. They have determined that classroom-based training is the only way to ensure that the person taking the certification test is the person signed up for the course.

Needs Assessment

SAS conducts an annual needs assessment survey to assess what courses to deliver in the upcoming year. The survey consists of about 400 items designed to determine whether and how customers use software (importance), when they last used the software (recency), and how often they use the software (frequency). In addition, SAS monitors product sales and other data to determine courses that customers are likely to need.

Course Content, Design, and Delivery Facilities

SAS is primarily a software development company and SAS is responsible for providing technical training to SAS customers. Therefore, SAS develops courses and uses training delivery methods that are customer-driven. The technology utilized for these courses includes:

- Internet (MS Live Meeting),
- CD-Rom/DVD,

- Videotape,
- Print-based self learning, and
- Classroom-based technologies.

SAS maintains 28 classroom-based training facilities throughout the United States where customers and SAS instructors can meet for face-to-face trainings (about 30% of classroom-based instruction is conducted at customer sites). All live Web and self-paced training courses are developed and delivered using facilities maintained at SAS headquarters in Cary, NC. SAS has 77 instructors, 20 of which are certified by SAS to teach one or more live Web courses. Because the nature of teaching is different for live Web and classroom-based courses, SAS requires instructors to take courses on providing training over the Web before they are allowed to provide live Web instruction. Instructors must also be certified in a course before they are allowed to teach it.

Course development is primarily initiated after review of customer needs as determined by an annual needs assessment survey and software sales and usage data. Because SAS' existence depends on expanding and retaining its customer base, courses are developed that provide existing and potential customers the know-how to effectively use SAS products.

SAS has developed both absolute rules and rules-of-thumb that must be considered when developing any course. These rules were developed because SAS acknowledged that people are likely to physiologically tune-out during training. Four absolute rules have been developed for courses that are not classroom-based. They include:

- 1) Participants must be given the opportunity to interact at least every 10 minutes
 - Ask questions about things just completed
 - Ask open-ended questions about general training subjects
 - Provide and complete short quizzes
- 2) Instructors must have specific training
 - Web delivery is different than classroom
- 3) Instructors must have two rehearsals before they can teach a course
 - Instructors must demonstrate they can effectively instruct over the web
 - Instructors must show they understand the material
- 4) Moderators must be present for each course session
 - Each course has at least one instructor, moderator, and technical support staff

Some additional rules-of-thumb that SAS considers when designing a course are:

- 1) Course design and delivery depend on complexity of the material, the need for interactivity, validation for certification purposes, and sensitivity of issues
- 2) No course session should be longer than a half-day
- 3) Classroom-based courses are best for interactions
 - Best for validation
 - Best for sensitive issues
- 4) Self-paced is best for informational courses
 - Easy to scale
 - Cheap to develop and deploy

- HTML has low standards – doesn't need much bandwidth and can be recorded easily to CD-Rom/DVD

SAS currently uses MS Live Meeting and Place Where, and is considering using Webex, to deliver live Web training. They believe that content delivery methods are more important than tool selection. SAS makes tool selection decisions based a lot on cost and whether the vendor will be around in a few years, with a few assumptions. The assumptions are that each tool has:

- Application sharing
- PowerPoint capabilities
- Chat capabilities
- Registration capabilities

Delivery Methods and Participant Interaction

SAS employs three primary delivery methods: 1) Classroom-based, 2) Live Web, and 3) Self-paced. Each delivery method provides specific opportunities for participant interaction. The delivery methods and strategies for interaction are described below.

Classroom-based. Classroom-based courses account for about 82% of SAS courses and are delivered at either one of SAS' 28 training centers or at a customer site. Training is provided by one of SAS' 77 instructors. The courses are designed for optimal interactivity using the latest in face-to-face training skills.

Live Web. Live Web courses account for about 10% of SAS courses. When SAS began delivering live Web courses (June, 2001) they believed that a key to live Web success would be providing students the ability to interact, without stopping training. To do this, SAS incorporated the following:

- Text questioning – Participants can e-mail questions during the training
- Phone questions – All questions come in privately before decisions are made about whether the question should “go live”
- Participants can “raise their hand” by indicating they have a question – The delivery tool indicates a potential question by changing the participant's “seat” color on the online screen visible to the moderator and instructor

All questions come in privately and are captured so they may be sent to participants as a training supplement. A moderator is available during every course session to determine which questions should be addressed during the session. Before any session begins, participants are e-mailed rules about live Web course etiquette. Participants are reminded of the etiquette during the course and phone lines can be muted by the moderator if one or more participants fails to use the proper etiquette.

Self-paced. Self-paced courses account for about 8% of SAS courses and are delivered primarily over the Internet. Customers may also request CD-Rom versions that can be distributed to participants as a CD or may be loaded onto a customer's Intranet site.

Interactions in self-paced courses are focused on participant interactions with the technology, not with other participants or the instructor. Examples include:

- Short quizzes that participants must get right before continuing the training
- Instructions to go practice using the software before returning to training
- Questions that direct participants down different paths depending on their responses

Course Evaluations

Evaluations occur immediately following a course and consist primarily of “smile sheets”. Courses that do not get an average rating of at least 3.5 out of 4 are further examined to determine why the ratings are low. SAS will directly contact customers to inquire further as to why courses were reviewed less favorably than expected. SAS also monitors the re-buy rate of trainings to help determine whether customers are willing to continue to participate in training. It is believed that customers will not continue to buy training if they feel it is not worthwhile. Therefore, SAS feels that a re-buy rate of 60% over a period of 18 months indicates that customers have evaluated the course positively enough to continue purchasing it.

SAS also uses short quizzes during self-paced courses primarily as an interaction method. Quizzes occur every few slides to ensure that participants are interacting with the media; they are rarely used as a measure of whether participants are learning. However, courses can be designed so that participants are blocked from continuing with the training until they provide correct responses to the quizzes.

Lesson Learned/Future Directions

- There is a definite need for training that is not classroom-based
 - Willingness to travel reduced dramatically after September 11, 2001
 - Travel more than 100 miles dropped by 50%
- It took 12-18 months for constituents to truly buy-into web training
- It takes time to develop courses
 - Classroom: 12 hours to develop 1 hour of delivery content
 - Live Web: 20 hours to develop 1 hour of delivery content
 - Self-paced: 60 hours to develop 1 hour of delivery content
- There will always be a need for classroom-based training
- Make it easy for participants
 - SAS will send CDs with downloading materials if participants cannot download from the web (Flash, Webex, etc.)
- HTML has low standards
 - It takes bandwidth to add video, audio, etc.
 - Can store hundreds of hours on CD
 - Streaming video is tough to get on CD – about 10megs/minute
- Transition from classroom-based to Web-based courses takes time
 - Most of the time is taken up redesigning interactivity
 - Add 30-45 days if development team has never migrated before

- For each project include a project manager, instructional designed, subject matter expert, technical review team, editor, and producer
- SAS's average class size is about 12 people
 - They try to limit most classes to 20 people; highly technical class to 10 people; and very general classes to 40 people