Blended Delivery Strategies for Competency-Based Training

Elwood F. Holton III
Mary Leah Coco
Janis L. Lowe
Jacqueline V. Dutsch

The problem and the solution. With employees located across a wide geographical area, the ability of organizations to provide equitable training programs is costly. Travel funds, enabling employees to attend on-site training events, can be severely limited or even nonexistent. Compounding the problem is the simple fact that travel to a central training location frequently results in longer workdays for employees, causing increased compensation expenses to cover the training associated over time. These factors, coupled with the organizational need to provide just-in-time or skill-based training can impose challenges for the human resource development practitioner. Thus, practitioners are turning to blended learning strategies as a way to overcome these obstacles. This solution, however, is not without its problems. This article describes blended learning within the context of learning theories and provides recommendations for best practice.

Keywords: *blended learning; competency-based training; skills based training; just in time learning*

Competency-Based Training

Introduced in the 1980s, competency-based training is being implemented worldwide by human resource development (HRD) personnel. Le Deist and Winterton (2005) define core competencies as the collective learning in an organization, specifically, the coordination of diverse production skills while integrating various streams of technology. According to Naquin and Holton

Advances in Developing Human Resources Vol. 8, No. 2 May 2006 210-228
DOI: 10.1177/1523422305286153

(2003), competency-based training, built around fundamental principles of demonstrating capability, usually requires employees to first demonstrate their ability to perform specific tasks. Competency-based training focuses on behaviorally stated and measurable objectives. Competencies are gained in multiple ways, such as life experience, on-the-job training, and training and development programs.

The use of competency-based training programs ensures that all training programs are integrated to produce specific results. A primary reason for the increasing number of competency-based training programs is that they can more easily incorporate learning activities or initiatives into daily business processes (Naquin & Holton, 2003). Closer alignment between training and desired competencies leads to workers who become more competent and capable in the workplace. Competencies can be developed to suit specific organizational needs, thereby increasing the relevance of training to employees. Organizations can set their own standards and competencies to meet practical purposes while providing market edge and establishing a secure working environment for employees.

To align individual capabilities and organizational core competencies, competency models have been created to assist in the competency-based training effort. Such a framework is typically viewed as a mechanism for linking HRD with organizational strategies (Le Deist & Winterton, 2005). A competency-based model can be a descriptive tool for identifying the knowledge, skills, and behaviors needed to effectively perform a role in an organization in order to assist this organization in achieving strategic goals (Le Deist & Winterton, 2005). By linking individual competencies with the desired organizational competencies through competency modeling, the development of successful training and development programs becomes an effort that will meet the needs of all stakeholders.

Within an organization, competencies are directly tied to critical outcomes. Ricciardi (2005) states that the completion of tasks performed at an ideal rate leads to the achievement of critical outcomes. Thus, it is critical for an organization to identify competencies in order to obtain the desired vital outcomes by systematically arranging conditions that support the exhibition and development of such stated competencies. The identification of stated competencies can be conducted by a single manager, a group of managers, a cross-sectional group of managers, or through a participatory approach. Regardless of the manner in which the competencies are determined, ensuring that the competencies reflect the desired outcomes of the organization is imperative.

In recent years, the argument has been made that "training just to train" is an ineffective method of improving performance. With many training programs evaluated only on Kirkpatrick's first level, it is difficult to assess the true effectiveness of a training program. When designing a training program for an organization, determining competencies will be essential to the success of a training program. To improve employee performance, which in turn

increases work and organizational performance, training for the purpose of improving employee competencies is central to the success of a training program.

Once organizational competencies have been determined, if appropriate, a training and development program must be designed to suit an organization's needs. There are multiple instructional design methods that can be followed to design a training and development program for an organization. Regardless of the instructional design method followed, meeting the needs of the organization will be important for the success of the program.

According to James (2002), the outcome of competency-based training should be an employee who possesses skills tailored for the organization. It is important to note, however, that despite the effectiveness of competency-based training, it cannot be used for everything. HRD as a field should be careful to avoid overimplementing or overadvertising the use of competency-based training in every training and development setting. If employed correctly, competency-based training becomes a much more applied type of learning that relies on the adult learner bringing a body of skills and knowledge to the learning situation to ensure the learning is maximized (James, 2002). A learner bringing past experiences into the training situation is a hallmark of adult education principles that is supported through competency-based training.

Some arguments have arisen as to the difference between "abilities" and "competencies." Westera (2001) distinguishes ability as the operational outcomes of tests, whereas competencies represent underlying cognitive functioning. Westera elaborates that competencies are not assumed to be fixed structures but rather are individual abilities that can be improved through training and development. Therefore, the criticality of organizations accurately identifying competencies is enhanced by the assertion that these individual abilities can be improved through training and development.

Development and implementation of competency-based training is merely one facet of ensuring the success of the training and development program. An organization that is structured to meet the competency-based training approach is key to the success of such a program. Organizations must have well-developed systems for providing training to meet the competency needs identified by key organizational personnel (Lawler, 1994). In addition to competency-based training, organizations must support the personal and career development of their training participants. By implementing a competency-based approach, organizations acquire a competitive edge within their market. This additional edge for the organization will increase the attraction of new employees while retaining the existing ones (Lawler, 1994).

Mulcahy (2000) indicates that competency-based training is gradually replacing traditional time-based training. This focus is moving from inputs to outputs or outcomes, which are the skill needs of enterprises defined by organizations and their market competitors. Mulcahy also indicates that

competency-based training is regarded as an important part of the development and recognition of individual workers, which develops the occupational competence of the individuals involved in the process. This, in turn, ultimately benefits the organization.

Blended Learning

Once the competency model is developed, the question that organizations face is, What instruction methods are most likely to result in the desired outcomes? This section reviews some of the key principles of blended learning relevant for competency-based training.

Traditional instructor-led training is no longer considered the sole means of instructional delivery for competency-based training (Sparrow, 2004). A symbiotic relationship now exists between instructor-led training and technologically based training. New instructional delivery methods include the following: Web-based instruction, streaming video and audio, and synchronous and asynchronous communication. Effective competency-based training now frequently employs a combination of delivery methods that is known as blended learning (Bielawski & Metcalf, 2003). Blended learning has been defined by various researchers as a combination of the characteristics from both traditional learning and e-learning environments. A distinct advantage to the use of a blended learning strategy lies in the instructor's ability to appeal to a variety of adult learning styles and preferences (Lanham & Zhou, 2003), which enhances competency-based development.

According to Lanham and Zhou (2003), there are two distinct areas associated with blended learning. These two areas are (a) blending traditional classroom learning and e-learning and (b) blending synchronous and asynchronous e-learning technologies. The first area of blended learning incorporates a combination of theory and practice from instructor-centered and student-centered learning with a goal of creating an environment that is accommodating across cultural lines. The second area of blended learning provides learners with communication and information through multiple media that are not contingent on live instruction (Lanham & Zhou, 2003).

Synchronous e-learning occurs when participants are taught at the same time, whereas asynchronous learning is independent and not necessarily conducted at the same time as other participants. Through the use of either synchronous or asynchronous e-learning, participants will be able to adapt their preferred learning style to the instructional situation. The use of either approach is also beneficial when coupled with the traditional classroom learning situation. Either approach is more than placing materials online for learners to access but rather leveraging the best characteristics associated with both the traditional and e-learning approaches in an educational situation to suit the needs of the learner and organization (Fox & MacKeogh, 2003).

Over the past decade, technology has become more prevalent and affordable in organizations. Through this advent of technology, educational options have greatly expanded. According to Osguthorpe and Graham (2003), the innovative uses of technology have begun to blur the lines between traditional face-to-face instruction and more recent distance learning environments. Blended learning is a delivery method of choice. Typically, blended learning consists of the following instructional approaches: instructor-led training, custom e-learning courses, workbooks and other print-based materials, and workplace assignments (Sparrow, 2004).

One of the most popular uses of blended learning is e-learning. The implementation of blended learning techniques is a direct response to organizational demands that participants reduce their time away from the job when attending training sessions. Organizations plan and implement e-learning strategies to supplement the skills of their workforce. Although e-learning yields many options for skill development of employees, it is critical to make sure this approach to instructional delivery makes an effective contribution to the development of a competent workforce (Nisar, 2004).

Bayer Co. provides evidence of this in implementing a blended learning strategy for development of employee personal computer (PC) skills followed by additional soft-skills courses, including communication (Murphy, 2003). Bayer began the implementation process with the introduction of PC skills using e-learning. Courses were introduced to participants during a 1-hr "launch session." The case study stressed the importance of the launch session in getting participant buy-in. After successful implementation of the PC skills training, specifically Office and Notes, a second pilot was conducted with a communication course on facilitation skills. A full blended learning approach was used. Participants completed a series of e-learning courses focusing on theory, followed by a 2-day workshop, enabling staff to practice their skills in a classroom setting (Murphy, 2003). Other companies successfully implementing blended learning approaches include Blue Cross Blue Shield of Georgia (BCBSGA), Caterpillar, and Aramark, to name a few (Galvin & Johnson, 2003).

According to Nisar (2004), some distinct advantages associated with the implementation of e-learning are as follows:

(a) convenience,
(b) cost-effectiveness,
(c) greater efficiency and time savings,
(d) significantly reduced training time,
(e) easier access for those whose opportunity for training is otherwise limited by location,
(f) consistent quality of training, and
(g) easily monitored participation and progress.

One of the most frequently reported reasons for utilizing e-learning in an organization is cost-effectiveness. The bottom line for any organization is return on investment for their training investments. If an organization is able to significantly reduce the cost of training, then theoretically the return on investment increases. However, whether this monetary saving translates into effective training and learning transfer is an issue that is unresolved in the literature. Although reducing the cost of training is important, it is vital that organizations not assume that e-learning will automatically yield the same competency outcomes as face-to-face instruction. Once e-learning has been conducted, evaluation should be conducted to determine if the learning and competency outcomes are indeed similar to instructor-led training.

BCBSGA effectively saved $648,000 by creating a performance-support tool that provides information to customer service representatives in a just-in-time format. Training was initially 40 hr in length and required participants to memorize large volumes of complex information or search through paper documents. Through implementation of a just-in-time information tool in conjunction with a 4-hr training class, BCBSGA was able to reduce training time by 36 hours while improving overall customer service metrics (Galvin & Johnson, 2003).

If e-learning is the sole method of blended delivery, interaction between instructor and student could be decreased. King and Doefert (1996) assert that interaction between the student and instructor is important to learner satisfaction. Interaction between student and instructor is necessary for feedback to occur between necessary parties (Berge, 2002). Intellectual development, particularly for higher level competencies, is largely achieved through active engagement between instructor and students (Aspden & Helm, 2004). Thus, when designing instruction that includes blended learning, it is important to consider three elements: learning goals and competencies, learning activities, and feedback and evaluation (Berge, 2002). Through examining these three key elements, instructional delivery can be designed to meet the needs of the learner and instructor. This is reemphasized in the Bayer case study. On completion of the pilot, one key component attributed to the success of the program was the human factor. Bayer addressed the human factor by having a mentor available to participants who was familiar to the participants because of attendance at the launch session, and by establishing time lines and expectations (Murphy, 2003).

Yet another dimension of blended delivery for competency-based training is that of cultural differences. Research suggests that learners from varying cultures have varying compatibility levels with different learning environments (Lanham & Zhou, 2003). When using online learning as the blended delivery method, cultural differences and preferences may become apparent. Thus, it is important to examine the cultural implications during the design of blended delivery courses if the participation across varying cultures is expected. Some general concepts that should be accounted for in order to

remain culturally sound when designing and implementing online learning are as follows:

(a) provide an environment free of colloquial language and slang;
(b) identify items or language that may be offensive to other cultures;
(c) identify areas in which cultures learn differently and make allowances for this in the learning environment; and
(d) provide an environment that ensures that all students are able to understand the materials (Lanham & Zhou, 2003).

Barriers between cultures can be greatly reduced through the above recommendations for preparing a culturally sound educational program via a blended learning mechanism.

Although e-learning is undoubtedly one of the most popular strategies in blended learning, there are other mechanisms widely used as well. Distance learning is another prevalent training strategy. Compressed video is one distance learning technique. Delivering instruction via compressed video is extremely different from instructional delivery in a traditional classroom. Distance learning requires an instructor to be more flexible because, as with any technology, there are often problems encountered during a compressed video session. The distance instructor must also collaborate more with the distance learners than might be necessary with only a traditional classroom setting. Some of the technologies associated with distance learning are well established and continued to advance. However, this educational method should be viewed as a work in progress.

Despite that compressed video is a work in progress, the reality is that socioeconomic and geographic factors can affect educational programs that are delivered via compressed video (Bynum, Cranford, Irwin, & Denny, 2002). Equipment to support the delivery of instruction via compressed video involves a substantial up-front cost as well as the costs associated with maintenance of equipment for both the host site and distance sites. Thus, although the concept of delivering competency-based training via distance education in theory offers a cost saving on a per session basis, the up-front costs may be an enormous roadblock to many organizations who are interested in this medium of instructional delivery.

To determine which blended learning method is best for an organization, a needs assessment must be conducted to determine the optimum instructional delivery strategy. Once the appropriate blended learning strategy has been determined, development of the competency-based training program must meet the organization's training need while taking into account the blended learning strategy's constraints and capabilities (Osguthorpe & Graham, 2003). If the instructional designer and instructor are not the same, these two parties must work together in the design of the training material in order to strike a balance between

the instructional needs, learner needs, instructor needs, and the blended learning strategy's constraints. Each course will likely have different design parameters that must be taken into account when determining the optimum blended learning–delivery strategy (Osguthorpe & Graham, 2003).

The human side of training must not be lost in the technology-driven training arena. It is important to include employees in the training design and implementation of a new training program that is focused on technology. Technology-based training has the ability to allow learners to drive their own training—what they want to learn and how they want to learn it. Therefore, when designing a technology-based, competency-based training program, the HRD professional must maintain client focus and determine what their needs are and how this training can accommodate them (Naisbitt, 1999).

Blended learning provides an opportunity for instructional delivery to be tailored to the specific learning needs of a particular population. This approach to instruction does not abandon the traditional approaches to instruction. Rather, a blended delivery strategy will incorporate new theory and practice into a multifunctioning system. Lanham and Zhou (2003) indicate that blended learning allows students to participate in a well-rounded competency-based training program while increasing students' compatibility with student-centered learning and increasing their proactive approach toward educational pursuits.

Blended Learning Strategies Employed

Since 1979, the state of Louisiana has provided managerial and supervisory training for its employees through its Comprehensive Public Training Program (CPTP). Computer-based instruction (CBI) has been a component of that program for the past 8 to 10 years and has provided state employees the opportunity to learn foundational material for generally applicable skills. CBI has also been an avenue for remediation necessary for Louisiana managers or supervisors to better understand courses offered specifically for managers and supervisors.

Since the adoption of the Louisiana Managerial Supervisory Survey (LMSS) competency-based training model, CPTP has expanded its use of technology for training purposes. In addition to CBI, the program now also uses compressed video to deliver instruction for select courses. Training participants now have the capability of enrolling in a mix of online, compressed video, or instructor-led courses; participating in e-mail discussions with instructors, training peers, or subject matter experts; solving case-based and practical problems; completing capstone projects; and/or selecting self-study options, such as independent reading. This mixture of training options is designed to address organizational needs (reducing costs and increasing accessibility to training) and individual needs (meeting the social, developmental, and cognitive needs as well as learning style preferences).

It is not surprising that political and economic concerns served as the impetus for the decision to use a blended approach for training in Louisiana. As is the case in many organizations, there was a compelling need to provide training to remote locations. Inequities resulting from constraints prohibiting delivery of training to remote areas of the state were unjustifiable—and rightly so. The costs associated with bringing employees to a central location prohibited some state agencies from allowing their employees to participate in the training programs, thereby creating an unfair advantage for employees of agencies with larger training and/or travel budgets. From the CPTP perspective, the costs incurred in sending instructors to remote training sites for relatively few participants resulted in an ineffective use of their limited financial and human resources. Thus, as online learning has expanded and improved, the state was anxious to take full advantage of the new media.

A partnership between with the Louisiana State University Agricultural Center, the Louisiana Board of Regents, the Louisiana Division of Administration, and the Louisiana State University (LSU) Division of Workforce Development enabled the establishment of a cost-effective technological infrastructure. This partnership offered a viable alternative to the more expensive traditional on-site delivery systems.

In its early stages, the compressed video technology proved to be incredibly challenging for the instructional designers, instructors, and participants. The instructional designers faced the challenge of balancing the need to link the content to the job requirements (performance indicators on the LMSS) and the need to create an interactive design. The instructors faced the need to learn the technology, as well as the best practices for instructors and facilitators, to help ensure transfer of training. The participants, who were by and large deeply embedded in a work culture that resisted change, faced the challenge of accepting a new training methodology.

Not to be overlooked were the challenges associated with the technology itself. Frankly, the technology in the early stages was usually unreliable and created high levels of frustration for trainers and participants alike. Dropped connections, poor resolution, equipment failures, and so forth were usually more typical than not. Minor events could create major disruptions in the connectivity between host and remote sites, costing valuable training time. For instance, a squirrel running across a power line in 2001 resulted in the loss of remote sites for the entire training session. Heavy rains could produce similar effects.

Advances in the technology and the lessons learned from those early days have resulted in a more effective system. Revisions to the blended technology strategies offered to the Louisiana state employees have been based on qualitative and quantitative information. Qualitative was periodical data obtained through interviews, surveys, and focus groups. Quantitative data are continually collected through participant learning assessments (i.e., comparisons of

the learning outcomes between participants from remote sites and those from live sites) and course evaluations.

Principles for Effective Compressed Video Instruction

Teaching via compressed video is very different from teaching in the traditional classroom. To be successful, these differences require the instructor to make some changes from his or her traditional delivery style. One difference, as you might expect, is use of additional resources. Other differences have to do with the instructor's approach to course development and delivery. For example, course preparation must be done more formally than is usually required for traditional, face-to-face courses. Instructors must be more flexible for distance courses because there may not be a single best way to deliver the material—there are more trial-and-error activities when delivering training via compressed video. The distance instructor must also collaborate more than the traditional instructor. The successful development of courses or programs hinges on the use of resources and experiences available within an academic department, college, or university *and* the support personnel required to operate the technology. Taking advantage of these resources and thinking of distance learning projects as team efforts will facilitate efforts to get courses or programs off to a good start.

To determine the practices that would make the compressed video classes most effective, 52 individuals were interviewed, representing instructors, compressed video facilitators, and participants from CPTP, the Department of Health and Hospitals (DHH), and the LSU Division of Workforce Development. The interviews were conducted over a period of 1 month, with the same interviewer at each session. The questions were pilot tested prior to implementation to ensure the questions were unbiased and did not lead the interviewee in any particular direction. By ensuring the questions were suitable for the purpose of the study, the researchers are confident the data gathered were an accurate representation of the opinions of the interviewees at that point in relation to the method of compressed video as the delivery method of course material. By examining the qualitative data obtained through these interview sessions, the following recommendations to make compressed video an effective method for course delivery were established:

(a) Active and knowledgeable facilitators should be present at each remote site to ensure participants are actively engaged and understand the course material and to serve as the liaison between the instructor and class participants.
(b) The remote site facilitator should lead the group activities at their respective sites.

(c) The host site facilitator should actively monitor the participation level and responsiveness of the remote sites both during the instruction and group activities. He or she should actively participate in the group activities by monitoring group progress both at the host and remote sites. Thus, it is important for the facilitators to be familiar with the course content and design.
(d) The instructor should ensure that the facilitators have the course material well in advance of the class. The facilitator should review this material and advise the instructor if there are areas of uncertainty about the content or their respective roles.
(e) The number of remote sites should be limited to two if a live class is also present.
(f) The number of remote sites should be limited to three if there are only remote sites present.
(g) A relationship between the facilitator and instructor should be encouraged to foster a more conducive learning environment for class participants.
(h) Equipment and logistical issues should continue to be improved at both the live site and remote sites.
(i) Course material and course design should be suitable for the method of course delivery via compressed video.
(j) Instructors should create a seating chart for remote participants and use that information to call on participants by name. Questions should be direct rather than rhetorical.
(k) Each site should be equipped with a speaker phone, cordless phone, and fax machines in the rooms as opposed to somewhere else in the building. Instructors should have access to these numbers and to the facilitators' cell phone numbers prior to the start of class.
(l) Instructors should explain the cost savings for the agencies that are associated with the use of compressed video (i.e., the agencies typically do not have money in their travel budgets to enable the participants to attend class. Note that there are costs associated on the delivery side for CPTP and DHH, so delivery is not free).
(m) The number of breaks should be reduced from every hour to 90 min or the instructor should be allowed to break at a logical stopping point in the course.
(n) The facilitators should orient the participants to the room including use of microphones and methods for eliminating audio distractions (i.e., turning off cell phones, not rustling papers, not locating microphones near window units).
(o) The number of participants should fit the rooms in arrangements that are conducive to learning and group activities.
(p) Participants should be able to view the instructor and remote sites on their monitors.

In addition, the following were adopted as guiding principles for developing blended learning strategies:

(1) Design for active and effective learning.
Principle: Distance learning designs consider
- specific content;
- needs, learning goals, and other characteristics of the learner;
- nature of the content;
- appropriate instructional technologies;
- desired learning outcomes; and
- local learning environment.

(2) Support the needs of the learners.
Principle: Distance learning opportunities are effectively and flexibly supported, including
- initial disclosure of information on the learning opportunities;
- orientation to the process of learning at a distance, including use of technologies for support;
- site and tutorial support;
- student advising and counseling;
- provision of technical facilitators who are supported in their use of these technologies; and
- partnering and collaboration are explored as appropriate.

(3) Develop and maintain the technological and human infrastructure.
Principle: The provider of distance learning opportunities has both a technology plan and a human infrastructure to ensure that
- appropriate technical requirements are established;
- compatibility needs are met;
- technology at origination and receiver sites are maintained to ensure technical quality;
- learners and learning facilitators are supported in their use of these technologies; and
- partnering and collaboration are explored as appropriate.

Blended Learning and the Adult Learner

The role of media and method in learning provides a valuable basis in considering when instructional technology facilitates learning (R. G. Clark, 1999; R. E. Clark, 1983). The distinction between the roles of media and method lies in what can be done with cutting-edge technology versus what should be done to foster learning with technology based on cognitive science theory and research (Mayer, 2001; Moreno & Mayer, 2002). The media-affects-learning hypothesis is grounded in the notion that more powerful, state-of-the-art instructional technologies facilitate deeper learning (R. G. Clark,

1999). Researchers and industry analysts believe that the origin of this position lies within the incredibly large budgets of the technology industry "which has a vested interest in selling these machines for instruction" (R. E. Clark, 1983, p. 456). Alternatively, the method-affects-learning hypothesis posits that the manner in which the technology is used promotes learning rather than the technology itself (R. G. Clark, 1999; Moreno & Mayer, 2002). Media is of less consequence as long as instructional methods promote appropriate cognitive processing during the learning event. Thus, the emphasis is on the learner and how media affects their learning process.

Bates, Holton, and Seyler (1996) cautioned that most research on e-learning has not considered the unique needs of adult learners. They called for new research and theory to integrate the opportunities presented by e-learning with the characteristics of adult learners. Lowe and Holton (2005) developed a theoretical model of how the needs of adult learners and technological characteristics interact to produce effective learner outcomes. Although originally developed for computer-based training, the model can easily be extended to incorporate any type of blended e-learning strategy.

Figure 1 shows the complete theoretical framework they developed. A complete discussion of the theory is beyond the scope of this article, and readers are referred to Lowe and Holton (2005) for more discussion. However, the theoretical propositions and general conclusions of the theory are directly relevant to the blended learning strategy employed in this project.

Nine propositions were specified for a theory of effective CBI for adults. The nine proposition statements, which were logically derived from the theoretical framework, are as follows:

Proposition 1: The level of learner self-directedness will be inversely related to the external support desired.

Proposition 2: The level of learner computer self-efficacy will be inversely related to the external support desired.

Proposition 3: The level of learner self-directedness will be inversely related to the CBI design components of instructional control and instructional support.

Proposition 4: The level of learner computer self-efficacy will be inversely related to the CBI design components of instructional control and instructional support.

Proposition 5: The learning-goal level is inversely related to instructional control and instructional support in CBI design.

Proposition 6: The learning-goal level directly influences the instructional strategy design.

Proposition 7: The instructional strategy design directly influences screen design and practice strategy in CBI design.

Proposition 8: The level of external support is inversely related to instructional support and instructional control in CBI design.

Proposition 9: The effectiveness of CBI will be maximized when the levels of self-directedness, computer self-efficacy, learning-goal level, and external support are incorporated in the CBI design.

In the effective system state, an alignment of both the upper support half and the lower design half of the model results in effective CBI. Alignment

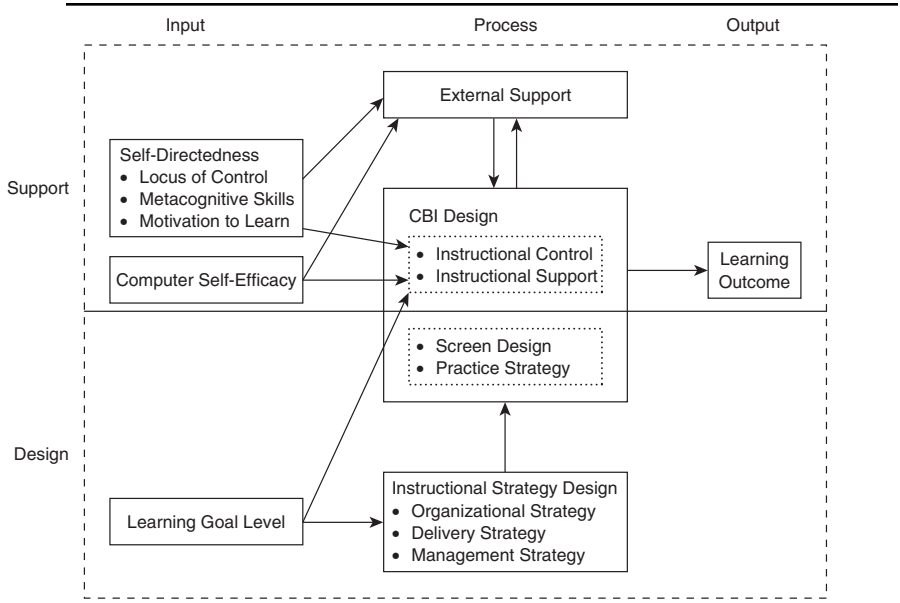

FIGURE 1: A Conceptual Model of Effective Computer-Based Instruction for Adults

occurs in two ways: (a) when the support units are complementary with the design units and (b) when the support units are complementary with each other and the design units are complementary with each other.

As an example of when the support units are in alignment with the design units, consider the situation where users have weak self-directedness and weak computer self-efficacy but strong CBI design of instructional control and instructional support, and strong external support exists. Or consider the case where users have weak computer self-efficacy, strong external support, strong self-directedness, and weak CBI design of instructional control and instructional support. In both cases, the support and design elements complement each other.

Alignment *within* the design unit occurs when the three units of learning-goal level, instructional strategy design, and CBI design components complement each other. The instructional strategy design should be matched with the learning-goal level to be effective in the area of design. Alignment within the support unit exists when the combination of self-directedness and computer self-efficacy are correctly complemented by external and program support.

As originally formulated, this theory applied only to CBI that had little or no instructor involvement. However, with blended learning strategies, the technology presents a continuum of instructor involvement. At one extreme is "pure" CBI that provides no instructor involvement and is basically a self-directed

learning process. At the other extreme is traditional instructor-led classroom instruction with its intensive instructor-student involvement and little technology. In between are blended combinations such as classes delivered by compressed video, which have reduced instructor-student involvement but are not as self-directed as CBI.

It can thus be seen that the optimum blended learning strategy is dependent on the characteristics of the adult learners as specified by this theory. Although the original theory assumed that a decision had been made to use CBI, in fact the decision as to what technology should be used and to what extent is shaped by the same factors shown in the theory outside of the CBI design component of the theory. In essence, that portion of the theory becomes the more general "technology design." Extending Lowe and Holton's (2005) theory, decisions about the appropriate blended learning strategy are a function of the self-directedness of the learner, the comfort level with learning via technology, external supports available, the desired learning-goal level, and the instructional strategy employed.

Several conclusions relevant to blended learning were drawn from the theory. The first conclusion drawn is that characteristics of the adult learner play an important role in the designing of technology-based learning for adults. Clearly, there are unique characteristics of adult learners that may significantly affect the design of technology-based learning. The adult characteristics of self-directedness and computer (or technology) self-efficacy were found to be important when using technology-based learning. Adults possess different levels of self-directedness and technology self-efficacy, and these differences should be taken into consideration. Adults with lower levels of self-directedness and technology self-efficacy would require more external support and program control of instruction. Those with higher levels of self-directedness and technology self-efficacy require less external support and more learner control of instruction.

The importance of considering learner characteristics is further accentuated when one considers that in competency-based training, the desired learning-goal level is usually high, at least at the application level of Bloom's taxonomy and often at higher levels. This, in turn, requires careful consideration of the self-directedness of the learner and the external supports provided. Furthermore, if the levels of self-directedness and technology self-efficacy are not aligned with the level of external support, the components of instructional control, and instructional support of technology-based learning design, the adult learner will not complete or obtain the desired learning outcome. Technology-based learning should be developed to respond to these individual adult differences.

A second conclusion drawn from this study is that technology-based learning design is interwoven with the units of self-directedness, computer self-efficacy, learning-goal level, instructional design strategy, and external support. This is not a simple relationship. For example, simply using software that converts face-to-face instruction to CBI is only one of the elements to be considered in

developing effective CBI. Successful technology-based learning must consider the alignment of each of the units of this theory to be effective.

The support portion of the model is equally as important as the design half of the model in designing effective technology-based learning. Not only are all units required, but they must be matched to provide appropriate levels of each unit to achieve the desired learning outcomes. For example, if both self-directedness and computer self-efficacy are at a low level, then both external support and the support part of CBI design must be at a high level for the support level to be aligned. Likewise, if the learning-goal level is low and the instructional strategy design is appropriate for the learning outcome, CBI design must be aligned with the support half of the model to be effective. There are many combinations of aligning the support half with the design half, but no matter what the combination, there must be a match for effective technology-based learning.

The third conclusion drawn from this theory is that learning-goal level affects the instructional design strategy for technology-based learning. This requires both the instructional designer and the instructional technologist to work together to ensure an appropriate technology-based learning design for the learning-goal level. For lower learning-goal levels, CBI should be designed with more program control. The lower learning-goal level is usually new knowledge or a procedure that requires learning step by step. On the other hand, higher learning-goal levels, such as those employed in competency-based managerial instruction, should be designed with learner control of instruction. The higher learning-goal levels foster the use of metacognitive skills possessed by the adult learner. Adult learners like to share their knowledge, and a cooperative learning experience would be beneficial at the higher learning-goal level. The instructional designer should use instructional design principles in developing the instructional strategy design unit.

A fourth key conclusion of this study is that both external and instructional supports are extremely important. Although the literature hints at the importance of external and instructional support, there is very little research in this area. Most research in instructional support is primarily in instructional feedback. External support and instructional support in technology-based learning design helps to develop the attributes of self-directedness and technology self-efficacy in adults. By providing external support, adults receive encouragement and have opportunities for positive experiences. This may be in the form of allowing the adult learner to engage in CBI during working hours, providing a computer lab with the appropriate hardware and software for CBI, praise for the adult learner's participation in technology-based learning, or a peer providing positive feedback about the experience. If adults are frustrated because external support is not available to answer their questions or provide assistance, the experience becomes negative and they are not likely to engage in technology-based learning again. The facilitator and the organization that is sponsoring the technology-based learning should make available the external support that the adult learner needs.

Instructional support in technology-based learning is a component of the technology-based learning design unit in the support half of the model. Feedback is one way of providing instructional support. This support should be delivered in small doses, with the opportunity to obtain more information if needed. By giving the adult learner some control of their learning, they will develop additional skills and have positive experiences that will improve their level of self-directedness and computer self-efficacy. When the adult learner can find the support they need, their technology self-efficacy level should improve.

As was seen in the previous section, the actual blended learning strategies employed varied depending on these factors and resulted in a wide array of technology-based instructional strategies. These strategies were entirely consistent with prior research as illustrated by this theoretical framework.

Conclusion

The promise of cost-effectiveness, the ability to reach wider audiences, and, frankly, just the novelty of new instructional technologies have generated great enthusiasm in the training arena. R. E. Clark (2001) cautions that interest in new technologies has often taken priority over finding empirically based principles for meaningful instructional design. There are problems and challenges associated with any technological innovation. Focusing solely on the delivery medium without regard for adult learning theory will certainly impede the effectiveness of any training program. During the instructional design phase when critical decisions about delivery media are made, HRD professionals should concentrate on applying adult and cognitive theories of learning in relation to the way in which a particular technology may facilitate learning. This requires identifying the unique features of the available technology and the ways in which these features may relate to the learning process.

References

Aspden, L., & Helm, P. (2004). Making the connection in a blended learning environment. *Educational Media International*, *41*(3), 245-252.

Bates, R., Holton, E. G., III, & Seyler, D. (1996). Principles of computer-based instructional design and the adult learner: The need for further research. *Performance Improvement Quarterly*, *9*(2), 3-24.

Berge, Z. L. (2002). Active, interactive, and reflective elearning. *The Quarterly Review of Distance Education*, *3*(2), 181-190.

Bielawski, L., & Metcalf, D. (2003). *Blended eLearning: Integrating knowledge, performance support, and online learning*. Amherst, MA: HRD Press.

Bynum, A. B., Cranford, C. O., Irwin, C. A., & Denny G. S. (2002). Participant satisfaction with a school telehealth education program using interactive compressed video delivery methods in rural Arkansas. *Journal of School Health*, *72*(6), 235-242.

Clark, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research*, *53*, 445-459.
Clark, R. E. (2001). *Learning from media: Arguments, analysis and evidence*. Greenwich, CT: Information Age.
Clark, R. G. (1999). *Developing technical training* (2nd ed.) Washington, DC: International Society for Performance Improvement.
Fox, S., & MacKeogh, K. (2003). Can eLearning promote higher-order learning without tutor overload? *Open Learning, 18*(2), 121-134.
Galvin, T., & Johnson, H. (2003). Best return on training case studies. *Training*, *40*(11), 24.
James, P. (2002). Discourses and practices of competency-based training: Implications for worker and practitioner identities. *International Journal of Lifelong Education*, *21*(4), 369-391.
Lanham, E., & Zhou, W. (2003). Cultural issues in online learning—Is blended learning a possible solution? *International Journal of Computer Processing of Oriental Languages*, *16*(4), 275-293.
Lawler, E. L. (1994). From job-based to competency-based organizations. *Journal of Organizational Behavior*, *15*(1), 3-15.
Le Deist, F. D., & Winterton, J. (2005). What is competence? *Human Resource Development International*, *8*(1), 27-46.
Lowe, J. L., & Holton, E. F., III. (2005). A theory of effective computer-based instruction for adults. *Human Resource Development Review*, *4*, 159-188.
Mayer, R. E. (2001). *Multimedia learning.* New York: Cambridge University Press.
Moreno, R., & Mayer, R. E. (2002). Learning science in virtual reality multimedia environments: Roles of methods and media. *Journal of Educational Psychology*, *94*, 598-610.
Mulcahy, D. (2000). Training for new times: Changing relations of competence, learning, and innovation. *Studies in Continuing Education*, *21*(2), 217-238.
Murphy, D. (2003, September). Bayer proves blending learning works. *IT Training,* 24-26.
Naisbitt, J. (1999). *High-tech, high-touch: Technology and our search for meaning*. Broadway Books: New York.
Naquin, S. S., & Holton, E. F., III. (2003). Redefining state government leadership and management development: A process for competency-based development. *Public Personnel Management*.
Nisar, T. M. (2004). E-learning in public organizations. *Public Personnel Management*, *33*(1), 79-88.
Osguthorpe, R. T., & Graham, C. R. (2003). Blended learning environments: Definitions and directions. *The Quarterly Review of Distance Education*, *4*(3), 227-233.
Ricciardi, J. N. (2005). Achieving human service outcomes through competency-based training. *Behavior Modification*, *29*(3), 488-507.
Sparrow, S. (2004). Blended is better. *Training and Development*, *58*(11), 52-55.
Westera, W. (2001). Competencies in education: A confusion of tongues. *Journal of Curriculum Studies*, *33*(1), 75-88.

Elwood F. Holton III, EdD, MBA, is the Jones S. Davis Distinguished Professor of Human Resource, Leadership and Organization Development in the School of Human Resource Education at Louisiana State University where he also coordinates their degree programs in HRD/AE.

Mary Leah Coco, MS, is a research associate with the Division of Workforce Development at Louisiana State University. As a research associate, she delivers training, conducts organizational needs assessments, and variety of other HRD focused initiatives. Her research interests include competency-based training, adult education theory, blended learning, program evaluation, and theory to practice.

Janis S. Lowe, PhD, is a labor market specialist manager with the Louisiana Department of Labor, Division of Research and Statistics. Her research interests include adult learning, computer-based instruction, and the theory building process.

Jacqueline V. Dutsch is an adjunct professor for the University of Phoenix and a member of the Board of Directors for Coastal Environments, Inc. She has years of experience in human resource development. Additionally, she has extensive experience in the coordination and delivery of computer-based and compressed video training programs.

Holton, E. F., III, Coco, M. L., Lowe, J. L., & Dutsch, J. V. (2006). Blended delivery strategies for competency-based training. *Advances in Developing Human Resources*, *8*(2), 210-228.