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# The role of Web-based distance learning in HR development

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***Abstract*** *Advances in computer technology facilitate innovative methods for delivering training in organizations. The Internet enables the delivery of computer-based training across time and distance. This medium, known as Web-based distance learning, provides opportunities to develop human resources to support creating a competitive advantage for an organization. This article discusses principles of WBDL design, measuring the effectiveness of training delivered through that design. Further, the relationship between WBDL and human resource development is provided. Suggestions for organizations planning to implement WBDL are included.*

## Introduction

Organizations today face a constantly changing business environment. Increasing global competition and quickly advancing technology are creating an economy requiring organizations to build a flexible and highly skilled workforce (Vicere, 2000). According to the resource-based view of the firm, employees are a strategic asset in building and maintaining a sustainable competitive advantage. Strategic assets are firm resources that are simultaneously rare, valuable, imperfectly imitable and non-substitutable (Barney, 1991). Employee knowhow; that is the knowledge, experience and skills of employees, is considered a strategic resource because it meets these characteristics (Michalisin *et al.*, 2000). Organizations that continuously provide training and development opportunities to their employees can develop employee knowhow, thus building a strategic asset that can lead to a sustainable competitive advantage.

The diversity and availability of new training media are growing and providing valuable tools for organizations to train and develop their employees. In fact, the American Society of Training and Development (ASTD) reports that organizations delivered 10.5 percent of their training through technology in 2001 compared to 8.8 percent in 2000 (Thompson *et al.*, 2002). We believe that organizations with an understanding of the value in developing employees are more likely to invest in these new technologies. Of particular growing interest is the medium we will refer to as Web-based distance learning (WBDL). This training technology is fairly easy for organizations to develop and can be adapted quickly to address changing organizational needs, making it an attractive complement or alternative to traditional training methods.

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Despite the possible utility of WBDL, it seems many organizations are lacking in an understanding of what constitutes effective training using these technologies thus preventing them from maximizing the media's potential. This lack of understanding is reflected in the challenges some organizations are facing in implementing technology delivered training. For example, drop out rates for WBDL courses are one of the biggest training problems facing organizations (Frankola, 2001).

Further, many organizations implement WBDL without the necessary planning or strategy to articulate the relationship between WBDL and the learning needs of employees and managers. Therefore, the goal of this article is to provide a framework to address the tie between an organization's strategic business needs and the implementation of effective WBDL. In the following sections of this paper, the authors discuss the history of WBDL and a framework to specify the benefits of linking WBDL to the organization's human resource development needs. Following this discussion, the authors synthesize current research to establish basic principles for the effective design of WBDL. Finally, recommendations are offered which will assist in reducing current gaps between WBDL's promise and reality given current social and technical limitations of the medium and our knowledge to date.

*The evolution of WBDL*

Computer-based training (CBT) is a term that refers to any training delivered via a computer. Figure 1 lists some common forms of CBT. CBT has been in existence for some time but recently has grown in popularity and use. CBT was in existence well before the invention of the personal computer. In the 1950s and 1960s organizations such as the government and universities began developing training utilizing the computer. The first CBT application was an early-warning air-defense system that was in essence a training simulation system (Ladd, 1990). As computers decreased in size and price, the use of CBT continued to grow with the potential to improve the effectiveness of training.

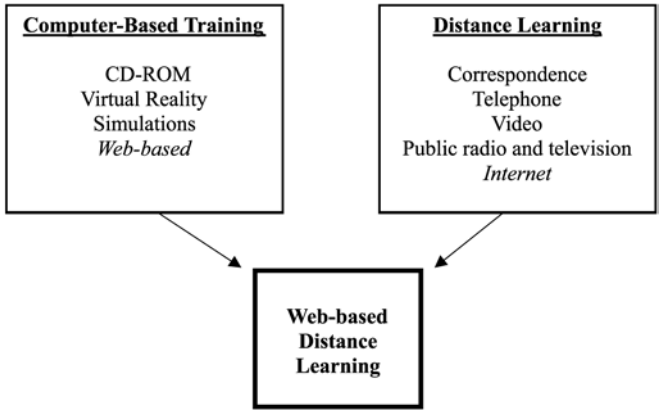



**Figure 1.**
The evolution of Web-based distance learning

An early issue for CBT that is not entirely resolved is providing access to all users. Early on, large and expensive computers made it difficult to access training and early CBT developers found creative ways to provide access to participants. In the late 1960s, Kent State University delivered CBT to nurses at local hospitals by purchasing a semi-truck and trailer to transport ten computer terminals directly to hospitals that wanted to participate in training (Ladd, 1990). Fortunately, computers have slimmed down a great deal. However, as CBT has grown in popularity, the issue of access continues to be of concern. Organizations have not always had a uniform mechanism to deliver their CBT and are still seeking creative ways to provide uniform access.

Similar to CBT, distance learning has been in existence for many years. Distance learning has its roots in correspondence courses and can include any kind of course where participants need not be physically present to participate. Distance learning may involve many different types of technology as listed in Figure 1. A main goal for an organization in implementing a distance learning initiative is to increase access to instruction and resources for employees (Gibson and Gibson, 1995).

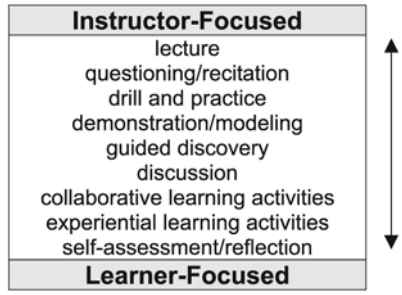
WBDL is the combination of computer-based training and distance learning and it provides a medium that has the potential to be a resource to help organizations meet the training and development needs of their total workforce. The Internet has brought a new dimension to computer-based training and distance learning by providing a new mechanism to deliver training. As pointed out by Greenberg (1998):

> Not since the mainframe has there been a way to publish computer-based training one time and make it simultaneously available to thousands of people from one central location over a standard network.

WBDL not only addresses the issue of uniform access, but also holds potential to dramatically change our approach to training. WBDL can allow organizations to provide training and information for employees across time and space barriers. It is a medium that is flexible and can be changed quickly to keep pace with the changing business environment.

Traditional classroom training has not become obsolete. However, training research over the past 30 years has advanced our understanding of learning and is leading to better training methods. As Peter Drucker explains "learning as we practice it still puts the teaching process at the center. Increasingly, we must put the learning process at the center" (Drucker, 2000). Berge proposes that teaching methods cover a continuum between being instructor-focused and learner-focused (Berge, 1998). More learner-focused learning implies that instructors must choose media that facilitate the learner's involvement. Figure 2 provides a representation of the continuum of various training media.

WBDL allows instructors to design the training around the individual learner. The technology actually brings more one-on-one interaction by providing an opportunity to create a personalized learning environment. The




**Source:** Adapted from Berge (1998)

**Figure 2.**
Teaching methods
continuum

design of the interaction can be focused and individualized. WBDL allows an individual to be at the center of the experience as opposed to just on the receiving end of information provided by a trainer (Galagan, 2000).

The use of technologies such as WBDL that allow employees to learn from a distance may grow in popularity as they allow organizations to meet their immediate and strategic needs for a flexible, well-trained workforce (Kosarzycki *et al.*, 2002). Further, WBDL promises lower distribution costs for just-in-time training at anytime to any location (Simmons, 2002). With these opportunities in mind, it is clear that there is more to developing effective WBDL than simply posting current training materials on the Web. The potential of this medium often is unrealized because organizations fail to tie the purpose of the medium to their business needs.

## A framework to apply WBDL to human resource development

There are many reasons that organizations find value in using WBDL. Several aspects of the current business environment have implications for the development of employees and managers. Tannenbaum (2002) outlines several organizational challenges with implications for human resource development. For example, global commerce increased by trade agreements and Internet technology creates a continual pressure on organizations to innovate and stay ahead of the competition. Internet technology also creates a more knowledgable consumer base leading to a need to better prepare employees to interact with customers. Further, these and other competitive factors lead to incessant change in organizations requiring employees to continually adapt to new demands. Finally, labor shortages in many markets require organizations to compete to attract, develop and retain talented workers.

A strategic approach to human resource development is necessary to address these business challenges (Tannenabum, 2002). The application of WBDL in particular requires a framework to ensure that the learning tool is targeting results that are aligned with the organization's strategy. Therefore,

Figure 3 proposes a framework to apply effective WBDL to an organization's human resource development plan.

*Strategic learning imperatives to address business challenges*

To address the business challenges identified above, Tannenbaum (2002) suggests several strategic learning imperatives. Here, we review three of these learning challenges that we feel WBDL may address, thus, providing a platform for WBDL to play a strategic role in meeting an organization's human resource development needs. The learning imperatives include:

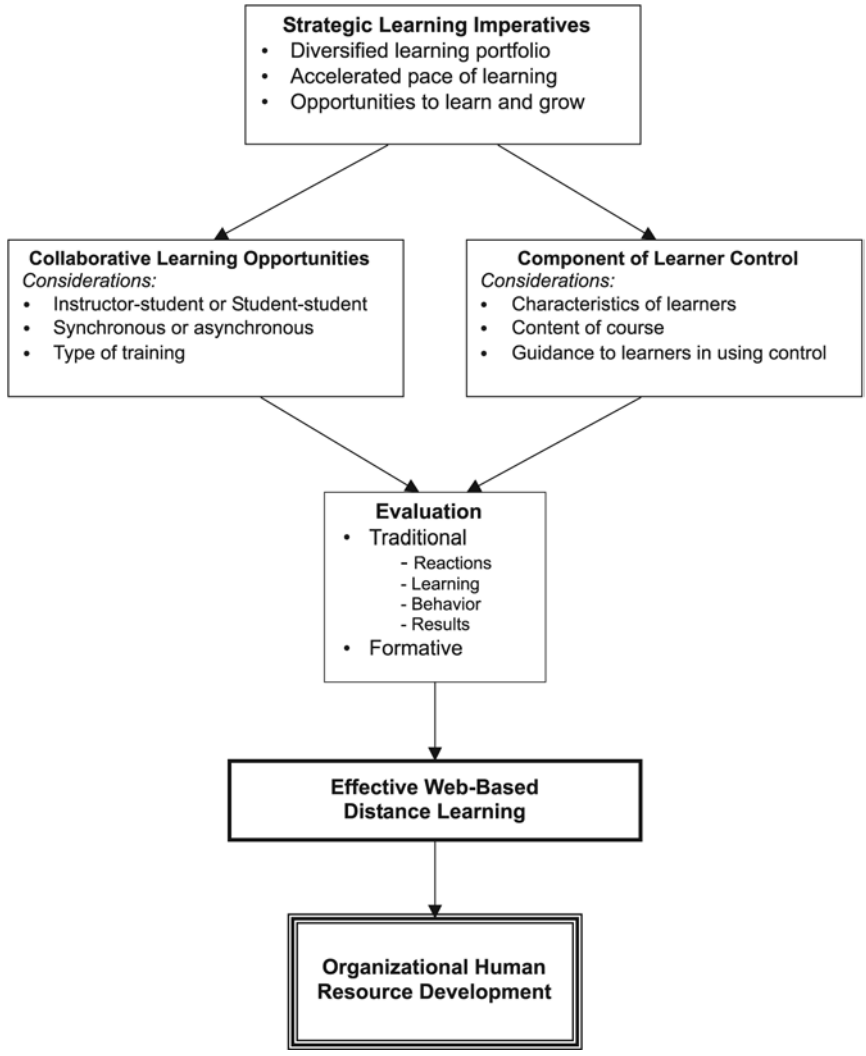



**Figure 3.**
From effective design to organizational human resource development

(1) diversifying the learning portifolio;
(2) accelerating the pace of employee learning; and
(3) making sure employees believe they have the opportunities to learn and grow.

Table I outlines how WBDL addresses these learning imperatives.

*Diversifying the learning portfolio.* Organizations must maintain a high level of talent to meet current competitive challenges. This leads to a need for a more diversified learning portfolio (Tannenbaum, 2002). Expanded learning options are necessary because traditional classroom training may not meet all of an organization's needs. Learning options providing more personalized training and individual customization are necessary to address the diverse challenges organizations face. We do not suggest, however, that WBDL may replace traditional classroom training. Rather, WBDL may in some cases provide a better or even a complementary alternative for organizations to meet a specific learning need.

WBDL is a valuable flexible addition to an organization's learning portfolio that can provide a more customized training experience to meet the diverse learning needs of employees. For example, an organization may have a complete portfolio of WBDL courses. Employees may select and complete the course (or component of a course) that meets a specific learning need.

In developing a training strategy, the American Red Cross (ARC) recognized workers have varying learning needs and styles. For example, they have many workers who are self-directed learners ready to select the appropriate learning resource and maximize their learning from that media. On the other hand, they also have workers who need more guidance. The ARC uses WBDL courses to meet strategic learning needs while allowing learners to identify and participate in training courses that are appropriate to their needs. Workers are able to download career assessment and planning tools and then determine the training and learning opportunities needed to meet their goals (Rogers and Becker, 2001).

*Accelerating the pace of learning.* Today's complex work environment requires a more accelerated pace of employee learning. Learning needs occur

| Organizational learning needs | The Web-based distance learning solution |
|---|---|
| Diversified learning portfolio | Alternative to traditional classroom training<br>Opportunity to address individual learning styles and needs |
| Accelerated pace of learning | New training courses developed quickly<br>Immediate access to new training courses<br>Consistent format |
| Opportunities to learn and grow | Around the clock access to learning opportunities<br>Access for all employees across geographic barriers<br>Tracking and reporting capabilities |

**Table I.**
Benefits of WBDL in meeting organizaitonal learning needs

more quickly and more often (Tannenbaum, 2002). As organizations cannot control when and how these learning needs emerge, they must address reducing the time that it takes to respond to a new learning need. As a result, training that can be provided "just-in-time" is needed to continue to prepare and develop the workforce (Thayer, 2001).

WBDL applications can be developed fairly quickly, and more importantly once developed, can reach employees almost immediately. Once a training course or developmental opportunity is published on the Web, it is immediately accessible by employees.

The flexibility of WBDL can help organizations meet their learning goals under seemingly impossible challenges. The United States Postal Service (USPS) faces the challenge of providing consistent training to its 800,000 geographically dispersed workers. For example, over 79,000 employees in the organization have personnel selection responsibilities such as serving on selection committees, reviewing job applications, or serving as selection officials. To maintain USPS standards, it is important to provide consistent training on selection methods to all of these employees. However, the cost of maintaining these training courses for so many employees was difficult because it involved constantly updating manuals and "training the trainers" to deliver consistent workshops. USPS finds Web-delivered courses a solution to its challenge as they allow a consistent course to be offered to thousands of employees online at once. Employees no longer need to wait months for the course to be offered or to travel to another location to take a course. The Web provides timely materials on an as needed basis, even serving the needs of small and remote facilities that do not often need to interview and hire new employees. Employees in these locations can easily access the course via the Web when they have a hiring need (Wankel, 2001).

Further, a WBDL system can create a training course template that is familiar to all trainees. As new training courses are available, employees can access and progress through the courses more quickly with consistent format. For example, Raymond Karsan Associates (RKA), a consulting firm that develops HR related products recently developed a series of management training courses for their clients. To meet a need RKA identified in their client base, they developed a series of 12 courses to address key management development competencies. To provide continuity among the courses, they designed the courses with common elements presented in a common format. As managers take more than one Web-based course, the common elements allow easier navigation (Kruse and Keil, 2000).

*Providing opportunities to learn and grow.* Competition creates a need to attract and maintain talent. A key action in doing so is to make sure employees believe they have opportunities to learn and grow continuously (Tannenbaum, 2002). Part of providing an environment to support continuous learning is to ensure that employees at all levels of an organization are able to actively pursue training and development activities (Noe *et al.*, 1997).

WBDL can provide access to learning opportunities to all employees that can access a computer that is connected to the Internet. An organization can even provide employees that do not work in offices with shared terminals to access learning opportunities via the Web. Further, training that at one time was cost prohibitive for all employees owing to travel expense may now be provided equally to all employees.

WBDL also allows you to track participation and provide feedback on employee's progress toward career development goals. Further, employees may appreciate the opportunity to access varied learning opportunities. For example, Nortel Networks, a global network engineering company, needed training to speed up time to market for new products and ideas. In evaluating their WBDL efforts, Nortel found that employees preferred the WBDL opportunities over other training options (Michalski, 2001).

*Effective WBDL design*

As pointed out by Brown and Ford (2002, p. 193): "poorly designed training will not stimulate and support learning no matter how appealing or expensive the technology used". To meet employee and management learning challenges, training designers must create WBDL courses that meet learning goals. Designers of WBDL must consider learner characteristics and needs in developing WBDL courses that individualize and facilitate rather than hinder learning (Brown and Ford, 2002). Research is far from solidifying consistent design standards. However, some guidelines and basic principles will foster learning through more effective design. By examining the human issues in the next section, some important guidelines for effective WBDL design emerge.

*Human issues in WBDL development and implementation.* The growing use of technology such as WBDL in the workplace has caused many changes in employee communication. A recent study found that the implementation of electronic communication not only reduces face-to-face communication, but also reduces overall organizational communication. The study found the main reduction in communication was casual discussions (Sarbaugh-Thompson and Feldman, 1998). The loss of casual interaction can do harm to the organization since innovative ideas are often a result of such interaction. Physical, face-to-face communication is also absent in WBDL. Does this lack of interaction affect the effectiveness of training? Web-based learners in a distant environment lack the guidance of an instructor they can interact with face-to-face. Further, participants also lack interaction with other trainees.

Another unique aspect of WBDL is the option of learner control. As mentioned earlier, traditional classroom training only provides control for the instructor. Web learners can have the ability to move freely through the training and even interact with Websites outside of the training course through the use of hypertext. Hypertext allows trainers to build in "links" or highlighted words that when selected, take the trainee to a different part of the training course or to an outside Web site for more information. Learner control in

WBDL creates a shift in responsibility in navigating a training course from the instructor to the trainee.

The absence of physical, face-to-face interaction with an instructor or other trainees and the flexible format of the medium present both a challenge and an opportunity for those designing WBDL. Addressing these aspects may provide an opportunity to improve the effectiveness of training. The absence of human interaction may be addressed by building in opportunities for electronic collaborative learning (i.e. "chat rooms" or electronic bulletin boards). The flexibility offered by learner control provides trainers the ability to give trainees ownership in the learning process, which may also lead to more effective training.

*Collaborative learning.* The absence of human interaction in WBDL creates a concern with the effectiveness of the training. Some believe that human interaction is a vital component of learning and that employee success will be reduced if it does not occur (Hallowell, 1999). There is a gap between what one can learn on one's own, and what one can learn in cooperation with an instructor or others. Collaborative learning is essential for learners in closing that gap (Vygotsky, 1962). When working with others, trainees can gain from their experience and skills. This process can help build their knowledge regarding the training material.

Collaborative learning has taken place if information is exchanged, even if the information is shared electronically (Khalifa and Kwok, 1999). Interaction involves the sharing of ideas and the development of knowledge through affirmation of understanding. It is possible to create opportunities to interact collaboratively through electronic media. Newman *et al.* (1997) reports a similar amount of critical thinking in face-to-face seminars and computer conference discussions. The question then becomes, what kind of interaction is necessary to improve the effectiveness of WBDL? There are different dimensions of collaborative learning that can occur including when the interaction occurs, who is involved in the interaction and how the interaction occurs. Another aspect to consider is if all training courses require a component of collaborative learning.

WBDL does not usually provide an opportunity for physical face-to-face interaction. However, face-to-face is not the only type of interaction that exists. Because Web-based learning can be synchronous, meaning training can occur in real-time, opportunities for interaction can be integrated into the course. A training course might include, for example, a live video of the instructor or a real-time chat discussion that allows participants to participate in an on-line discussion. Asynchronous interaction can also occur in WBDL. Asynchronous interaction occurs over time and includes electronic communication alternatives such as bulletin boards and e-mail that allow participants to communicate with one another when convenient.

A study by Stephenson (1992) looked at CBT supplemented by human interaction in a traditional classroom course. The study found that individuals performed better when their computer-based study was supported by human interaction, however, there was not a significant difference between interaction

that occurred with the instructor and interaction that occurred with other students. This result indicates that instructor interaction is not the only interaction that should occur. Collaborative discussions with fellow participants can also lead to increased learning.

The need for collaborative learning may also depend on the type of training. WBDL may not be the right solution for all situations. One study comparing in-class and Web-based discussions showed that physical presence is better for creative problem exploration and idea generation. The computer environment better supported the later stages of linking ideas, interpretation and problem integration (Newman *et al.*, 1997). It is possible for the trainees to prefer the computer interaction in some circumstances. In a comparison of in-person discussion and a computer assisted class discussion, Alavi (1994) found that students reacted more positively to the computer-assisted discussions. They perceived higher levels of skill development and learning and demonstrated a stronger interest in learning.

*Learner control.* Learner control may be looked at from several perspectives. In the Web-based learning environment, learners may have control over pacing through the course, the sequence of the training, or over the content they choose to explore in the training (Milheim and Martin, 1991). Providing an interactive interface is part of learner control. This interface gives the learner ability to manipulate and explore the material (Najjar, 1998). Design of this interface also provides the trainer with flexibility in customizing the training again leading to a need for understanding effective design principles.

Not all employees come to a training course with the same amount of knowledge and understanding of a topic. WBDL offers flexibility so that every trainee does not need to participate in every part of the training. Trainees often have different needs for information and time in completing WBDL. These differing needs will cause some trainees to visit certain screens or components several times (Milheim, 1995). The ability to provide varying practice and pacing levels provides organizations with a medium that can be adapted to different trainees without modifying the actual training content. This ability to provide more individualized instruction can also lead to a reduction in learning time (Russ-Eft, 1994).

The capability to provide links to other materials is a potentially powerful feature of Web-based distance learning (Brown and Ford, 2002). Hypertext is a tool for learner control that can be used within sections to give the trainee access to more information if needed. If a company is designing a training course for their customer service representatives, for example, one section might provide information on the steps involved in completing a typical transaction on the call. The steps might look something like this:

(1) Answer the call within three rings using the standard greeting.

(2) Ask the customer for their account number and open their account.

(3) Identify the customer's reason for calling.

Further steps would address other proper techniques to follow when dealing with a customer on the telephone. This training may be provided for experienced representatives as well as new hires. Experienced representatives know what the "standard greeting" is and also how to open an account on their computer so they can move ahead to the new information that they desire to learn. A new hire, however, may not be familiar with these items so the underline lets them know they can click on the hyperlink to get more information on this topic.

Research on learner control has found that a correct contingency must be identified before it is a useful concept (Tennyson, 1980). That is, the level and type of learner control that is appropriate will vary based on the learner and the content of the course. Current research leads us to focus on providing the learner as much support as possible in the effective use of the control they are provided in the Web-based environment.

For example, caution must be exercised when using hypertext. Research has indicated that the non-linear nature of hypertext can create disorientation among users (McDonald and Stevenson, 1998; Schroeder and Grabowski, 1995). If confronted with an overwhelming number of choices, there is the possibility that the trainee will get lost and the training will lose its value. There is also the possibility that if given free reign, the learner may not approach the training as intended and as a result, not learn the intended concepts.

Further, the presence of learner options may impact training effectiveness. A study examining learner choices in an Intranet-based training course on problem solving found that employees do not always use the control provided wisely (Brown, 2001). Learners may move quickly through training or skip over important training components. Brown reported that some of the learners with the worst post-test scores skipped over practice opportunities. These findings indicate that designers should pay careful attention in determining the amount of learner control to provide to learners. While the flexibility is important, designers should ensure that progress is monitored and needed practice opportunities are required.

One approach to providing this balance is through adaptive guidance. Adaptive guidance is a training strategy that provides the learner with interpretive information about their progress in training and gives them direction in best utilizing the training available. In a study that provided adaptive guidance to supplement learner control in a computer-based environment, Bell and Kozlowski (2002) found that this guidance helped learners make better learning choices resulting in a positive result in their learning and performance.

*WBDL evaluation*

There are several ways to evaluate training and at this time, there is not an agreed on theory on the best approach (Salas and Cannon-Bowers, 2001). Initial

investigations of the success of WBDL are important for organizations as these evaluations may impact decisions to move forward with WBDL initiatives. Trainee satisfaction with a training course is often measured immediately following training. As with any training, the main goal of evaluation is to determine what, if anything, the trainee has learned. It is of further interest to determine if the new skill or knowledge has been applied in the trainee's work setting. Finally, it is important to determine if the new skill or knowledge actually results in improved performance or productivity. In Kirkpatrick's typology that has been used by training researchers for almost three decades, these dimensions are referred to as *reaction, learning, behavior* and *results* (Kirkpatrick, 1976). To measure the effectiveness of training, the instructor must examine each of these levels of evaluation.

Because of the expense and time commitment involved in designing WBDL, organizations should also consider taking a formative evaluation approach. Formative evaluation is the process of evaluating the course as it is being developed and is a recommended approach when developing multimedia applications (Tessmer, 1995). The goal of formative evaluation is to improve early versions of course development and to eliminate problems or "de-bug" learning courses. A thorough discussion of formative evaluation techniques is found in Brown and Gerhardt (2002).

## Conclusion

It is clear that WBDL has the potential to have a significant impact on the future of training and development. However, to ensure that WBDL is a worthwhile investment for an organization, it is important to have an implementation plan that is specifically tied to an organization's business strategy. With careful planning and evaluation, WBDL has the potential to solve many of an organization's employee and management development challenges. We suggest that organizations pursuing the development of WBDL application take note of the following considerations:

- WBDL should be tied to specific business objectives. We have provided several examples of applications designed to solve specific challenges such as accessing remote employee populations. The development of WBDL can be time consuming and costly, therefore, organizations should articulate specific objectives when designing WBDL to ensure that their initiative stays on track. WBDL should not be considered a replacement for traditional classroom training provided by an organization. WBDL should be used as an alternative or complement to other training an organization provides.
- Designers should consider the need and opportunity for collaborative learning when designing WBDL. The ability to create varying types and degrees of interaction with course instructors and other course participants is a powerful feature of this medium.

- Designers should carefully evaluate the level and design of learner control within the WBDL environment. Organizations must understand that learners come to courses with varying skill sets and that it is important to provide appropriate opportunities for different learning paths for different individuals.
- Organizations should evaluate their WBDL efforts. Whether through traditional evaluation efforts, or formative evaluation, WBDL should be examined to determine if it is meeting the objectives specified in the planning stages of the training.

These considerations are based on our early understanding as to what constitutes effective WBDL. Further research is needed to help to establish more specific design principles and direction for organizations. Research, for example, has supported the need for a collaborative component in WBDL, but not what kind of activity is most effective (Arbaugh, 2000). Further research should focus on identifying what kind of collaboration is needed to improve the effectiveness of training, specifically examining the timing and type of interaction, the participants in interaction, and what kind of training collaborative learning best supports. Learner control needs further exploration to determine the most effective mix of the learner control constructs of sequencing, content selection and pace. As these areas are explored further, the potential of WBDL to support a firm's competitive advantage through human resource development will grow.

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