CONTENTS

Foreword to the Second Edition  xi
Robert F. Mayer

Preface  xix

The Editors and Editorial Advisory Board  xxvii

Foreword to the First Edition  xxix
Thomas F. Gilbert

PART ONE: THE FUNDAMENTALS OF HUMAN PERFORMANCE TECHNOLOGY  1

1 What Is Human Performance Technology?  3
Harold D. Stolovitch, Erica J. Keeps

2 The Origins and Evolution of the Field  24
Marc J. Rosenberg, William C. Cascarella, Cathleen Smith Hutchison

3 Transforming Organizations Through
Human Performance Technology  47
Gary A. Rummel

4 General Systems Theory and Behavioral Psychology  67
Dale M. Brethower
CHAPTER THIRTY-ONE

Beyond Distance Education: Distributed Learning Systems

Ellen D. Wagner

Distance learning seems to have finally come of age. After almost two decades of being passively, as "almost as good as face-to-face, instructor-led instruction, the professional literature provides ample empirical evidence supporting the important role played by well-designed and well-implemented distance learning initiatives.

Even as distance learning courses and programs have become ubiquitous features on the teaching and learning landscape, the discipline of distance learning is experiencing a significant expansion of its methodological underpinnings. Distributed learning represents a methodologically distinct variation on distance learning that responds to calls for supporting needs of individuals on terms that they are increasingly defining for themselves.

At first glance, the difference between these two terms may appear to be one of semantics. However, there are operational distinctions between distance learning and distributed learning that affect how performance improvement interventions are positioned and implemented. Both distributed learning's "just in time, just for me" orientation and distance learning's "extended classroom" approach of meeting the performance improvement needs of geographically dispersed learners require design and development consideration to leverage the unique strengths of each approach in practice. The following discussion describes some of the similarities and differences between these two closely related yet operationally distinct performance improvement methodologies. This discussion helps set the stage for subsequent descriptions of factors to be considered in developing both distance and distributed learning interventions.

ATTRIBUTES OF DISTANCE LEARNING

Distance learning (also called distance education, distance education and training, and teletraining, depending on the application environment) involves the transmission of educational, instructional, or training programming to two or more people at two or more locations separated by space or in time. It has evolved in large part as a response to demands for improving information access, equity, and particular attention paid to improving proximity of instructional resources via telecommunications technology.

Correspondence-related variations on distance learning have been a component of continuing and extended studies programs in the United States since 1892 (Pittman, 1990), but technology-mediated distance learning has grown logarithmically since the late 1980s (Moore, 1990). Until that time, technology-mediated distance learning had been far more commonplace outside the United States. "Electronic" distance learning programs, beginning with radio broadcasting, made their first appearance in the early 1930s. Countries such as Australia and Canada used electronic distance learning to provide rural and minority students with access to educational resources that would otherwise have been out of reach. Other countries have applied distance learning methods in more strategic, less marginalized ways; for example, during the 1930s Joseph Stalin chose distance learning as a way of increasing the number of technicians and technologists in Soviet society. Distance learning has been used in Africa, on a scale that is proportionally far greater than what has been seen in Europe or North America, for purposes of adult education, health education, and political education (Perraton, 1982).

Table 31.1 displays the names, dates of establishment, and number of enrollments of national "open universities" as of 1992, giving some idea of the scope of distance learning's influence on a global scale. In reviewing these numbers, Brown and Brown (1994) suggested that if the number of learners receiving distance learning programming in elementary, secondary, training, and noncredit areas had been included in these estimates, the number of participants in distance learning efforts would probably have been quadrupled. If one were to adjust these figures to account for the explosive growth in distance learning courses and programs since 1992, it is very likely that these numbers could be increased tenfold beyond that.

In his classic treatise on the topic, Keegan (1990) suggests that distance learning exhibits the following attributes:
- There is some provision for two-way communication in the institutional process. Telecommunications technology typically provide an interactive link through which discussion and dialogue are maintained among geographically dispersed course participants. However, written correspondence serves as the primary means of interaction in non-technological, self-paced distance learning implementations.

- People tend to receive instruction individually or in small groups rather than in large groups. Instead of meeting with others at a centralized location, a learner may complete a course at a workstation, at home, in the office, or at some other location where he or she may be the only course participant at that particular site. A small number of individuals may convene with another at one site, to be connected with small groups or with individuals located at other locations. Individual learners and small groups of learners participating in a common distance learning experience collectively constitute a learning cohort that functions as a single entity, in much the same way that participants in traditional classrooms operate as a single entity.

Implicit in this description is the notion that distance learners are found in locations that are distinct and apart from the institutions and organizations offering instruction. In its simplest sense, distance learning offers an alternative to site-based classroom instruction by extending the reach of the classroom instructor via technology.

Technology is particularly significant in distance learning settings because it fosters interaction (or, at a minimum, the perception of interaction) between the instructor and the learners, among learners, and between learners and the content they are expected to learn (Moore, 1989). Distance learning practitioners view this interactivity as the single most significant attribute that defines the contemporary distance learning experience. The two-way technologies provide vehicles for real-time exchanges of audio, video, text, and graphical information. It is this two-way, real-time exchange capacity that serves as one of distance learning’s primary identifying characteristics (Wagner, 1994).

Technologies most often associated with distance learning include print, audioconferencing, audiostreaming teleconferencing, interactive compressed video teleconferencing, computer-mediated conferencing, and video teleconferencing using satellite, broadcast, coaxial cable, and fiber optic transmission media. These technologies facilitate the interactive exchange of information that helps replicate the communication dynamics typically encountered in conventional classroom settings.

Distance learning courses and programs tend to be utilized in environments where all classes, site-based and distant, are scheduled according to a master calendar. Classes tend to begin and end on a fixed schedule and tend to be managed by an instructor. Distant learners are often supported by facilitators who minister to the needs of students at fixed (albeit distant) instructional sites or...
centers. Distance learning experiences tend to employ a cohort group model to motivate and retain participants. In distance learning settings, interactions are employed with the intent of establishing a "social presence" marked by intimacy among participants and immediacy of responses between the instructor and the learners (Gimarcadrena, 1995). In distance learning settings, concern for the interactions between teachers and students, among students, and between students and content reflect a concern for message transmission fidelity between sender(s) and receiver(s).

**ATTRIBUTES OF DISTRIBUTED LEARNING**

Distance learning differs from distance learning in that it tends to focus on the needs of individuals looking for immediate access to information, performance support tools, and instructional opportunities. This contrast with distance learning's orientation, which is focused on extending the classroom via technology. Distributed learning also tends to maximize connections between and among learners and resources, regardless of their relative physical locations. In other words, in a distributed learning setting a learner may be physically at a centralized site, whereas the resources that are needed may be at some physical distance from that centralized location. Another scenario may be that the learner is far from the resources, and both learner and resources are at sites that are distant from the primary organizational location. What is most relevant here is that the physical locations of learners and learning resources are irrelevant. What is relevant is the connection that exists between and among learners and resources.

As is true in distance learning, technological developments and strategies for technology use actively shape distributed learning experiences. However, some differences between the two approaches are worth noting. Whereas distance learning is influenced by technologies that enable conferencing, distributed learning is influenced by the interactive connectivity linking learners with learning resources. The technology deployment in distance learning has been affected by deregulation and competition in cable television and telephone industries. Distributed learning has been jump-started by developments in the computer hardware, software, and networking industries. Whereas distance learning has employed several modalities (audio, text, video) for connecting people, distributed learning technologies converge audio, video, and data-transmission media into a single integrated digital "pipeline."

**Technological Influences on Developments in Distributed Learning**

To better understand the expansion from the cohort-oriented, classroom extension model of distance learning to include the individualized, "anytime, anywhere" model of distributed learning, it is worth taking a closer look at specific technological developments that have influenced both models.

- **Accelerated desktop computer processing speed.** The processing power of today's desktop computers rivals that of large mainframe computers of a decade ago. These increases in desktop accessible speed and power greatly increase the ability of individuals to generate creative computing solutions to meet their own needs, on their own terms. This means that powerful, customizable computer-based performance improvement solutions are within reach of the majority of computer users.

- **Platform-independent data transmission protocols.** In the net-to-distant past, the selection of an operating system defined how and with whom one could exchange data files. Given the tremendous developments in networking protocols, it is now possible for UNIX users to share data with Microsoft Windows 95 users, who can in turn share that information with Macintosh OS users, who can in their turn share information with OS/2 users. This means that concerns of networking can be focused less on the tools of communications networking than on the intent of interpersonal networking.

- **Improved browser technology, and such features as Java-enabled client-server interactivity.** Readily accessible "new media," such as on-line multimedia and hypermedia, offer computer users at all levels of proficiency a gateway to an array of full-motion, fully animated, interactive, responsive information resources. Features like "streaming" audio and video transmit digital bits representing sounds, pictures, and motion in real time as a Web page loads on a user's computer, allowing Web sites to offer real-time multimedia programming comparable to that available on a CD-ROM (as long as sufficient bandwidth is available for transmission). There is every indication that in the next few years, on-line multimedia will be the rule rather than the exception for learning facilitation and professional development. For example, a recent survey using the HotBot search engine shows that the number of Web pages containing streaming media content increased more than 275 percent between September 1997 and January 1998. This represents an increase from approximately 100,000 pages containing streaming media functionality to more than 280,000, with the number of pages increasing monthly at logarithmic rates (Guglielmo, 1998).

- **Content objects and knowledge-content distributors.** A content object is a modular data unit that encapsulates information to describe and present a concept, a skill operation, or a procedure. Employing a categorization schema called a meta-data structure defines an object's descriptive attributes (that is, whether it is text, animation, audio, or video information; the size and type of the file; the topic being presented in the object; the performance that the object is intended to elicit; and so on). The meta-data structure makes it possible to combine powerful database capabilities with on-line search and file-retrieval capabilities so that specific content objects can be identified, located, and retrieved. Known as knowledge-content distributors, or RCDs (Masic, 1998), these content-object/meta-data structure tools operate as "wholesalers" of on-line and digital learning content from multiple vendors, providing user organizations with the ability...
to mix and match learning products. In practical terms, this means that users can select and compile the precise content objects that they specify.

- **Improved backend database technologies.** Combined with the browser and interactive features already noted, programs employing full-scale database back ends make it possible for even small businesses to leverage the power of real-time on-line transactional processing. They also make it possible to offer adaptive, fully personalized professional development resources that respond to a user's profile, needs, and interests by establishing search and sort protocols that access only the information that is relevant according to that user's profile.

- **The ubiquitous availability of commercial Internet service providers (ISPs).** Many people forget that the .com designation for commercial Internet users has been available only since the privatization of the National Science Foundation's NSF Net in the mid-1990s. Until that time, most Internet users were affiliated with government and government-sponsored research organizations, educational institutions, and branches of the military. Buoyant numbers of commercial Internet service providers and the competition among them have dramatically affected the access to service, types of service, costs for service, and provision of user support that Internet users have come to expect.

- **Improved access to the bandwidth needed for large file transmission.** Because of complaints from those who bemoan the delays they encounter downloading large graphical files over the "World Wide Web," and because of consumer demands for more bandwidth, Internet service providers are escalating plans for upgrading network and modems capacities. Asynchronous digital subscriber line (ADSL) service, offering transmission speeds up to thirty times faster than what is available over standard (twisted copper pair) voice grade telephone lines, is starting to emerge in select markets. Transmission speeds more than a thousand times faster than those currently available are very likely to be offered in the next few years.

**Influences from Human Performance Technology on Distributed Learning**

Evolving technology has certainly exerted its influence on the emergence of both distance and distributed learning, but the most important variables influencing the initiation of a distant or distributed learning experience come from a need to bring about individual and/or organizational performance improvement in the workplace. Today's economy and business environments operate by new rules, shaped by an organization's ability to adapt and respond to change. This in turn depends in large part on that organization's employees' ability to think critically, solve problems, and anticipate new possibilities (Carnevale, 1991; Rothwell, 1996). The growing workplace demand for information, instruction, and training resources that are available when and where support is needed is tacit acknowledgment of the need for more individualized performance support. Increasingly, learning resources can be accessed on-line; the presence of a growing

on-line learning and performance support marketplace is shifting the balance of power from providers to consumers. It is easy to understand why there is growing impatience with traditional methods of designing, delivering, and managing learning experiences that are increasingly out of touch in a "wired world."

Training continues to play an important role in supporting the ongoing development of employee knowledge and skills. As a case in point, the American Society for Training and Development's 1998 State of the Industry Report indicates that more than 81 percent of all training continues to be delivered in classroom settings by instructors or trainers (Bass and Van Buren, 1998). Even so, there is growing recognition that training may be insufficient for the kinds of continuous, individualized performance improvement that are enabled through distributed learning:

- **Training usually is not proactively developed to meet a company's strategic business needs.** Rather, it is implemented to react to a performance deficiency. Distributed learning provides a means of proactively pursuing information and performance support resources when and where resources are needed.
- **Training is often designed as something "done to" learners.** Specific outcomes need to be achieved, and learners are expected to conform to a path dictated by the designer of the learning experience, the instructor for the learning experience, or both. Typically, training is not designed to be flexible enough to meet an individual's learning needs, and typically it is not available at the time it may be needed by any given individual. Distributed learning provides a means of responding to an individual's self-determined need for improvement wherever there is access to Internet or network connections.
- **For those who want to apply what they have just learned, returning to work from the training setting can be disheartening.** The crises of the moment often interfere with the best intentions. Goals set after completion of a training experience get set aside to deal with the details of day-to-day business operations, and often the goals are never implemented. Distributed learning helps bring training and information resources directly to the desktop. It makes it easy to track down resources needed to make decisions. It can even help locate resources, both on line and off line, that are available at times and in formats that match the individual's needs.

**CHALLENGES IN DESIGNING DISTANCE AND DISTRIBUTED LEARNING SYSTEMS**

Even though the rationale for initiating a distance or distributed learning (D&DL) implementation may be compelling, there are several other considerations that need to be factored into one's thinking before one embarks on a particular design path:
- The courses that designers are expected to develop for distance and distributed learning contexts may or may not look like courses as we have always known them. This is especially true in the "lifelong learning" market represented by postbaccalaureate adult learners straining against the rapidly changing developments in their chosen disciplines. It is also true of training and performance support efforts that focus on updating knowledge and skills of individuals working in rapidly changing industries. This is an important point that should be included as part of the expectations setting that should be undertaken when constructing a DDL design.

- A basic goal of any learning design is to establish parameters within which the outcomes of the particular design intervention can be achieved. When the design is for a familiar venue, such as a classroom, it is well to bear in mind that the audience will tend to have expectations of what is likely (or not likely) to occur. Distance and distributed learning audiences may not have the same degree of experience with these two modes as they do with classroom-based experiences. They may not understand the challenges of the opportunities, or even the differences, that DDL experiences offer. Actively setting expectations around what is likely to be encountered during the DDL experience is an important component of learner motivation.

- The demand for traditional course offerings (for example, a five-day, site-based, instructor-led course offered at a centralized training center) may begin in an era of alternative means for accessing content where and when it is needed. Even so, there are times when getting groups of people together in face-to-face instructional settings is an essential part of the total learning experience. It is important to balance the things that distributed and distance learning can do very well with the things that can be done even better in other presentation modalities. It is also important to remember that distance learning's unique attributes make it appropriate for certain tasks for which distributed learning may not be as appropriate, and that distributed learning may be better than distance learning for achieving certain learning outcomes.

- Distance learning experiences may serve as a surrogate for the training experiences with which most of us are familiar, but distributed learning experiences represent a completely new approach for supporting informational, instructional, and performance support needs of individuals. Some training professionals (Filipczak, 1996; Cohen, 1997) have even suggested that (distributed) training offered via the Web is more similar to a performance support system than it is to our expectations of training. The logical extension of this discussion seems to suggest that the value of a distributed learning experience is somehow suspect because it is not the same as (classroom-oriented, instructor-led) training. It may be more productive to consider what the outcome of a learning experience is supposed to be, and then to select an instructional approach that accommodates the necessary conditions and constraints of the learning task, than to debate the value of any particular approach out of context.

- The strategies used for constructing instructional designs must increasingly account for learner-determined and learner-navigated paths while also continuing to maintain instructor-directed and domain-dependent learning parameters. In other words, distributed learning strategies must account for individual users' desire to move about in the on-line experience on terms they define for themselves. At the same time, sponsors of the learning experience need assurances that the topics that each learner must master are going to be mastered, regardless of the path that the user takes as she or he moves about. This means that design strategies need to include significantly more flexibility for individualized learner control and learning management than has typically been found in more behaviorally oriented models of teaching and learning.

CONSIDERATIONS IN DESIGNING LEARNER-CENTERED INSTRUCTION

Whether one is working in a context of distance or distributed learning, developing learner-centered designs involves a significant philosophical and methodological shift from behavioral to cognitive perspectives, and from objectivist to constructivist perspectives. Wagner (1990) notes that in most traditional learning contexts, instructional design activities tend to focus on the arrangement of contingencies to elicit specific responses. The seemingly algorithmic nature of the process of design ("First you state your goal, then you define your objectives . . .”) almost suggests a stimulus-response relationship (" . . . and then your student will perform certain tasks with 80 percent accuracy, 90 percent of the time"). Even in cases where designs are developed to accommodate cognitive tasks (such as knowing, remembering, thinking creatively, and solving problems), designs tend to reflect an objectivist rather than a constructivist orientation (Wagner and McCombs, 1995).

Duffy and Jonassen (1992) note that objectivist perspectives have shaped instructional design practice since it first emerged. Objectivism suggests the following propositions:

- The world is completely and correctly structured in terms of entities, properties, and relationships.
- Meaning exists in the world outside the realm of human experience.
- People have different understandings of meaning, which are based on their different experiences, but these are only partial understandings.
- The goal of complete and correct understanding is to get people to know, without bias from their prior experiences, the entities, attributes, and relations that exist.
Dwyer and Johnson (1992) suggest that constructivism provides an alternative basis for conceptualizing instructional experiences, whereby there are many ways in which to structure the world. This further suggests that there are many meanings or perspectives for an event or concept. Consequently, there is not a single correct meaning or understanding for which learners must strive.

A constructivist perspective makes perfect sense from a theoretical position, but the notion of "self-determined correct answers" can easily strike fear in the heart of a Human Performance (HIP) technologist responsible for demonstrating that learners are achieving "world-class standards," or that they have achieved specific performance-based outcomes. In order to counter such concerns, constructivists emphasize situating new (cognitive) experiences in the context of authentic (learning) activities (Brown, Collins, and Duguid, 1989). Learners are given an opportunity to draw on their own experiences, interpretations, and situational relevancies to infer their conclusions for a given situation. This provides an alternative to the prevailing approach guiding the design of instruction, wherein learners are provided with a plan of action, and success is simply a matter of following that plan.

Distance and technology. Learning both provide unique design and implementational contexts in which to pursue learner-centered principles. In DDL settings, where learners are not in physical proximity to their instructors, and where technology mediates the learning experience, there is a perception that learners may need to work more independently than in traditional settings (Kember, 1995). This is even more pronounced in distributed learning settings, where learners must establish their own paths for achieving performance outcomes. There is a general perception that successful learners tend to demonstrate a high degree of self-efficacy and are willing to take on challenging tasks on the basis of their previous experiences of success. There is also the belief that successful students are intrinsically motivated to succeed, and that they tend to believe that the control they exercise over events in their lives is internally mediated (Riddle, 1994).

Ironically, evidence from psychological and educational literature indicates that all learners benefit from instruction in which they are motivated, feel that they exercise control over their learning experience, are respected, and are accountable for their own learning outcomes. However, there continues to be the perception that these variables, although essential components of distant and distributed education learning experiences, may not be as important in traditional training and instructional settings. There is also the perception that, as "alternatives" to traditional instruction, distance and distributed learning experiences use instructional designs, models, and techniques that are oriented toward the needs of individuals more than may be typically encountered in traditional group settings.

STAGES IN DEVELOPING DISTANCE AND DISTRIBUTED LEARNING SYSTEMS

Designers working in distance and distributed learning environments will need to approach their endeavors with all those circumstances and constraints in mind. However, even though it is important to respond to the demands of a specific distance or distributed learning endeavor, designers must focus on the core activities associated with the actual construction of performance improvement interventions. These include the time-honored activities associated with instructional system design: assessment, design, development and evaluation.

Assessment

Assessment encompasses a broad range of activities used to establish the parameters within which a DDL experience needs to be developed. Assessment includes determining the domain of the content to be included in the experience, and it often results in the establishment of content benchmarks (that is, clearly articulated measures defining a topic's conceptual range and learner mastery of content included in that range). Assessment identifies and describes the performance that results from an expressed or observed need, and it targets the essential tasks that need to be addressed. Assessment also considers the needs and interests of a broad array of stakeholders. This group includes but is not limited to the following:

- Learners for whom a learning experience is intended
- Instructors or facilitators responsible for monitoring learners' progress
- Managers of the performance improvement endeavor to which the learning experience belongs
- Experts (with their expectations) from the market in which "high-performing graduates" must demonstrate their skill and content mastery

In concrete, pragmatic terms, assessment takes a close look at the attributes of the audience for which instruction is intended, to ensure that such design elements as treatment, tone, and mode of presentation are appropriately selected. Assessment also considers the context in which a course will be implemented, points out the need for technical support, as appropriate, and ensures that resource scheduling has been addressed. Assessment activities determine whether either distance or distributed learning is the most appropriate means of instructional delivery for the targeted audiences.

Some of the techniques used for conducting assessments include site visits, observations, analysis of extant documents, reviews of annual reports, surveys,
reviews of literature, industry summaries, interviews, questionnaires, and such focus group activities as user requirement workshops, where individuals representing targeted groups articulate learning needs and delivery preferences. Other rich sources of assessment data include summaries from other relevant course evaluations, instructor evaluations, and program evaluations. Recommendations for future research, or summaries of "next steps" from evaluation reports, also provide information that can be used in compiling the data from which to begin constructing a learning design.

The technologies needed to implement a proposed course present designers who are working in distance and distributed learning contexts with a broad array of challenges. In many cases, technical questions are posed from the perspective of an organization's staff in information technology or management information systems staff. Course designers need to be aware of the impact that a proposed design may have on a variety of stakeholders, including designers and developers, administrators and managers, and support staff in addition to the learners. Examples of questions that DML stakeholders should be able to answer before embarking on a DPLD endeavor are listed in Table 31.2.

Design

Design activities typically involve reviewing information collected during the assessment stage and then constructing a proposal for meeting as many of the needs outlined by the assessment as possible. The intended audiences are identified. Learning objectives and performance objectives are articulated. Performance standards are established. Primary and secondary resources for supporting the delivery of the learning experience are identified. Instructional strategies and tactics are specified. Media needed to support the delivery of a course are specified. The end result of a DPLD course design effort is a design blueprint that describes in great detail all the elements of a course that must be in place for the course to be successful. Table 31.3 offers a sample planning checklist for course design and development, highlighting sample questions to be asked in developing a DPLD design blueprint.

Regardless of the specific responses to these and other questions, there are key elements common to effective and implementable course designs, whether the designs have been crafted for a distributed learning experience, a distance learning experience, or a face-to-face, instructor-led experience. These are outlined in the sections that follow.

Clearly Articulated Objectives or Alternatives. Regardless of one's (objectivist or constructivist) orientation, learners need to know what is expected of them or what they should expect from themselves to be successful in a given learning task. From an objectivist perspective, learners should be able to articulate what

| What kind of | What are the | What bandwidth is required for distribution? |
| delivery?    | costs associated with this design? | |
| What is the delivery environment? | What kind of program maintenance is available? | What kind of system will the learners need? |
| What is the timeline for development? | What is the equipment replacement schedule? | What operating systems are involved? |
| What resources are available for development? | What staff is required for implementation? | What are the connectivity options? |
| What effects are to be achieved? | What is the ROI? | How much will this improve my learning? |
| What outcomes are to be achieved? | What is the impact on scale? | How will this help me do my job better? |
| For whom is this really intended? | What is the impact on achievement? | How will this improve my access to learning resources? |
| Who needs to be involved in the decisions? | What is the impact on efficiency? | How easy is this for me to use? |
| Who needs to approve this design? | | |
Table 31.3. Course Design and Development Planning Checklist.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Priority</th>
<th>Action, Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the outcomes or goals for your D&amp;DL course? Is it tied to a more comprehensive curriculum? Is it linked to other course design and development efforts?</td>
<td>High</td>
<td>Mid</td>
</tr>
<tr>
<td>Who are the stakeholders for this course? (This includes learners, managers, funders, marketers, and any other group that may be affected by this effort.)</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Do you have, or can you make a successful case for a development budget appropriate for your project? To whom is the funding request to be made?</td>
<td>High</td>
<td>Mid</td>
</tr>
<tr>
<td>Is a stand-alone, networked, or speaker-supported approach more appropriate for your needs?</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Do D&amp;DL designs involve new or technology requirements or those technology requirements be met in the D&amp;DL?</td>
<td>High</td>
<td>Mid</td>
</tr>
<tr>
<td>Are you willing and able to take ownership of the project, including implementation, support, and updates?</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Have you determined your return on investment (ROI)? What economics of scale do D&amp;DL provide?</td>
<td>High</td>
<td>Mid</td>
</tr>
<tr>
<td>Cost benefits frequently go beyond ROI. What additional benefits might accrue from this project? How can you demonstrate this?</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>What staff resources will be needed to deploy this course?</td>
<td>High</td>
<td>Mid</td>
</tr>
<tr>
<td>Does the content for this course change frequently, or is it reasonably static?</td>
<td>High</td>
<td>Mid</td>
</tr>
<tr>
<td>How many learners are you planning to teach? Where are they? How will they interact with you? What kinds of support will they need in order to perform appropriately?</td>
<td>High</td>
<td>Mid</td>
</tr>
<tr>
<td>How will you account for the human interactions that users need to experience? What kinds of outcomes do you hope these interactions will achieve?</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

they expect do as a result of an instructional or performance improvement intervention. From this perspective, performance objectives should be employed and should be stated with action words. Designers should consider the conditions under which an expected performance is to be offered, and they should consider what measures will be employed to demonstrate that an objective has actually been achieved.

From a constructivist perspective, learners need to be able to index new ideas (for example, in the realms of information, skills, and abilities) to their own personal experience because the experience in which an idea is embedded is critical to an individual's understanding of and ability to use that idea. The constructivist approach suggests that one should not focus on transmitting the "actions plans" typically embodied in performance objectives but instead should focus on developing learners' skills so that they can construct their own action plans in response to situational demands and opportunities (Duffy and Jonassen, 1992). This calls for situating new learning in the context of authentic experiences (that is, experiences that are likely to be encountered, and in which the new knowledge will be used). It is important to show learners how to construct plausible interpretations of what is being learned so that they attain a measure of comfort in generating alternative or original (situationally contingent) learning plans for themselves. This approach suggests that, although all such interpretations are not equal, it cannot be presumed that there is a single right response or course of action.

**Instructional Strategies.** Instructional strategies help define the approach to be used in ensuring that content is presented in ways appropriate to the achievement of the intended outcomes. Examples of instructional strategies include interaction techniques, learning activities, and attentional and mnemonic devices. Instructional strategies also address learning styles and cognitive strategies likely to be employed by learners so that designs can complement the natural abilities that learners bring to the tasks in question.

**Content Selection, Treatment, and Presentation.** What needs to be said? How much information is enough? How can one tell if there is too much information for a given learning task? How should content be presented? What style of presentation should be used? What tone should be used? What level of vocabulary is most appropriate? Are the examples clear and relevant? Are they appropriate for all prospective members of a learning cohort?

**Capabilities and Limitations of Development.** Is it essential to develop one's own customized teaching and learning solution, or can off-the-shelf courseware be used? Are the designer and the developer of the D&DL experience also the teacher and the technology support staff? How much time is available for design...
and development? What kind of budget exists to support the course design and development efforts? Will there be support for course maintenance?

Technologies. What tools offer the best coverage for course distribution? How can the maximum transmission fidelity be achieved? What kinds of investment and support will be necessary to ensure seamless, transparent, and reliable transmission services?

Interaction. As Wagner (1997) notes, very few topics in the world of distance learning have generated as much discussion and debate as the construct of interactivity. Discussions of interaction in distance learning implementations have typically focused on Moore's (1989) "teacher with learner, learner with learner, learner with content" schema (see, for example, Crys, 1997). This interaction schema implies the purpose, intent, and/or intended outcome of an interaction by indicating who or what is to be involved in a transaction. However, the explicit description of an interaction's purpose, intent, and outcome is still left to the imagination.

The earlier emphasis on the agents of an interaction set the stage for a more meaningful discussion of the outcomes enabled by a variety of types of interactions that are implemented in distance and distributed learning designs. Wagner (1997) has identified categories of interactions that focus on achieving specific performance outcomes in distance and distributed learning settings:

- Interaction for participation provides learners with a means of engaging with one another. Participative interaction ranges from using names of participants in discussions to articulating one's interest in assuming leadership responsibilities in a learning cohort.
- Interaction for communication offers the ability to share information and opinions, or to have an intentional influence on the opinions or beliefs of others.
- Interaction for feedback refers to any information that allows learners to judge the quality of their performance. From a behaviorist perspective, feedback provides reinforcement, which is intended to correct and direct performance. Cognitiveists suggest that feedback provides learners with information about the correctness of a response so that they can either determine that a response is right or wrong or correct an incorrect response so that long-term retention of correct information is enabled.
- Interaction for elaboration involves coming up with alternative explanations for why an idea may be flawed in a particular way. It makes new information more meaningful for learners. When a bit of information associated with a given idea is expanded or even manipulated, it becomes easier to recognize all the various conceptual "hooks," or points of conceptual similarity, that may be associated with that information.

- Interaction for learner control and self-regulation provides learners with the information needed to manage the depth of study, range of content covered, type of alternative media needed for information presentations, and time actually spent on a specific learning task (Kim, 1990).
- Interaction for motivation suggests that curiosity, creativity, and higher-order thinking are stimulated by relevant, authentic learning tasks of optimal difficulty and novelty for each student.
- Interaction for negotiation involves the willingness of another individual to engage in a dialogue, to come to consensus, or to agree to conform to the terms of an agreement.
- Interaction for team building is necessary to ensure that individual members of a team actively support the goals of the group. Interactions facilitate such desirable behaviors as recognition and acceptance of individual differences, expression of respect for the team as well as for its members, effective listening, a shared sense of responsibility, and confirmation of expectations within the group.
- Interaction for discovery refers to the cross-fertilization of ideas that occurs when people share their perspectives with one another in the pursuit of defining new constructs, concepts, and procedures.
- Interaction for exploration provides a vehicle for defining the scope, depth, and breadth of a new idea. Just as it is important to recognize a new idea, it is also important to distinguish a new idea from existing ideas and to determine the parameters within which a new idea will retain its unique identity.
- Interaction for clarification relates to finding one's way through a sea of performance expectations that may or may not be clearly articulated.

Development

D&D courseware development involves the actual production of the interventions called for by a specific design. A designer may or may not be directly involved in constructing the interventions that are called for, but it is imperative that a designer be familiar enough with the interventions being proposed to understand the constraints that may be encountered in development.

An effective course design needs to specify how the following activities will be accommodated:

- Creative design. An appealing visual appearance requires the input and participation of professional artists. If an intervention is not presented in an engaging, motivating way, even the most effective instructional design in the world may not be able to capture the interest or participation of its intended audience.
- Interaction and interface design. The less ambiguous the intent of the functional directions on a Web page or a computer-based training screen, the more likely users will be to engage in activities presented by means of that Web page or screen. A well-designed user interface reduces the need for adjunctive training.
in using an online application. It can even increase the accuracy of users' responses because users can concentrate on the critical learning task instead of deciphering hard-to-read or hard-to-understand directions.

- **Subject matter expertise.** The credibility of a learning intervention is directly proportional to the accuracy of the information it presents. Subject matter experts play an essential role in conceptualizing, shaping, and reviewing the information presented in a learning design.

- **Content creation.** Information presented to learners must be configured in such a way that they can use it effectively. This means using a writing style and treatments that offer the most appropriate perspectives for the audience and for the medium that has been selected for transmission. This also means selecting or creating graphics, illustrations, and tables that exemplify key points or summarize information in meaningful ways. In any kind of mediated instruction, it is crucial to involve the producers and developers of those media in the process of content creation because their input has a direct impact on the physical appearance of the content in the presentation. This step may involve video screenwriters, directors, producers, and editors. It may also involve computer programmers and coders, database analysts and programmers, and quality assurance or testing personnel.

- **Programming.** Programming requirements will vary from application to application and from development environment to development environment. The requirements may include but not be limited to database development, HTML programming, CGI and C++ coding, and Java scripting (in any of its current iterations). Programmers will be able to work most successfully when there is, at a minimum, a clearly articulated set of functional and technical specifications for the application under construction that guide the programmer's efforts.

- **System operation.** Well-written and well-produced resources cannot have the impact they deserve if there are difficulties in getting the programming distributed to the right audience. Steps must be taken to ensure that signals are broadcast, that servers are operational, that networks are appropriately configured, that end users' machines have the appropriate capacity, and that the appropriate browsers have been installed.

Another way to consider development requirements is to review the kinds of activities typically involved in development and to determine how many of these activities need to be included in any one particular development effort. These activities include but are not limited to the following:

- Technical writing
- Storyboarding and scripting
- Coding and scripting
- Authoring

**Evaluation**

Evaluation is the process of interpreting information to make effective decisions. Evaluations help people make judgments about value, quality, and importance. Here are some typical evaluation questions:

- Did the learners learn anything?
- Can the learners do what the design indicated they should be able to do?
- How is this learning to be demonstrated?
- Was this course worth the effort?
- Would we offer it again?

Designers should keep in mind that the skills of an evaluation, in the simplest state, may consist of nothing more than the ability to use the tools of one's experience as the rationale to undertake another, similar experience. But evaluation methodologies can also provide a highly rigorous means of quantifying impact, effects, and results. From the perspective of a course design, the evaluation of learners (for example, testing and performance appraisal) should determine whether the course objectives have been achieved.

In making a decision about implementing a distance or distributed learning intervention, it is also useful to think in terms of the benefits to be accrued from the implementation. These benefits may include the following:

- **Reduction of turnover.** In a situation where turnover is high because of a perceived lack of opportunity, interactive technology-based training can offer employees opportunities for skill development that open up new avenues of growth in the organization. The cost savings can be calculated if the full measure of
hiring, training, outfitting, and supporting replacement personnel can be accurately calculated.

- **Improved morale.** Organizations where morale is low because of a perception that employees are not highly valued can correct that perception by an investment in interactive technology. This investment can be correctly seen as an investment in the employees themselves.
- **Increased use of training and support programs.** By making an investment in interactive technology-based training and support, an organization signals the importance and value it places on these things. This, in turn, can motivate employees to avail themselves of these resources, thereby enhancing their own value to the organization.
- **Competitive advantage through use of leading-edge interventions.** Until interactive technology is the norm, those organizations that adopt it for employee development will be recognized as leading edge organizations. This perception is often accompanied by the belief that these organizations provide leading-edge products and services to their customers and to the marketplace (Derryberry and Wagner, 1997).

**SUMMARY**

This chapter has presented a brief overview of issues to be addressed in considering the addition of distance learning and distributed learning to an organization’s repertoire of performance improvement skills. Distance learning and distributed learning offer two related yet distinct methods for responding to the learning and performance support needs of individuals. Neither approach is necessarily intended as a replacement for classroom instruction; rather, they offer two distinct alternative means of improving access to learning opportunities and resources. As with any other kind of technology-based solution for performance support, there will be a strong tendency for either distance or distributed learning to be oversold as the best of all possible solutions. The likelihood of successfully implementing either of these two approaches is greatly enhanced when the methods of Human Performance Technology are employed.

**References**


Moore, M. G. (1989, Apr). Three modes of interaction. Presentation at the annual meeting of the National University Continuing Education Association, Salt Lake City, UT.


 As should be eminently clear by now, Human Performance Technology (HPT) is, more than anything else, a field of professional practice with global application. It is a relatively young but growing field. Because it is still coalescing into a profession, many HPT-related issues remain largely untreated. These have to do with the conduct, practice, and professional growth of Human Performance (HP) technologists.

Practitioners come to this field from a disparate variety of disciplines, and as HPT professionals they must possess not only technical abilities and competence in practice but also broader competence in business. Many, however, entered the field with academic or corporate backgrounds but virtually no formal preparation for dealing professionally with clients, either as internal consultants or as external consultants.

The eight chapters in Part Five deal with various facets of HPT professional practice. The first of these chapters delves deeply into the skill sets, characteristics, and values required of the HP technologist. It draws on observation, documented practice, writings, research, knowledgeable client informants, and experienced HPT practitioners to provide basic and advanced professional criteria for current and future practice.

The second chapter of Part Five discusses issues related to the standards and ethics for an eventual HPT profession. Although the chapter does not specify what these standards or ethics should be, it offers a basis for their creation, along with a model for ethical decision making.