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Title:	Clinical psychology : a publication of the Division of Clinical Psychology of the American Psycholo
Title Abbrev:	Clin Psychol (New York)
Citation:	2004;11(3):313-331
Article:	The role of instructional design and technology in
Author:	Weingardt, KR
NLM Unique ID:	9438459 Verify: Unique Key
ISSN:	0969-5893 (Print) 1468-2850 (Electronic)
Collation:	Serial: Printed language material
Publisher:	Published for the Division of Clinical Psychology of the Ame, New York, NY :
Copyright:	Copyright Compliance Guidelines
Authorization:	Losi/Alison
Need By:	N/A
Maximum Cost:	**$15.00**
Patron Name:	Weingardt Ken, email x22846
Library Groups:	VALNET
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Received:	Aug 01, 2006 (11:28 AM EST)
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The Role of Instructional Design and Technology in the Dissemination of Empirically Supported, Manual-Based Therapies

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The principles, processes, and tools of instructional design and technology (IDT) can facilitate the translation of paper-based, text-intensive Manual-Based Therapies (MBTs) into media-rich, interactive, Web-based training (WBT) applications. This article outlines available technology-based mechanisms for delivering instructional content, provides examples of how each can be used for effective dissemination of MBTs, and outlines the advantages that may accrue from this approach. Clinical researchers and IDT professionals can collaborate to increase adoption of treatment manuals by employing user-friendly, instructionally sound Web applications that incorporate video role-plays, audio narration, graphics, animation, and dynamic, interactive content.

Key words:* manual-based therapy, dissemination, empirically supported treatments, instructional design and technology, Web-based training. *[Clin Psychol Sci Prac 11: 313–331, 2004]

The principles, processes, and tools of instructional design and technology (IDT; Reiser & Dempsey, 2002) can be used to disseminate the content of empirically supported, Manual-Based Therapies (MBTs). To maintain clarity of focus on the potential contribution of IDT, there are two key assumptions: (1) that the dissemination of empirically based psychological therapies is desirable, and (2) that MBTs with some evidence of clinical efficacy constitute the best initial candidates for dissemination. Although these assumptions are debatable (see Carroll & Nuro, 2002; Hayes, 2002) and entail some implicit and explicit assumptions of their own (Addis & Waltz, 2002), they are defensible and consistent with the market forces that continue to exert pressure on psychotherapists to deliver treatments with some evidence of empirical support (Craighead & Craighead, 1998). Given these assumptions, the major question is not whether treatment manuals should be used as a vehicle for disseminating empirically supported therapies, but rather how to make treatment manuals better and more effective for use in clinical practice. It is the role of IDT in addressing this question that constitutes the focus of this article.

Although the application of IDT principles, tools, and processes to the dissemination of empirically supported psychological therapies is in an early stage, the technologies and processes outlined in this article are not mere speculation or science fiction. Some of the mechanisms and applications that I describe certainly are on the technological cutting edge. However, each is grounded in the practical application of existing forms of instructional technology and represents the logical extension of a little-known, but firmly established, field of study that traces its roots to behaviorism and systems theory.

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doi:10.1093/clipsy/bph087
Clinical Psychology: Science and Practice, V11 N3,

In the overall organization of this article, I begin with a brief review of the MBT literature and an introduction to the science and practice of IDT. Next, the different types of technology-based mechanisms available for delivery of instructional content are discussed, and examples of how each can be used in the dissemination of empirically supported MBTs are provided. Six major advantages that may result from the migration of MBT content from paper-based manuals to technology-based delivery mechanisms are offered, and the article concludes with some thoughts about future directions in the design, development, implementation, and evaluation of empirically supported psychotherapies and other research products.

HISTORY OF MANUAL-BASED THERAPIES

The value of empirically supported MBTs has been the topic of vigorous debate since the first psychotherapy manuals emerged in the 1960s (Lambert, 1998; Lambert & Ogles, 1988). Proponents argue that MBTs allow practitioners to capitalize on the superiority of actuarial or statistical prediction over clinical judgment, make it easier to train and supervise therapists in specific clinical techniques and strategies, and focus and time-limit therapy more than might otherwise be the case (Wilson, 1996, 1998). Opponents, on the other hand, contend that widespread implementation of MBT protocols will compromise therapist flexibility, replace clinical judgment, reify therapy in a fixed and stagnant fashion, ignore important common therapeutic factors, and generally be impractical and inappropriate for use in clinics where therapists of diverse experience, background, and training treat clients with multiple and diverse presenting problems (Carroll & Nuro, 2002; see also Kendall, 1998).

MBTs initially were developed by psychotherapy researchers who needed to specify and standardize their interventions (Luborsky & DeRubeis, 1984). As such, their primary purpose was to ensure internal validity, and their primary role was evaluative. By training therapists to adhere to, and demonstrate competency in, the faithful delivery of a manualized treatment protocol in the context of a randomized clinical trial, researchers were able to move beyond the question "Does psychotherapy work?" and to address more specific, applied questions, such as "Which treatments work?"; "Why do they work?"; and "For which type of clients or problems are they best suited?" (Addis, 1997). The widespread use of treatment manuals to specify, standardize, and differentiate therapies in efficacy trials was described as a "minor revolution" (Luborsky & DeRubeis, 1984) that facilitated the rapid development of standardized protocols for the treatment of a wide variety of disorders, ranging from panic disorder and agoraphobia (Turovsky & Barlow, 1995) to bulimia nervosa (Wilson, 1997).

In recent years, MBTs have been asked to perform an increasingly ambitious and qualitatively different role from that which they have historically fulfilled. As capitated managed care systems began to pressure clinicians to deliver more evidence-based mental health services, they turned to the "empirically supported" MBT protocols that had been used to train research therapists. Because these protocols constitute psychology's closest approximation to genuine "evidence-based treatment," some psychologists suggested that front-line clinicians follow these protocols in their daily practice (Strosahl, 1998). This fundamental shift effectively expanded the role of MBT from one of evaluation in the context of tightly controlled clinical trials to one of widespread dissemination in diverse clinical practice settings (Addis, 1997). With this shift, the debate surrounding their use intensified (see Carroll & Nuro, 2002; Kazdin, 1998). The very structure and control that made MBTs effective vehicles for evaluation became their most frequently criticized characteristics (Beutler, 2002).

INTRODUCTION TO INSTRUCTIONAL DESIGN AND TECHNOLOGY

There is an entire field of study devoted to the use of technology to accomplish instructional goals. Whether such goals involve improving physicians' confidence in addressing domestic violence (Harris, Kutob, Suprenant, Maiuro, & Delate, 2002) or integrating specific case information with medical encyclopedias, digital libraries, and databases (Singer, Riedel, & Leven, 1999), IDT provides a systematic process of applying human and media resources to accomplish them efficiently. This field concentrates not only on the application of technology such as computer or Web-based training (WBT) per se, but "encompasses the analysis of learning

and performance problems, and the design, development, implementation and management of instructional and non-instructional processes and resources intended to improve learning and performance in a variety of settings" (Reiser, 2002, p. 12). In other words, IDT is a process that typically includes assessment of learning needs, design and production of instruction, and follow-up evaluation of results. Contrary to popular misconception, the development of a technology-based delivery mechanism (such as a WBT course) is but one aspect of a much larger systematic process.

In fact, the origins of the instructional design (ID) field pre-date the Internet and even modern computers. Although the exact origins of the ID process are unclear, the writings of Silvern (1965) represent an early attempt to apply general systems theory and systems analysis to create effective and efficient aerospace and military training (Gustafson & Branch, 2002). By the early 1970s, IDT methods had become common in all branches of the military (Branson, 1975) and had started to appear in industrial and commercial training applications. Today, IDT is the accepted standard training methodology for large organizations in both the public and private sectors.

Interestingly, most early theorists in this area (including Silvern) were behaviorists (Burton, Moore, & Magliaro, 1996). In keeping with the psychological zeitgeist of the 1970s, these early theorists believed that a wide variety of behaviors can be observed, measured, planned for, and evaluated in ways that are reasonably reliable and valid. As such, they posited that the challenges of training and performance improvement, much like other types of behavioral change, can best be addressed by conducting an objective analysis of how systemic components are observed to interact, recording these observations, and then coordinating efforts to shift them in the desired direction.

The wide variety of ID process models described in the literature (e.g., Dick & Carey, 1996; Gagné, Briggs, & Wager, 1992; Kemp, Morrison, & Ross, 1998) share the core elements of analysis, design, development, implementation, and evaluation (or ADDIE; see Figure 1). *Analysis* is a multifaceted process that typically includes inquiry about the *audience* (Who are the learners? How many are there? What level of training and experience do they have? How technologically

Figure 1. The "ADDIE" model: A basic model of instructional systems design. (Adapted from Dick & Carey, 1996.)

literate are they?), the *goals* of the training (What is the training designed to accomplish? Will the training teach cognitive, psychomotor, or affective objectives?), and the *context* in which the training will occur (What is the technological infrastructure? What human and budgetary resources are available?).

The *design* phase begins with writing objective, measurable student performance objectives (SPOs). An SPO is a statement of observable behavior or performance on the part of the learner that typically prescribes a minimally acceptable, measurable standard (e.g., quantity, quality, efficiency, durability) and the conditions under which learned behavior or performance is to occur (Vogler, 1991). "After completing this training, the learner will be able to accurately identify and label three different cognitive distortions evident in a video-based case study example" might be an example. Once the SPOs have been identified, the instructional designer specifies the learning activities associated with each objective and the media or delivery mechanism by which the audience will receive the instruction.

Development refers to the construction of the instructional materials. For a traditional instructor-led classroom course, this might involve writing an instructor's guide and an accompanying student workbook. For a videotaped distance learning course, the development phase would involve writing the script, hiring actors, finding a location, shooting the video, editing, and postproduction. For a self-paced, online course, the development phase would involve using a Web authoring tool (a software environment, such as Macromedia Dreamweaver™ or Flash MX™) to assemble the individual graphic and textual elements that together will form the course.

As the name implies, the *implementation* phase refers to the process of putting the instruction into practical effect. For a traditional lecture-based course, implementation would occur when the class is actually held. For courses delivered online, implementation occurs when the content is posted on a system called a learning management system (LMS). An LMS is a software

system that provides an interface between the learner and training professionals; it launches and tracks courses, handles the course catalog and registration, records course status and completion, and records scores for testing and certification (Rosenberg, 2001).

The ID process incorporates a formative and summative *evaluation* phase that assesses the degree to which the training accomplished its stated goals. In the training and development literature, evaluation is typically conceptualized in the context of a model proposed by Donald Kirkpatrick (Kirkpatrick, 1959a, 1959b, 1960a, 1960b). In the Kirkpatrick model, *Level 1* evaluation measures learners' reactions to the material, *Level 2* measures the degree to which new learning has taken place, *Level 3* measures the extent to which learners are able to transfer newly acquired knowledge and skills into on-the-job performance, and *Level 4* measures the impact that these performance improvements have on the bottom line (in our case, outcomes at the client and mental health care system levels). A more comprehensive discussion of the ID model was provided by Dick and Carey (1996), who developed what is perhaps the best-known and most widely used contemporary ID model.

ROLE OF INSTRUCTIONAL DESIGN AND TECHNOLOGY IN DISSEMINATION OF EMPIRICALLY SUPPORTED PSYCHOLOGICAL THERAPIES

The use of empirically supported, manual-driven psychological therapies to change clinical practice can be viewed, at least partially, as an instructional challenge. The instructional goal is to convey new clinical approaches, strategies, and techniques in a way that is easy to learn, easy to use, and easy to understand. IDT provides a structured process to analyze the specific needs of a target clinical audience; design and develop effective, relevant instructional content; and deliver it using technology-based mechanisms that are interactive, media rich, and engaging. In so doing, IDT has great potential for effective dissemination of MBTs. Effective dissemination goes beyond simple diffusion of information to encompass the process by which target groups become aware of, assimilate, accept, and adopt the disseminated information (VanArminge & Shannon, 1992).

Technology-Based Mechanisms for Disseminating Psychological Interventions

The idea of using a technology-based platform for disseminating psychological interventions is certainly not a new one. For example, Greist and colleagues spent many years developing and empirically validating a cognitive–behavioral treatment for depression that is delivered via interactive voice response (IVR) technology over a standard touch-tone telephone (Selmi, Klein, Greist, Sorrell, & Erdman, 1990). More recently, Greist and colleagues have been exploring the role of a similar IVR platform in delivering behavior therapy for obsessive–compulsive disorder (Greist et al., 2002). Rothbaum, Hodges, and colleagues have been investigating the role of a very different technology platform in the treatment of anxiety disorders. Their work has involved the use of virtual reality as a mechanism for providing exposure therapy. To date, they have investigated the role of virtual reality in the treatment of acrophobia (Rothbaum, Hodges, Kooper, Opdyke, Williford, & North, 1995); fear of flying (Rothbaum, Hodges, Smith, Lee, & Price, 2000); and posttraumatic stress disorder (Rothbaum, Hodges, Ready, Graap, & Alarcon, 2001). Newman, Consoli, and Taylor (1999) have explored yet another application of technology for the treatment of anxiety disorders: the use palmtop computer programs.

In the realm of clinical training, investigators have examined the role of videotape in providing novice therapists with expert modeling and feedback regarding individual therapy skills (Baum & Gray, 1992), in demonstrating differential approaches to marital and family therapy (Fine & McIntosh, 1986), and in identifying the ways in which video products can enhance the training of group therapists (Brabender, 2002). In fact, the use of audio- and videotape to facilitate supervision and training has become a common feature of many clinical psychology training programs and is an important mechanism for rating therapist adherence and competence in psychotherapy outcomes research.

Each of these mechanisms would constitute what training and development professionals refer to as *e-learning*. Because the terminology used to describe e-learning is often unclear, redundant, and confusing, refer to the American Society for Training and Development (ASTD) Web site (http://www.learningcircuits.org/glossary.html), which has an up-to-date glossary

of e-learning terminology. Briefly, ASTD defines e-learning as a field that covers a wide set of applications and processes, such as Web-based training, computer-based learning, virtual classrooms, and digital collaboration. This definition subsumes the delivery of content via all electronic media, including the Internet, intranet/extranet (local-area network/wide-area network [LAN/WAN]), audio- and videotape, satellite broadcast, interactive TV, and compact disc–read-only memory (CD-ROM) (Kaplan-Leiserson, 2003).

Available mechanisms for the delivery of instructional content can be categorized as they relate to *time* (i.e., Does the instructor deliver the content at the same time that the learner receives it?), and *place* (i.e., Are the instructor and learner both present at the same physical location when the instruction is delivered?). Figure 2 depicts how the four major categories of delivery mechanisms relate in terms of time and place. This model has a clear place for traditional content delivery mechanisms, such as face-to-face classroom instruction and supervision (Quadrant A) and libraries (Quadrant B), as well as more recent technology-based delivery systems such as videoconferencing (Quadrant C), audio- and videotape (Quadrant D), and Web-based training (also Quadrant D).

Although many types of delivery mechanisms could conceivably be used for the dissemination of empirically supported, manual-driven therapies, this article focuses primarily on the potential role of two e-learning platforms that capitalize on the many advantages of the Word Wide Web: asynchronous Web-based training and synchronous Web conferencing or synchronous virtual classrooms.

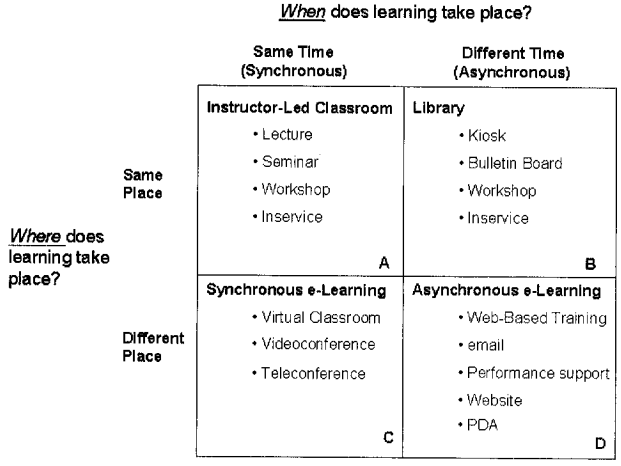

Figure 2. Mechanisms for the delivery of instructional content and how they relate to one another in terms of time and place.

Asynchronous E-Learning: Web-Based Training

Asynchronous means occurring at a different time. This category of delivery mechanism describes a learning event in which people cannot communicate without time delay. Some relatively mundane examples of asynchronous e-learning include online bulletin boards, list serves, and e-mail exchanges, by which a learner and an instructor can exchange information, ask and answer questions, submit and review assignments, exchange draft documents, and the like.

The form of asynchronous e-learning that has the most potential for effectively disseminating empirically supported MBTs is media-rich, engaging, and interactive WBT. A WBT is a self-paced, online course created by an ID team, variously consisting of a project manager, an instructional designer, a content developer, a graphic artist, a multimedia producer, a Web developer, a systems designer, and a subject matter expert (Lee & Owens, 2000). Within a WBT, content can be presented in the form of static text (hypertext markup language [HTML]), high-resolution graphics, animated sequences, streaming video, and audio narration. Essentially any media format that is supported by a Web browser can be embedded in a WBT course to deliver instructional content. In addition to delivering instructional content, WBTs provide opportunities for the learner to interact with that content, which can be programmed so that the learner's choices and responses determine the course of future learning activities.

For example, our research team has recently begun working on the design and development of a WBT course based on a National Institute on Drug Abuse (NIDA) treatment manual, *A Cognitive-Behavioral Approach: Treating Cocaine Addiction* (Carroll, 1998). The paper-based manual can be downloaded from http://www.nida.nih.gov/TXManuals/CBT/CBT1.html. We have applied for funding from NIDA to translate the content from this traditional MBT into a series of interactive, media-rich, Web-based modules for clinician training. A prototype module, "Coping with Cravings" can be previewed at http://www.nidatoolbox.org.

This WBT will ultimately utilize a variety of media and mechanisms for delivering the necessary instruction. We intend to communicate the majority of content via text and streaming video clips of a therapist demonstrating the target strategies and techniques. Conceptual points will be illustrated using graphics and animated sequences. Handouts for monitoring relapse triggers and pocket cards summarizing effective coping strategies will be available so that therapists and clients can easily download them and print them out. In addition, we intend to give learners the ability to post comments and questions to bulletin boards, thereby providing a forum in which to discuss the challenges of implementing the protocol in their individual practice settings. We are also considering building an "ask-the-expert" function that will allow learners to submit e-mail questions to clinicians who have expertise in delivering this particular MBT. The variety of ways in which these media and mechanisms can be combined and applied to achieve instructional goals is limited only by the skill and creativity of the project team.

In keeping with good design principles, our WBT presents the content in a self-paced fashion that maximizes learner control (Driscoll, 1998; Horton, 1999; Lee & Owens, 2000). The learner can access the course material anywhere that they have access to an Internet connection and can start, stop, and resume taking the course whenever it is convenient for them. The learner can also quickly and easily move freely between, and within, content modules. By providing the learner with ample opportunity to interact with the material through a variety of exercises, we hope to promote depth of information processing (cf. Craik & Lockhart, 1972). For example, our WBT will include interactive exercises that provide counselors with the opportunity to help a hypothetical client identity, label his or her individual relapse triggers, and detect his or her automatic thoughts related to the subjective experience of craving.

Synchronous E-Learning: Web Conferencing and Virtual Classrooms

Synchronous e-learning is a term describing a real-time, instructor-led learning event in which the instructor and all learners are logged on at the same time and communicate directly with each other, but are not physically present at the same location. The most common form of synchronous e-learning is the telephone conference call. All of the callers are "on the line" at the same time, listening to a facilitator and communicating with one another. A more technologically sophisticated form of synchronous e-learning is referred to as a *virtual classroom* or *Web conference*. Companies such as Placeware™ WebEx™, Centra™, Interwise™, and Hewlett-Packard™ have made rapid progress in developing this type of platform in recent years. Virtual classroom or Web-conferencing platforms typically include such features as bidirectional audio and video streaming (so the audience and instructor can see and hear each other); a virtual whiteboard to enable real-time illustrations; online surveys, tests, or polls that can provide instant feedback about performance; and the ability to share Web sites, PowerPoint slides, software applications, and digital video clips with the audience. Almost anything that is available on the Web can be shared and discussed using synchronous e-learning platforms. Videoconferencing and two-way live satellite broadcasts of lectures to learners in a classroom are other forms of synchronous e-learning.

Evidence for Effectiveness of E-Learning

To date, there are no published reports of methodologically rigorous studies evaluating the efficacy or effectiveness of IDT for the dissemination of empirically supported MBT. However, there is fairly extensive literature in the field of education that suggests that technology-delivered instruction can be as effective as face-to-face instruction. In one oft-cited book, Russell (1999) reported the results of his review of 355 studies published between 1928 and 1998 and concluded that there is "no significant difference" between distance education and traditional instruction.

The more recent studies of the type that Russell reviews (e.g., Carey, 2001; Johnson, Aragon, Shaik, & Palma-Rivas, 2000) typically present identical content via an e-learning format (e.g., asynchronous WBT or interactive video) and a synchronous face-to-face classroom. Following the completion of the course, researchers compare student outcomes, including (1) measures of student performance such as test scores and grades, (2) student attitudes about learning, and (3) overall student satisfaction. Unfortunately, much of this literature is characterized by a variety of methodological

shortcomings, including lack of control for extraneous variables, lack of random selection of subjects and of random assignment of subjects to conditions, and use of outcome measures without demonstrated validity and reliability (Institute for Higher Education Policy, 1999).

Despite the relative lack of methodologically rigorous outcomes data regarding the efficacy of e-learning, the use of e-learning to deliver instructional content continues to increase exponentially. Since 1995, rapid advances in computer and other digital technology, as well as the Internet, have led to rapidly increasing use of these mechanisms for delivering instruction, particularly in training in business and industry (Reiser, 2002). Based on a questionnaire that was administered to respondents from over 550 organizations in 42 countries, the American Society for Training and Development (ASTD) reported that the percentage of corporate training content delivered via learning technologies increased from 8.8% to 9.7% between 1997 and 2000 (ASTD, 2002). The use of e-learning continues to increase in higher education as well. Between the 1994–1995 and the 1997–1998 academic years, enrollments in distance learning courses in higher education institutions in the U.S. nearly doubled, with 78% of public 4-year institutions offering such courses in 1998 (Lewis, Snow, Farris, Levin, & Greene, 1999). Even in the government sector, delivering certain types of training via e-learning has become more of the rule than the exception. In one of the largest e-learning projects ever, the federal government launched an e-training Web portal in June 2002 that lets 1.8 million employees access information technology (IT) and management courses via the Internet from their home or office computers (George, 2002).

Although the academic literature in education and psychology cannot currently provide the type of efficacy data that would be ideal to have in hand before beginning experimentation with e-learning applications for clinical training, the rapid and widespread adoption of these technologies across such varied audiences and subject matter areas strongly suggests that these technologies may be effective mechanisms for delivering training in our field as well. Given that the tools currently available for the development and delivery of e-learning applications are powerful, relatively inexpensive, and increasingly easy to use, the cost of conducting initial pilot work in this area is extremely low relative to the potential benefit for our profession and for our clients. The following section outlines some of the reasons why pilot studies in this area might be particularly fruitful.

Suitability of Manual-Based Therapies for Development as Interactive, Media-Rich, Web-Based Training

Particularly for the more structured and concrete MBTs, the authors of existing paper-based manuals have completed many of the initial ID tasks required to migrate the content into WBT format. Lengthy, complex treatments are broken down into manageable modules, strategies and techniques are spelled out in step-by-step fashion, session-by-session guidelines are given, and technical and theoretical jargon has been minimized.

The critical task that remains is to take the content from the hard copy manual and translate it into a user-friendly, engaging, interactive Web application. If done well, this process involves much more than converting the manual's content in HTML format and posting it on the Web. Unfortunately, many WBT developers take this easy route, which usually results in text-intensive "page-turners" that save on printing costs, but do nothing to engage learners or facilitate their interaction with the material. In contrast, a well-designed WBT involves an extensive amount of preproduction ID work before the content is ready for Web development (Lee & Owens, 2000).

The preproduction process typically begins with the creation of a storyboard, which is a document that depicts the information that will be presented on each screen, including the text; the screen layout; ideas for still graphics, video, and animation sequences; and a script for audio narration. The storyboard serves as the blueprint though which the instructional designer communicates the essential features of the WBT to the developers responsible for writing the actual code. Because any substantial departure from the original MBT content might undermine its existing empirical support, the preproduction process should also include iterative review of the storyboards by subject matter experts. IDT professionals speak of "migrating" content from one format to another, for example, from a paper-based MBT to a set of WBT modules. As a check on this

migration process, subject matter experts should review each storyboard and compare it with the paper-based manual content to ensure that the Web-based module will be a high-fidelity replication of the original. On completing development of the WBT and conducting a trial that demonstrates it to be as efficacious as the original MBT, the paper-based manual could then serve as a reference or as an alternate form of delivery for those who lack access to the appropriate technology platform.

A comprehensive description of the ID, development, and implementation process for WBTs is beyond the scope of this article. Consequently, reference should be made to the work of Driscoll (1998), Hall (1997), and Horton (1999). The important point is that MBTs, by their very nature, serve as an uncommonly efficient starting point for the IDT process.

Advantages of Web-Based Training Over Traditional Text-Intensive Treatment Manuals

Not only is the transition from paper-based manual to ID storyboard fairly easy, it also entails many important advantages. Such advantages include the following:

1. User-friendly design can improve acceptance and adoption by practicing clinicians and students.
2. Dynamic, interactive WBT design can improve learner engagement with the instructional content.
3. Information can be presented in a case-based format that provides a realistic clinical context.
4. Hypotheses regarding eclectic versus rule-based implementation of manualized therapy protocols can be tested.
5. Content that is developed for one online course can be reused.
6. Client self-study materials can be integrated with therapist training.

Improving Acceptance and Adoption Using User-Friendly Design. IDT processes and tools can be applied readily to existing MBTs in order to make them more *user-friendly*. This issue is one (and perhaps the only one!) on which there is consensus among psychotherapy researchers, practicing clinicians, and experts in technology transfer. Everyone agrees that *MBTs need to become more "user-friendly"* (Carroll & Nuro, 2002; Craighead & Craighead, 1998; Hayes, 2002; Kendall, 1998; Strosahl, Hayes, Bergan, & Romano, 1998). This means that they must be easier to learn, easier to use, and easier to understand, especially for people who are not already experts in the content area. IDT provides the processes and tools to move MBTs beyond static paper-based manuals, and into the realm of technology-enabled, interactive learning experiences. These experiences can incorporate all of the latest Web technologies (video, audio, graphics, animation) to make learning about a new clinical technique or strategy engaging and enjoyable. Such user-friendly training may well increase the rate at which clinicians choose to expose themselves to new information, and may ultimately increase the likelihood that clinicians accept and adopt the empirically-supported strategies or techniques being taught.

Improving Learner Engagement Using Dynamic, Interactive WBT design. Moving MBT content into Web-based format allows designers to create opportunities for the learners to interact with the content. Rather than the passive, unidirectional transfer of knowledge that occurs when reading a book or a text-intensive, online page-turner, more sophisticated Web applications provide a variety of means by which the learner can act on the content, and such actions can determine the course of future learning activities. Authoring environments, such as the CourseBuilder™ extension to Macromedia's Dreamweaver development platform, allows instructional designers and developers to present the learner with engaging stimuli (e.g., video or animation sequences) and then present a variety of responses from which to choose. Feedback can be given depending on which response the learner selects.

Other types of interactive exercises include "drag-and-drop," which in developer's parlance "is an intuitive GUI [Graphical User Interface] gesture used for transferring data from one GUI component to another" (De Lisa, 1999). In this type of exercise, the learner clicks on an icon and drags it to one of several other possible locations on the screen, each corresponding to a potentially correct or incorrect response. This is the electronic equivalent of the familiar paper-and-pencil "matching" task that is a mainstay of K–12 educational testing, by which a learner may be asked to draw a line between each term and its correct definition. Another popular vehicle for facilitating learner interaction is the "mouse-

over," in which a user moves the mouse over a link (text or graphic), and an image or description can be displayed. Refer to the work of Graham (1998) and Kristof and Satran (1995) for an in-depth treatment of other vehicles for facilitating user interaction.

WBT can also be used to present *dynamic* content, which means that the content presented to the learner changes depending on the learner's previous choices and responses. In contrast to text-based manuals, which are typically processed in linear fashion, from start to finish, the ability to present dynamic content means that WBT can be truly self-paced or individualized (Morrison, Ross, & Kemp, 2001). Learners who demonstrate their proficiency at a basic skill by meeting initial learning objectives can follow an accelerated learning path, whereas learners whose previous responses indicated that they may need remediation can be provided with the content that is appropriate for their current level of performance. In recent years, the rapid evolution of powerful database development platforms makes the creation of complex, individualized learning paths much more feasible.

Providing Realistic Clinical Context Using Case-Based Presentations. In mental health, as in medicine, clinicians typically think about their work in the context of the cases that they treat. This clinical, case-based framework can be incorporated in Web applications to create MBTs that practicing clinicians find relevant and engaging. IDT processes and tools allow for media-rich presentation of complex case information, for example, using a video role-play to model therapist behavior in a difficult client–therapist interaction.

In addition to the use of such case-based material for didactic purposes, media-rich presentations can be used to conduct scenario-based assessments of how the learner/therapist would react to a hypothetical case. In this type of application, a subject matter expert would work with an instructional designer to articulate two or three key lessons he or she would like to be internalized and then use storyboards to highlight a success path for that lesson and one or two failure paths. The storyboard could then be developed as a video segment depicting a therapist–client interaction that intermittently stops the action and provides the learner the opportunity to make a choice about what the therapist should do or say next. The learner would then receive appropriate feedback on his or her response. Kindley (2002) presents a more detailed treatment of scenario-based e-learning.

A third way in which case study information could potentially be applied in the context of WBT is in a problem-based learning (PBL) framework. In this methodology, often used in medical education, students are exposed to an array of real and simulated patients and presenting problems. They then generate hypotheses, gather data, synthesize information from multiple sources, and generate diagnoses and treatment plans (Barrows & Tamblyn, 1979). Research has found that PBL students tend to retain, integrate, and transfer information better than students exposed to traditional didactic instruction (Norman & Schmidt, 1992). Although there is virtually no existing literature regarding PBL for psychotherapy training, the potential role of communication and instructional technologies in the exploration of this area are clearly promising.

Evaluating Eclectic Versus Rule-Governed Implementation. One of the most debated issues about the potential role of MBTs as vehicles for dissemination is the degree to which practicing clinicians must closely adhere to the structured treatment protocol. Whereas some argue that close adherence to manualized protocols is necessary to replicate the positive findings from randomized clinical trials (Wilson, 1998), others argue that practicing clinicians are better served if they are encouraged to implement the new skills and techniques in an eclectic fashion when, according to their clinical judgment, the skills seem to apply to the specific case at hand (Hayes, 2002; Kendall, Chu, Gifford, Hayes, & Nauta, 1998). Although WBT does not allow for the experimental manipulation of the flexibility with which an MBT is implemented in actual clinical practice, it does allow manipulation of the degree of control that the learner has over how the content is accessed during training. Consequently, a WBT can be designed to promote relatively more or less flexible implementation of a particular MBT.

A variety of research designs could be used to test hypotheses regarding flexibility in implementation. For example, participants in one condition might take a WBT course that forces them to go through each of the modules in a linear fashion. To provide even tighter

control over access to content, the WBT could be programmed so that participants could only access the content for a specific session the day before that session was to take place. To ensure faithful implementation of the MBT during the actual sessions, participants could be provided with the same high level of supervision and feedback that typically is provided to research therapists during randomized clinical trials. The comparison condition might consist of a WBT that contains the identical MBT content but is programmed to provide learners with access to the content that they want, when they want it, in any order, and in as much or as little detail as they would like. Clinical outcomes of patients treated by participants in these two interventions could be compared to one another as part of a randomized clinical trial or as part of a straightforward effectiveness trial (cf. Strosahl et al., 1998). Regardless of the evaluation methodology, the point is that IDT processes and tools allow experimental manipulation of the flexibility with which the training is actually delivered.

Reusing Content. In recent years, the proponents of e-learning have adopted a set of standards to ensure interoperability of e-learning content across different technology platforms. Much as mass production and standardized parts revolutionized the automobile industry, the standardization of e-learning content development and delivery systems has the potential to radically improve the efficiency of developing materials to aid the learning process. The e-learning standard was originally developed by the U.S. Department of Defense and is referred to as the sharable content object reference model (SCORM). Again, a detailed description of this model is provided elsewhere (Advanced Distributed Learning Co-Laboratories [ADL], 2002). For purposes of this article, I provide only a brief overview to give a rudimentary conceptual understanding necessary to appreciate the implications for dissemination of MBTs.

A straightforward (and vastly oversimplified) way to explain SCORM is by drawing an analogy to Lego™ building blocks. In this analogy, each individual Lego block corresponds to what is referred to as a *learning object*, which is a self-standing, discrete piece of instructional content that meets a learning objective. Each learning object consists of three fundamental elements: (1) instructionally sound content with a focused learning objective; (2) learner-centered, rich media environments that enable the learner to practice, learn, and receive assessment; and (3) metadata or key words that describe the attributes of the learning object and the available mechanisms for communicating with management systems or other Web applications (ADL, 2002).

The primary advantage of building SCORM-conformant e-learning objects is technical: The course will be compatible with the wide variety of learning management systems currently used to launch and track online courses. However, there is an equally compelling conceptual reason to ensure that WBTs conform with SCORM. Because each learning object is discrete and self-contained and focuses on one and only one learning objective, different constellations of learning objects can be combined to form different lessons, and different amalgamations of lessons can be combined to form courses.

For example, in the NIDA treatment manual *A Cognitive-Behavioral Approach: Treating Cocaine Addiction*" (Carroll, 1998), there are a number of modules that include reference to discrete topics, such as identifying relapse triggers and enhancing motivation to maintain continued abstinence. Our WBT design team has decided to view each of these submodules as discrete learning objects and to develop the content in such a way that each submodule can be designed, indexed, and tagged for easy repurposing. Whether we choose to use our "Motivational Enhancement" submodule elsewhere in the current WBT, to insert it in a different course, or to produce it as a stand-alone product, little if any technical reworking will be necessary. Rather than reinventing the wheel each time we begin a new project, we can examine our library of existing learning objects and begin by leveraging much of the work that we have done to date.

Integrating Client Self-Study Materials With Therapist Training. Another advantage of using WBT for the dissemination of empirically supported MBTs it is that it is possible to integrate the client self-study materials (e.g., self-monitoring tasks, homework assignments) into the MBT itself. To do so simply requires the design and development of a companion Web application for clients—an online client workbook, so to speak. This companion Web application can contain all of the

forms, reminder cards, and the like that are discussed during each session, as well as any supplementary resources or exercises that may be appropriate. As clients complete each form, it can be electronically submitted to the therapist WBT, thereby making it available for review during the next session. Although this sophisticated technology will not eliminate the perennial problem of clients not completing their homework, it would allow therapists to keep a closer tab on client progress and to address problems in a more timely fashion.

As mentioned, there is evidence that certain stand-alone computer-based treatments can be as effective as therapist-administered treatment for certain disorders (e.g., Newman et al., 1995; Rothbaum et al., 2000; Selmi et al., 1990). Building a WBT for therapists that could interact with, and complement, the existing computer-based treatment could conceivably enhance the effectiveness of the original stand-alone application. It might be the case that providing a technology-based medium by which the therapist could actively participate in the structured, self-administered intervention could act synergistically to improve client outcomes. For example, the WBT might inform the therapist that the client has been having trouble completing a particular assignment, thereby prompting the therapist to address that issue during the next session.

The Role of Synchronous E-Learning in Disseminating Manual-Based Therapies

Synchronous e-learning platforms also have several potential applications for clinical training. First, these platforms can be used to facilitate case observation and real-time clinical supervision. For example, a Web cam in the therapy room could be used to transmit a live audio-and-video stream of the interaction between a trainee who is learning to use an MBT and his or her client to a clinical supervisor in an office or virtually anywhere else that has broadband Internet access. Many vendors can encrypt live video streams to protect client privacy. After observing the live session, the supervisor could activate a Web cam so the trainee and supervisor could see and hear one another and could debrief about the session immediately. Alternatively, they could arrange to "meet" online at some mutually convenient time in the future. Many vendors also allow for the recording and archiving of virtual sessions so that a therapist and/or supervisor could review the session at a later date.

Another potential application of this type of technology is for group supervision or training workshops. Here, an experienced clinician, who might be geographically separated from a group of trainees, would be available to meet with the trainees virtually to provide expert instruction and feedback about implementing an MBT in their practice setting. Clinical cases could be presented, recorded sessions could be reviewed and discussed, and therapeutic techniques and strategies could be demonstrated through role-play and modeling. Note that the trainees need not be physically present at the same place for the training, but could also access the session remotely via the Internet.

Synchronous e-learning platforms can also be used to mediate direct, real-time interaction between a therapist and his or her client. Such online interaction has become known as *e-therapy* and has been the topic of considerable interest and debate over the past few years. Because this application of IDT is beyond the present focus on clinical training, refer to the work of Grohol (1999), Hsiung (2002), and Maheu (2003) for detailed discussions.

The Role of Instructional Design and Technology Relative to Traditional Clinical Training and Continuing Education Activities

IDT as an Adjunct to, Not a Replacement for, Traditional Clinical Training and Supervision. The most promising role for these technology-based delivery mechanisms is as an adjunct to, rather than a replacement for, traditional training. Although many in the corporate training and development industry have been quick to jump on the e-learning bandwagon and proclaim online learning as the sole solution to any and all training needs (see Rosenberg, 2001), recent research suggested that the industry is rapidly moving toward a more "blended" approach in which self-paced WBT courses are offered in conjunction with instructor-led lectures, face-to-face group exercises, online mentors, and other traditional forms of instruction and support (Barbian, 2002).

Particularly in clinical psychology, for which a primary goal is to train clinicians in the subtleties and nuances of MBTs, there is simply no replacement for

face-to-face classes and supervision. However, both synchronous and asynchronous e-learning do have a variety of important adjunctive roles to play. Some of the ways that synchronous e-learning can be incorporated with traditional supervision and training were described above. Using an asynchronous platform, a trainee might be asked to complete a WBT course on a particular MBT as a prerequisite to implementing that protocol in a supervised clinical setting. Here, the WBT would serve a didactic function by providing a broad overview and conceptual understanding of the approach, much like attending an introductory lecture or reading a textbook. Valuable face-to-face practicum time could then be devoted to discussing the challenges of applying the MBT in the context of a specific case presentation.

Providing Additional Options for Obtaining Required Continuing Education Using Instructional Design and Technology. Clinicians who practice in rural areas or who otherwise lack easy access to high-quality continuing education (CE) activities will likely benefit from technology-delivered instruction that can be accessed anytime and anywhere Internet access is available. Practitioners who have physical disabilities that limit their mobility might also choose to fulfill their CE requirements by completing these activities online. In fact, a wide variety of accredited online CE activities are currently available for these individuals as well as for many other busy clinicians, who simply appreciate their convenience and relatively low cost. Practitioners who are unable to attend traditional CE activities and lack access to a computer with an Internet connection can often obtain CE credits on a "home study" basis (i.e., by reading a paper-based MBT and obtaining a passing grade on a posttest). Because successful migration of MBT content to an IDT format ensures that the content of the Web-based modules remains true to the original paper-based manual, practitioners who choose to learn about the MBT by reading the manual should not be at a disadvantage relative to those who are able to learn about the MBT online. For those practitioners who do have a computer but lack Internet access, another option would be to disseminate the WBT program on a CD-ROM or digital video disc (DVD).

ADDRESSING ORGANIZATIONAL AND SYSTEMIC BARRIERS TO CHANGE

IDT is not a panacea or a process that can operate in a vacuum. IDT cannot address psychological reactance and/or rational objections that individual practitioners may have about evidence-based, manual-driven practice. IDT alone cannot address the many intrapersonal, interpersonal, organizational, and systemic barriers that can prevent changes in clinical practice (Goldman et al., 2001; Pincus, Pechura, Elinson, & Pettit, 2001). Using the framework developed by evidence-based medicine researchers (e.g., Grol, 1997, 2001; Grol & Grimshaw, 1999), the role of IDT in the dissemination of empirically supported MBTs can best be classified as an *educational* approach to changing clinical practice. Because the educational approach relies heavily on the intrinsic motivation of professionals to acquire new knowledge, skills, and abilities, dissemination efforts that rely exclusively on this narrow approach are unlikely to be successful.

Interventions designed to change clinical practice are most likely to be successful when they combine multiple approaches (Grol, 2001; Shaneyfelt, 2001). Table 1 summarizes the wide variety of available approaches to changing clinical practice. Although this synthesis was generated from a review of the evidence-based medicine literature, it applies equally well to the dissemination and implementation of empirically supported MBTs. The first three approaches outlined (the educational, epidemiological, and marketing approaches) all attempt to change clinical practice by influencing the internal cognitive and affective processes of the individual practitioner. As such, they alone cannot address the systemic barriers to change that exist at the patient, practice, health plan, and purchaser levels (Pincus et al., 2001).

By focusing on influences that are external to the individual clinician, a second broad category of interventions can serve as a powerful complement to internally focused approaches (see Approaches 4–7 in Table 1). To be maximally effective, an educational approach such as using IDT to educate clinicians about an empirically supported MBT could be embedded in a larger intervention focused on external, systemic influences. For example, a clinician who has completed our WBT on providing cognitive-behavioral therapy (CBT) for

Table 1. Approaches to changing clinical practice

Approach	Focus	Example
Approaches that focus on factors *internal* to the clinician:		
1. Educational	Intrinsic motivation of professionals	Complete workshop, course, WBT
2. Epidemiological	Rational information seeking and decision making	Follow clinical practice guidelines
3. Marketing	Attractive product adapted to needs of target audience	Receive brochure, promotional materials, watch public service announcement
Approaches that focus on factors *external* to the clinician:		
4. Behavioral	Reinforcing desired performance	Receive award or monetary bonus for desired behavior
5. Social interaction	Social influence of significant peers/role models	Convince local opinion leader(s) to support change in practice
6. Organizational	Creating structural and organizational conditions to improve care	Form total quality enhancement team
7. Coercive	Control and pressure, external motivation	Receive reprimand, fine, or sanction for failure to perform desired behavior

clients with a substance use disorder could subsequently receive a visit from an expert consultant who could answer questions and provide on-site supervision ("academic detailing," a social interaction approach; cf. Mittman, Tonesk, & Jacobson, 1992).

In addition, the managed behavioral health organization (MBHO) for which the clinician works could ensure that the relevant templates and codes for CBT are added to the computerized practice management system, and that practitioners are allocated a sufficient number of sessions in which to complete the manualized treatment (organizational approach). More active organizational approaches to large-scale implementation of Empirically Supported Treatments (ESTs) could also be pursued. For example, the State of Hawaii recently formed a multidisciplinary Empirical Basis to Services Task Force in an effort to improve mental health practice for children. This task force reviewed the empirically supported treatment literature for children and established a process by which a university, State Department of Public Health, and family partnership was established to address specific issues of relevance to statewide implementation of empirically based services. Refer to the work of Chorpita et al. (2002) for a more detailed description of this ambitious project.

On a more molecular level, behavioral or coercive approaches could also be used. For example, an MBHO might program their practice management system to automatically remind the clinician to offer the MBT for patients they have diagnosed with a substance use disorder (behavioral approach). Although these approaches may well raise legal and ethical concerns, the clinician could also be offered a financial incentive to implement the MBT with appropriate patients (behavioral approach) and/or to sanction the practitioner when she or he fails to implement it (coercive approach).

It might be asked, what would motivate an MBHO to use IDT to disseminate manual-based treatments in the first place? Given that managed care systems can be more focused on the financial implications of their operations than on the degree to which their participating providers are delivering evidence-based treatments, the cost savings associated with using IDT for clinical training is a major issue. Although no data are available that directly address the cost savings associated with training for mental health practitioners, several dramatic examples from the world of business highlight the substantial cost savings associated with moving training activities online. For example, in 1999, Ernst and Young realigned and condensed 2,900 hours of classroom training into 700 hours of Web-based learning, 200 hours of distance learning, and 500 hours in the classroom, which resulted in an overall reduction of 35% in training costs (Hall & LeCavalier, 2000). That same year, the Internal Revenue Service generated an estimated travel cost savings of $40 million by conducting 30% of its training via e-learning (Hall & LeCavalier, 2000). Similarly, the Rockwell Collins Corporation reduced learning and development expenditures by 40% by converting 25% of its classroom

offerings to computer-based training/WBT, while more than doubling the total number of learning offerings (Hall & LeCavalier, 2000). Given the magnitude of these cost savings, it seems likely that administrators of MBHOs would be receptive to experimenting with technology-based training delivery mechanisms in their organizations.

Research on the diffusion of innovations provides another valuable perspective on the larger social and systemic factors that can influence the process of changing clinical practice. Because a comprehensive synopsis of the diffusion literature is beyond the scope of this article, refer to the work of Rogers (1995), who has conducted much of the seminal work in this area. Very briefly, the innovation-decision process is a process by which an individual such as a practicing clinician passes from (1) *knowledge* (first knowledge of an innovation, such as awareness of the CBT for treating patients with substance use disorder), to (2) *persuasion* (forming an attitude about it, either favorable or unfavorable), to (3) *decision* (a decision to adopt or reject the innovation), to (4) *implementation*, which involves actually putting an innovation to use (e.g., using CBT in daily clinical practice), and finally to (5) *confirmation*, which occurs when an individual seeks reinforcement of a decision that has already been made.

The potential role of IDT in the process of diffusing an innovative, manual-driven, empirically supported therapy lies primarily in the knowledge stage. A well-designed WBT could be quite effective at delivering what Rogers (1995) refers to as *how-to knowledge*. How-to knowledge consists of information necessary to use an innovation properly. In the case of clinical training, this how-to knowledge can be quite complex, including how to identify clients for whom the treatment is appropriate, how to structure the therapy, how to utilize various clinical techniques and strategies correctly, how to deal with clients who are not responding to treatment, and so on. Another type of knowledge that WBT might effectively deliver is referred to as *principles-knowledge,* which consists of information dealing with the functioning principles underlying how the innovation works. In our case, the principles-knowledge would consist of the theory underlying CBT, for example, why one would want to conduct a functional analysis or use a skills training approach.

This knowledge stage is extremely important because, when an adequate level of knowledge (particularly how-to knowledge) is not obtained prior to the trial and adoption of an innovation, rejection and discontinuance are likely to result (Rogers, 1995). As discussed in the context of the various approaches to changing clinical practice, knowledge transfer is a purely educational intervention that constitutes a necessary but insufficient condition for effecting enduring change in clinical practice. Before changing his or her practice behavior, the individual clinician must first develop a favorable attitude toward the innovation. In contrast to the knowledge stage, which consists primarily of cognitive activity, this persuasion stage is largely affective and involves the individual seeking out innovation-evaluation information from peers or local opinion leaders. Again, IDT may play an instrumental role.

In addition to delivering principles-knowledge and how-to knowledge, IDT could also be used to deliver persuasive communications designed to influence learner attitudes. The same principles that govern the effectiveness of print and broadcast advertisements may well apply to WBT and other forms of technology-based training delivery mechanisms. For example, the elaboration likelihood model (Petty & Cacioppo, 1986) posits that the influence exerted by various communication elements will depend on the elaboration (issue-relevant thinking) that occurs during processing. When elaboration is high, the central route to persuasion is followed, by which only those message elements (called *arguments*) relevant to forming a "reasoned" opinion are influential. Conversely, the peripheral route to persuasion occurs under low levels of elaboration as elements (called *peripheral cues*) that are irrelevant to developing a reasoned opinion become influential. Elaboration in turn depends on the person's motivation and ability during message processing.

As in print and broadcast media, developing a persuasive communication that can be embedded in a WBT might involve anticipating how much elaboration is likely to occur during message processing. If learners are motivated to learn about a particular MBT, then elaboration is likely to be high, and more emphasis on including compelling rational arguments would be appropriate. When this is not the case, other techniques, such as manipulating the attractiveness and credibility of

the message source or attempting to influence the learner's perceptions of the emotional or symbolic features of a particular MBT, might be more effective (Puto & Wells, 1984). For example, if we anticipate that community drug abuse counselors will be relatively less motivated to learn about the cognitive-behavioral approach outlined in our NIDA Clinical Toolbox WBT, we might consider having the course hosted and narrated by an attractive, experienced counselor who is in recovery himself or herself. Testimonials from clients who have benefited from this approach are another means of emphasizing the peripheral route to persuasion. Conversely, if we anticipate that community counselors will be highly motivated to learn this material, we might emphasize the central route to persuasion and provide rational arguments such as links to studies demonstrating its effectiveness.

CONCLUSION AND FUTURE DIRECTIONS

The principles, processes, and tools of IDT can be used to effectively migrate the content of empirically supported MBTs from paper-based, text-intensive manuals to easy-to-use, engaging WBT applications. MBTs serve as an uncommonly efficient starting point for the development of instructionally sound WBT applications, and such applications would have many advantages over their existing paper-based counterparts. Potential advantages include improvements in learner engagement, providing designers and developers with the ability to efficiently reuse content, and the ability to integrate client self-study materials closely with clinician training. Furthermore, synchronous e-learning could significantly enhance the efficiency of clinical supervision and training by providing a platform for supervisors and trainees who are geographically separated to conduct one-on-one supervision, review videos of sessions together, and conduct virtual workshops in which supervisors could demonstrate new strategies and techniques as they interact with trainees in real time.

Despite the potential of this approach, reference need only be made to the ADDIE ID model to realize that we have yet to touch on the important issues of implementation and evaluation. Once a researcher has invested the time and effort required to migrate the content successfully from an empirically supported manual to a WBT format, how would the online course be delivered to its target audience? Who would be responsible for hosting the course? Who would be responsible for registering participants and reporting their test scores? Who would be responsible for ongoing maintenance and technical support? Large public corporations and universities typically invest many millions of dollars in enterprise-grade software applications called learning management systems (LMS) to perform these critical functions (Hall & LeCavalier, 2000; Rosenberg, 2001). In the absence of such a centralized organizational structure, how would our profession handle these demands? Would APA be willing to sponsor an LMS that would allow practitioners to access all of the empirically supported, MBT-based online courses currently available? Would practitioners who access an online course be willing to share in the cost of this system?

At this very early stage, there are certainly more questions about implementation than there are answers. Fortunately, designers and developers do not necessarily have to wait until all of these issues are resolved to initiate the ID process for an individual MBT. In my previous work providing strategic consulting services to corporate training and development departments in the technology industry, I noticed that early adopters often design and develop e-learning applications long before their organization has an LMS up and running. Initially, they might host the course on a server across the hall (or under their desk) and advertise its availability locally via word of mouth. Once the corporate LMS is available, these individuals then post their WBT on the system, thereby making it available on a larger scale. My research team has been through a similar process; we first developed a prototype WBT on a local machine and later moved it to an LMS sponsored by one of the institutions with which we are affiliated. The point here is that larger implementation issues, although critically important, can be addressed before, during, or after development has been completed.

Finally, and perhaps most important, the issue of evaluation must be addressed. Training and development professionals typically conduct only a Kirkpatrick Level 1 evaluation, demonstrating that participants are satisfied with their learning experience, and sometimes a Level 2 evaluation, by which participants demonstrate that they have obtained new knowledge and skill by

achieving a passing score on a test. Researchers are interested in conducting much more rigorous evaluations. In addition to Levels 1 and 2, we must also demonstrate that participants are able to transfer newly acquired knowledge and skills into improvements in job performance (Level 3), and that these improvements in job performance affect the bottom line (Level 4). For example, in measuring the impact of our NIDA WBT, we must demonstrate (1) that clinicians like our WBT, and (2) that after completing the course, they can demonstrate improved knowledge about CBT for treating patients with substance use disorder. However, we must also demonstrate (3) that they change their clinical practice by adhering to the new CBT protocol, and (4) that their patients experience improved outcomes as a result.

The challenges of evaluating therapist adherence to or fidelity with an empirically supported protocol disseminated via IDT (Level 3 evaluation) are not necessarily any greater than the challenges of evaluating adherence to an MBT that is disseminated via traditional clinical training. As in any psychotherapy efficacy trial, therapists who receive training in a new protocol via IDT would need to be videotaped (or recorded on digital video), and the labor-intensive process of reviewing those videos and rating therapist adherence to the protocol would need to be completed. Similarly, ongoing compliance could only be ensured via continued monitoring of in-session behavior via live supervision or videotape review. Granted, e-learning platforms might facilitate this process, for example, by allowing a supervisor to observe a session in real time via a synchronous platform or by facilitating the asynchronous archiving and viewing of digital video segments to facilitate the coding of therapist adherence. However, the arduous and time-consuming process of evaluating adherence/fidelity and compliance and providing adequate one-on-one supervision would be substantially the same.

A risk inherent in using IDT for disseminating MBTs is that some may try to implement a particular technology-based intervention without maintaining an appropriate level of quality control over the training environment. In traditional environments such as university graduate school training, internship, or specialized institutes, the supervisor typically has a significant degree of control, both to determine which trainees require remediation and to prevent unqualified trainees from having clinical contact. Only in the context of a controlled clinical training environment can we ensure that trainees apply technology-delivered clinical training content in an ethical, responsible, and effective manner. Thus, traditional training environments have an important role to play in the dissemination of MBT content via IDT because they ultimately maintain responsibility for how trainees go about implementing these treatments with real-world clients.

The notion that therapist adherence, fidelity, and compliance must be carefully measured is most consistent with what Hayes (2002) referred to as the "systematic replication" model of dissemination. In this model, dissemination research tests the external validity of scientifically proven technologies, identifying subpopulations of responders and nonresponders and the necessary and sufficient conditions for replication of the results obtained in efficacy trials. In contrast, Hayes (2002) proposed a practical application model in which dissemination research examines how to improve outcomes in the real world of health care delivery. In this model, the focus is not on strict adherence to MBT protocol, but rather on the identification of "technologies that clinicians are willing to accept and adopt. If they are too hard to learn, too confusing, too complex, or too boring, then that limits their practical applicability" (p. 411).

IDT can provide clinical researchers with the processes and tools required to empirically evaluate dissemination efforts under either of these two models. For example, IDT would make it easier to deliver the increasingly comprehensive, detailed, and complex MBTs that focus on the identification of the exceptions, combinations, and subpopulations that are found to limit or enhance effectiveness under the systematic replication model. Alternatively, in keeping with the practical application model, which views the ideal therapy manuals as "humble, simple and short" (Hayes, 2002, p. 412), MBT content could be presented on a simple Web site that allows clinicians to quickly access only information that they find relevant and useful for the case at hand. From either perspective, the role of IDT in the dissemination of empirically supported therapies may well be quite substantial.

ACKNOWLEDGMENT

This research was supported by the Program Evaluation and Resource Center and the Health Services Research and Development Service of the Department of Veterans Affairs. I would like to thank John Finney, Keith Humphreys, John McKellar, and Rudolf Moos for their valuable feedback on a previous version of this manuscript.

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Received March 24, 2003; revised June 20, 2003, and September 19, 2003; accepted September 25, 2003.