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Introduction

How Can Technology Advance Mental Health Treatment?

This volume presents some of the exciting new developments and evolving technologies in the field of mental and behavioral health. Specifically, my coauthors and I discuss ways that technology fosters (a) better access to care and a higher degree of patient-centered care; (b) development of improved treatments, including alternatives and helpful adjuncts to pharmacological treatments and psychotherapy; and (c) development of our abilities as professionals, in terms of refining the quality of our work and extending our leadership from research and practice into business and innovation. Our purpose is to help readers use technology to advance these goals in their professional psychology practice.

How Can Technology Move Mental Health Forward?

We are in a revolutionary time, with change driven in large part by technology. Opportunities now exist to address important issues in health care as aided by these developments (National Institute of Mental Health, 2016). One looming challenge facing psychology professionals is to provide mental

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health services to those in need who do not have access to care; there is a huge gap between the need for mental health services and their availability (Rabbitt, Kazdin, & Scassellati, 2015). For example, it is estimated that approximately 70% of those suffering from adult depression who need services will not receive them (Olfson, Blanco, & Marcus, 2016). This presents a major public health challenge, one that requires innovation, for which technology is essential.

One answer to the problem of access is *telehealth*—also known in our field as *telepsychotherapy*, *telepsychology*, and *telemental health*. The Agency for Healthcare Research and Quality and the National Institute of Mental Health (Mohr, Burns, Schueller, Clarke, & Kinkman, 2013) initiated a review of mental health behavioral intervention technologies by an expert panel. Their conclusion was that "videoconferencing and standard telephone technologies to deliver psychotherapy have been well validated. Web-based interventions have shown efficacy across a broad range of mental health outcomes" (Mohr et al., 2013, p. 1). Video technology has become so inexpensive that it is now included in most computers. This is providing options, not only for telehealth but also for remote supervision that brings expert consultants directly into our offices.

Rapid advancements are also taking place in the development of sensors and devices used to measure biometric data. Embedded in a smartwatch or other wearable device, biosensors can measure heart rate, posture, stress data, blood alcohol level, and activity level. If you wear the device to bed you can also monitor sleep patterns. All these data can be fed into smartphone apps. Using an app in conjunction with your smartphone's built-in audio input, you can also analyze mood from voice tone and word patterns (Kraft, 2017).

Apps for secure communication and other types of data exchange are also on the rise. Electronic health record apps connect patients to doctors, monitor drug distributions, and in many ways increase the reach of health clinics. Innovators of all kinds—startups, nonprofits, scientist–clinicians acting as consultants—are tackling a huge array of problems with technology-first solutions (Schmidt & Cohen, 2013).

Hand-in-hand with apps, other treatment technologies are emerging as alternatives and as adjuncts to traditional treatments such as pharmaceuticals and psychotherapy. Their increased affordability enhances their potential to move clinical research forward. Treatment technologies include virtual reality, biofeedback devices, neurofeedback devices, transcranial magnetic stimulation, electrocranial therapy, and others. These devices can also be used to assess and monitor the biological and emotional components of various states.

While it has been slower on the uptake than medicine, the field of behavioral and mental health is now fully entering the world of technology-enhanced services. Moreover, these advances and trends are being embraced and expected by the public. A recent article in *Forbes* reported that "emerging trends in recent years have the potential to completely change the health care environment for those struggling with mental health conditions" (Utley, 2016, p.1). *Forbes* editors selected four technologies for investors and consumers to watch: a mobile app (Pacifica) for anxiety; a mobile app (WEconnect) for addictions that track mind, body, and spiritual activity levels and keep the person connected to support systems; a wearable device (Spire) that

monitors physiological states and can detect emotions, triggering a notification that is sent to your phone when you need to improve your mood; and a neurostimulation device (Fisher Wallace Stimulator) that stimulates the brain to release dopamine and serotonin and is thus useful for improving mood. These advances in technology are offering the field of mental health abundant entrepreneurial opportunities for those who embrace these changes, enjoy innovation, and want to find new ways to resolve the challenges facing the field.

Clinical decision making is fundamental for effective clinical practice and requires access to high-quality information (Magnavita, 2016). Technology allows access to the most up-to-date information instantly. In a previous publication, *Clinical Decision Making in Mental Health Practice*, the authors highlighted the importance of understanding how bias in decision making can be reduced using technology. Decision making requires expertise, high-quality information, and analytics: how to weigh factors and predict probabilities in an unbiased fashion. Technology provides many aids to improve and enhance the process of informed clinical decision making. Caspar, Berger, and Frei (2016) discussed various aids to clinical decision making, including (a) knowledge databases, (b) Internet-accessible information on mental health problems and treatments, (c) web-based platforms providing psychoeducation about treatment options, (d) computer-assisted and Internet-based questionnaires and tests, (e) assessment of biological states, (f) feedback systems, (g) videorecordings of patients for supervision and peer consulting, (h) actuarial/statistical decision making using algorithms, (i) use of videoconferencing among clinicians, and (j) webinars capitalizing on the wisdom of specialists (pp. 149–157). Many of these methods are being improved as we accumulate more health-related information in large data sets called "big data." In this volume, we examine patient feedback systems as one mechanism for improving clinical decision making. These are systems that are designed to gather patients' views about how treatment is going, feedback that providers can use to improve treatment and, hopefully, improve outcomes.

Audience for This Book

This book is largely for mental health practitioners who already use technology for personal or professional purposes. Most chapters forge into the *why* and *how* without spending too much time on the *what*; the authors assume readers are familiar with certain terminology, such as hardware, software, operating system, Internet, browser, search engine, cloud storage, network, app, webinar, video calling, media streaming, e-mail, text, and encryption.

Our target audience includes scholars and practitioners who wish to become entrepreneurs. This could mean starting a company; it might also include partnering as a business collaborator or advisor to other entrepreneurs whose product or service impacts mental and behavioral health care in some way. Psychology is behind the curve in generating the interdisciplinary collaborations and business enterprises (e.g., startup companies) that we see in other scientific disciplines. The field of psychology can start

to catch up by marrying technology, psychological science, and business. As already noted, there are many innovative developments that are shaping the nature and scope of mental health practice. Kraft (2017) referred to the shift this way:

> [We are moving] from the "Quantified Self" era, where the data has generally remained siloed on the devices and apps of the individual and not integrated into clinical care, to the emergence of "Quantified Health," where the data from common consumers' wearables, scales, BP cuffs, glucometers and even home lab data, will flow through consumer's smart phones . . . into the electronic medical records . . . (EMRs) of the clinician. (p. 46)

These emerging areas offer interesting opportunities for those with entrepreneurial drive, whether they work inside or outside the support structures of major research institutions.

Having said this, we think there is much here for both digital natives and digital immigrants. Prensky (2001) distinguished between digital natives and digital immigrants, noting that the immigrants learn to adapt to their environments, while to some degree retaining a "foot in the past" or having an "accent" (p. 2). A type of socialization has to occur among those of us who didn't grow up with digital technology. Becoming familiar with technology is like learning a new language. By contrast, the digital natives "are used to receiving information really fast, often in relatively short bytes. . . . They like parallel process and multi-tasking," and further, their brains may actually be different in structure than the brains of digital immigrants (Prensky, 2001, p. 2). Most of those born after the year 2000 are fundamentally different from those born before, in that they grew up with technology and were almost always digitally connected. While it is more difficult for the digital immigrants to assimilate new approaches, they often find it gratifying to master new technologies and experience how they can improve and enhance professional functions once a basic level of proficiency is achieved.

There are many versions of what a technology-based or technology-assisted practice might look like. In this book, we do not take the stance that all practitioners should incorporate all or even most of the technologies described herein. Instead, we expect that readers already conduct periodic needs assessments to help them determine the changes to their practice that will best align with their goals. For example, in the coming year, do you want to focus on increasing administrative efficiency? Will doing so allow you to spend more time examining your treatment decisions? Might that, in turn, optimize patient outcomes? Readers who will get the most out of this book are those who have a realistic view of what their practice needs to thrive and/or expand. They also have the capacity to purchase new tools, train users, and take concrete steps to ensure protection of clients' personal health information.

Organization of This Volume

In Chapter 1, Steven A. Sobelman and John M. Santopietro review the HIPAA and HITECH laws, ethical principles and enforceable ethics standards, and practice guidelines that are essential to successfully incorporating and managing the technologies available.

Chapters 2 and 3 cover technologies whose main benefit is increasing access to mental health care. Comer and Barlow (2014) proposed that specialty care in mental health could be efficiently delivered using video technology, so that those in underserved areas could have access to high-quality care. And, in fact, as Carolyn L. Turvey demonstrates in Chapter 2, the telemental health movement is well underway, although it is not without pitfalls. In her chapter, Turvey emphasizes client safety and confidentiality in situations where the clinician is treating a client at a remote location, such as the client's home, where there is no staff member to manage either logistics or the care-receiving environment.

Chapter 3, by David D. Luxton, introduces several classes of apps that are designed to complement or in other ways integrate with traditional mental health care. According to the National Institute of Mental Health (2016): "Mobile devices like cell phones, smartphones, and tablets are giving the public, doctors, and researchers new ways to access help, monitor progress, and increase understanding of mental wellbeing" (p. 1). Luxton's chapter illustrates these and other functions of apps, highlighting throughout their value for enhancing access, affordability, and client-centered care.

Chapters 4 through 7 focus on specific technology-based treatments. The cost of purchasing most technological products declines as time passes. For example, when I first started a group practice over 3 decades ago, neurofeedback equipment cost thousands of dollars—out of reach for most practitioners. Yet today, as you will read, many therapeutic devices are proving to be a valuable, inexpensive resource for practitioners to use with those patients suffering from trauma and anxiety disorders, where retraining brain states is beneficial. In Chapter 4, Liza C. Zwiebach, Laura Loucks, Devika Fiorillo, and Marat V. Zanov show how virtual reality therapy can be used in outpatient and inpatient settings to enhance treatment response by controlling exposure to traumatic events in a realistic format.

In Chapter 5, Jeffrey A. Marksberry and Daniel L. Kirsch present a noninvasive approach for using electrical stimulation to the brain to alter brain states. This technology is widely applicable to many settings and has a fairly short learning curve for the interested clinician. Many patients purchase or rent home-use versions of these devices and find them quite useful to down-regulate anxiety between sessions.

In Chapter 6, Ed Hamlin informs us how neurofeedback evolved and how it is proving to be a valuable resource for those interested in teaching patients how to alter their brain states, which has important implications for a variety of clinical syndromes seen in clinical settings. Portable EEG devices, which have become very inexpensive, are now being used in a variety of ways to enhance and augment psychological treatment.

In Chapter 7, Paul M. Lehrer and Richard Gevirtz provide a concise overview of heart rate variability (HRV) biofeedback for those interested in understanding its benefits or incorporating it into clinical practice. As other iterations of biofeedback, HRV "is mainly used as an intervention in which the effective factor is information a patient receives about physiological states that can otherwise not be validly monitored by the patient him- or herself" (Caspar, Berger, & Frei, 2016, p. 152). This general approach has been criticized by some as being reverse logic. In short, the criticism goes, just because one's brain generates a certain type of activity or frequency wave while the

person is in a desired state (e.g., a calm or focused state) does not necessarily mean that training oneself to produce the targeted brain activity translates into an ability to attain the desired mental state. The approach toward biofeedback we take in this volume is two-fold: (a) we share the evidence base supporting the clinical use of biofeedback, and (b) we encourage practitioners to explore its possibilities. Now that the technology is affordable, it makes sense to continue testing and validating it to further uncover the relationships between body and mind.

Chapters 8 through 11 move into applications of technology for professional development. In Chapter 8, Michael J. Lambert, one of the pioneers in the area of patient feedback systems, describes how collecting and interpreting data with such systems can lead to better outcomes by keeping practitioners informed of the progress that is being made and allowing us to address threats to treatment.

Chapter 9, by Jasen Elliott, Allan Abbass, and Tony Rousmaniere, shows how using video technology can enhance an iterative process of deliberate practice as we strive to become more effective therapists. In Chapter 10, Jon Frederickson and Tony Rousmaniere show us how to use technology to advance your training, often without having to leave your office.

In Chapter 11, Steven A. Sobelman and I explore the topic of how technology creates new possibilities for entrepreneurship, offering a vehicle for innovation in mental health and opportunities for new business ventures to solve the problems the field faces. Understanding entrepreneurship and the potential benefit of marrying technology, psychological science, and psychotherapeutics can provide alternative career options for innovators.

And in the final chapter, Jeffrey Zimmerman and I present a thought process practitioners can use when developing or expanding the scope of their practice via technology.

I use or have used most of the technological advances presented in this volume. While there are additional advances that might have been included in this volume, I chose those that I, and many of my colleagues, have found to be most beneficial and relatively inexpensive. The chapter authors and I hope that by the time you finish reading this book, we will have helped you answer most, if not all, of the following questions:

- How can I ensure that my practice's technology use is HIPAA-compliant?
- How do I evaluate the technology available to me for fit with my goals, current skills, and practice culture?
- How can technology help me refine the treatments I deliver for better patient outcomes?
- How can I use technology to expand my practice offerings?
- How can I use technology to share my knowledge with others?
- How can I leverage my research and/or practice experience to create useful products?
- How can I ensure that sound psychological science is guiding the development of new technology being developed to serve the mental and behavioral health sector?

Behavioral and mental health care is beginning to experience an explosion in technology-based trends. This technological revolution is radically altering the delivery of health care. By 2020, it is predicted that most of heath care will experience a digitalization and be predictive and preventive, based on real time data from wearable devices and biosensors, and the deciphering of big data from electronic medical records and other sources (Deloitte LLP, 2014). New products are being introduced with promises to improve mental health and many more opportunities for development and innovation will be possible. New business enterprises to meet the needs of this expanding technology-based era will be available for those who have entrepreneurial interest and skills.

With these rapid developments in technology and the provision of mental health care, there will be a need for ethical guidelines that are responsive to this changing terrain. In the next chapter, we will look at the laws, ethics codes, practice standards, and clinical guidelines you will need to understand as you implement or refine your professional use of technology.

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