Future of Telepsychology, Telehealth, and Various Technologies in Psychological Research and Practice

Marlene M. Maheu
Myron L. Pulier
Joseph P. McMenamin
Les Posen
Abstract

It is increasingly urgent for psychologists to confront the difficult questions raised by the way that information and communication technologies are altering not only health care, but the human experience worldwide. Whether psychologists embrace or resist aspects of technology, they should: recognize how advanced technologies are changing the way we communicate and process information, anticipate needed growth, and prepare to meet ensuing challenges to professional psychology. Exponential growth of technology is enabling new mental health services, extending existing ones, and augmenting options available to individuals for self-monitoring and decision-making, both with and without professional involvement. Professional organizations can help retain psychology’s leadership position by promulgating more specific guidelines and policy for science, practice and education. Protection of clients already requires new legal and regulatory initiatives for licensure, referrals, client education, privacy, screening, assessment, record-keeping, reimbursement and self-help product development. Protections for psychologists require new risk management procedures and adaptations by malpractice carriers as multidisciplinary teams evolve within and beyond health care into new public and private sector arenas. Key technologies that presage future trends include video teleconferencing, "smart" mobile devices, cloud computing, virtual worlds, virtual reality and electronic games. Predicting change and adapting psychology accordingly will enable psychologists to future-proof their workplaces. Equipping future generations of psychologists and patients to collaborate more successfully in all potential growth areas requires educators and trainers to increase their focus on technology in graduate education, training and supervision.

*Keywords:* telemental health, mhealth, online therapy, malpractice insurance, reimbursement, licensure
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Two potent forces—the technological expansion of health care delivery and heightened consumer expectations—present psychologists with the imperative to efficiently and ethically leverage new tools and systems to enhance practice, research, education, training and policy. Despite individual psychologists choosing to adopt or resist the profound changes in delivery of and demand for behavioral healthcare services, administrators, clinicians and their professional organizations should recognize the nature, advantages and dangers inherent in the changes, anticipate how technology will continue to transform practice and prepare for the expected opportunities and challenges.

Information and communication technology (ICT) in health care has given rise to the term telemental health to describe telehealth activities focused on behavioral health care (Baker, 2011). Telehealth itself encompasses not only direct provision of professional care to remote and home-bound clients such as by video teleconferencing, but also administrative, back-office and continuing educational activities mediated by technologies, websites and smart device “apps” that help client access trustworthy ICT resources, electronic diaries, telephoned reminders and self-monitoring tools—technologies that can readily supplement traditional services for patients who come in for in-person treatment, and that can provide valuable assistance to populations worldwide who will never obtain direct care.

Recognizing the Role of Technology in Professional Psychology

Telemental health extends beyond psychological disorders, problems of living and self-development to take on such psychological aspects of general health care as adherence to treatment plans, lifestyle issues and preventive care. In these ways, ICT is altering the medical
ecosystem and supporting wider participation of psychologists in all of health care, both medical and non-medical. Non-health-related aspects of psychology also are poised for rapid expansion. In "traditional" practice of clinical psychology, ICT can facilitate working with other treating professionals (such as a patient's primary care physician, psychiatrist, social worker and, indeed, non-professional carers) as a team (Siebdrat, Hoegl, & Ernst, 2009). Beyond this currently common "split treatment" model, increased attention to the psychological aspects of general health care can be expected as accountable care organizations (ACOs) focus on cost containment (Rozensky, 2011) and put greater emphasis on collaborative management of the most expensive chronic illnesses (Von Korff, Gruman, Schaefer, Curry, & Wagner, 1997). ACOs are associations of providers that assume responsibility for the cost, quality and care of a group of people covered under federal health care programs (Devore & Champion, 2011) as codified by law (Patent Protection and Affordable Care Act, 2010). These new entities deploy "medical home" and other patient-centered approaches, emphasize preventive care through multidisciplinary teams that may include mental health professionals and employ electronic clinical records and other ICT tools (Beacham, Kinman, Harris, & Masters, 2012; Tew, Klaus, & Oslin, 2010). Psychologists can not only participate in ACOs, but may be best suited to optimize team interactions within such entities (Siebdrat, Hoegl, & Ernst, 2009) and to support communications with family and patient to encourage self-management (Wagner, et al., 2001) and their use of Internet-based support resources (Paul, et al., 2011).

With the psychotechnologies (those technologies particularly useful for delivery of mental health care), psychologists can attract new clients, perform screening, assessment and various kinds of therapy (Holländare, Andersson, & Engström, 2010) and offer a range of services beyond what was formerly practical or even possible.
Benefits of the psychotechnologies in complementing traditional mental health services have long been substantiated (Maheu, Pulier, Wilhelm, McMenamin, & Brown-Connoly, 2004), allowing psychologists to ethically conduct clinical assessments and therapy wholly or in part by telephone, email, videoconferencing and websites (Donker, van Straten, Marks, & Cuijpers, 2009). When conducted in carefully controlled settings, highly successful outcomes have been documented. For instance, in a study of 98,000 mental health patients, hospitalization utilization was decreased by an average of 25% between 2006 and 2010 when telemental health services were delivered with remote videoconferencing (Godleski, Darkins, & Peters, 2012).

Telespsychology offers opportunities for adequately prepared professional psychologists to not only increase their effectiveness, but also broaden their range of services and enrich their practices (Eonta et al., 2011; Glueckauf, Pickett, Ketterson, Loomis, & Rozensky, 2003; Greene et al., 2010). However, telespsychology also calls for innovation in graduate training; continuing education; guidelines from professional associations; and for new approaches in insurance coverage, regulation of professional activity and applicable law (Eby, Chin, Rollock, Schwartz, & Worrel, 2011). Regulation of telespsychology is expanding (Gilbert, 1999; Health Insurance Portability and Accountability Act, 1996). Reimbursement is becoming available, particularly for Medicare and Medicaid services (Davidson & Santorelli, 2009). Telespsychologists are needed in a variety of institutional settings including correctional facilities, schools, hospitals, the military and particularly in nursing homes (Maheu et al., 2004), where the mandatory reduction of antipsychotic medications will require behavioral interventions (Centers for Medicare and Medicaid Services, 2012).

Telemental health is increasingly consumer-driven to an extent that is outrunning professional readiness and opening opportunities for non-professionals to displace psychologists.
in supplying counseling. The International Telecommunication Union (2012) estimates that 87% of people on our planet already had cell phone subscriptions by mid-2011. Even rural Americans will soon have access to online video and other high-speed services (National Broadband Plan, 2010). The psychotechnologies are profoundly altering consumers' communication about psychological issues with both peers and professionals, and how people seek and acquire knowledge in this area (Beckner, Howard, Vella, & Mohr, 2010; Neil, Batterham, Christensen, Bennett, & Griffiths, 2009). Consumers increasingly expect to be able to contact professionals by email and text messaging. The health industry, including insurers and even pharmaceutical firms, are steadily responding to patients' demand for information (PwC Health Research Institute, 2011).

**Research and Technology**

Technology does not bring unalloyed good news for psychologists. Patients sometimes prefer telephone and Internet-based interactions above in-person meetings with psychologists (Mohr et al., 2010), even though the quality of psychology resources directly available to consumers is inconsistent (Klein, et al., 2010). Using technology, primary care physicians may achieve outcomes comparable to those of psychotherapists (Shandley et al., 2008). Consumers can independently access certain fully automated psychological tests and other interventions online (Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010), but effectiveness and standardized, ethical administration generally need far more attention. There is thus a great need for higher-quality research (Hailey, Roine, & Ohinmaa, 2008; Whitten, Johannessen, Soerensen, Gammon, & Mackert, 2007), particularly in evidence-based methods for bringing treatment safely into the "unsupervised" setting of patients' homes (Luxton, Sirotin, & Mishkind, 2010).
That 9.8% of responding practitioners already use weekly email for clinical services (Jacobsen & Kohout, 2010) raises questions about practitioner training and assessment of clinical competence. Severe penalties exacted by licensing authorities for online violations of professionalism highlight the need to promote training to increase understanding and self-monitoring of practitioners' Internet-communications with patients (Greysen, Chretien, Kind, Young, & Gross, 2012). What are the repercussions of using platforms such as Skype™, Facebook™, Twitter™ or other Internet platforms without adequate training (Cretien, Azar, & Kind, 2011)? Can these or similarly easy-to-access platforms be used more safely? To what extent will their availability and power enable non-professionals to draw consumers away from receiving proper, ethically-delivered care? How can the psychology profession respond to such divergent yet pressing challenges?

With psychology research institutions at the forefront of understanding both normal and abnormal human behavior, human factors, marketing and consumer behavior, in addition to ever-growing specialties in psychotherapy, psychology is in prime position not only to shepherd the change of technology adoption for all health care, but to lead other health professions in the journey. More specifically, as scientist practitioners, psychologists are in an optimal position to consider evidence-based data and integrate them with technology. For one thing, research is showing how improvements in user interface and in system capabilities can overcome reluctance by patients and clinicians to adopt ICT more widely (Krist & Woolf, 2011).

Gordon Paul (1967) called for optimal fit among patient, problem and intervention. As technological options increase, it is becoming more imperative for psychologists to add their selections of best technology to Paul's list (Glueckauf & Lustria, 2008; Harwood et al., 2011; Maheu, et al., 2004).
Furthermore, technology is bringing consumers greater options outside of traditional mental health care that might better meet their access needs because of cost, location, time of day, language, social class, educational level, available social support and other circumstances… specifically services available in their hip pockets, through a mobile device. With teens already preferring to communicate via social media and texting, it is reasonable to question whether, in the next decade, in-person treatment will remain the primary mode of intervention (Fox, 2010).

Psychologists clearly need to identify and become familiar with alternative methods and services to remain relevant and viable in the marketplace.

**Anticipating the Future of Telepsychology**

Consumers are embracing the unfettered flow of communication using whichever device is near at hand. This development points to the need for psychologists to be trained in the risks and benefits of an ever-growing variety of telecommunication tools (Schwartz & Lonborg, 2011). A client can move smoothly from a supportive conversation on the telephone with a family member in the morning; to an in-person therapy session with a therapist; to a crystallizing insight sent via text messaging to a friend; to tracking with a smartphone-based, self-help "app" (i.e., application or program) entry later that same day; and to further integrating lighthearted commentary on a social networking website later that evening. A well-motivated individual might then also find a self-help article or receive one from a supportive spouse, friend or family member for further discussion the next day. Indeed free, Internet-based communication sources, psycho-education and social media platforms will take over many of the current basic and support functions served by psychologists, who, one hopes, will be available to understand and skillfully guide clients in using the most appropriate resources, and possibly help clients tailor technology to their specific needs.
How can we anticipate which technologies are likely to become prominent in mental health care delivery in the near future? The technologies most prone to rapid adoption are those that allow us to *enable, extend, augment* and *connect* (Posen, 2011), as their built-in intelligence facilitates completion of complex tasks with minimal demand for understanding *how* they work. Once in widespread use, such tools become models for other technologies to follow (Kiplinger, 2010; Norman, 2011). It is increasingly important, then, for clinicians and administrators to anticipate and plan effectively for future trends by understanding each of these aspects. With these aspects in mind, we can predict that in addition to increased use of video teleconferencing, the technologies most likely to be central in the telemental health are mobile devices, cloud computing, virtual worlds, virtual reality and gaming.

**Mobile Devices**

The *smartphone* and *tablet* or *pad* computer devices best embody the attributes compelling consumer acceptance of ICT and point to the tools psychologists and their clients will employ over the next few years (Chen, 2011). Despite the "technological divide" associated with sex, age, race, religion, physical challenges, political affiliation, wealth, education and location, these handheld computers are quickly replacing cellular phones in general use. Many psychology-specific applications or "apps" are available for researchers, practitioners, students and consumers (Luxton, McCann, Bush, Mishkind, & Reger, 2011; Maheu & Pulier, in press.).

*Enabling* lets people accomplish what their bodies alone cannot. Smartphones enable conversations with several people simultaneously, almost anywhere and at any time. Psychologists can far better maintain continuity with clients, assess and respond to urgent situations, quickly consult with colleagues and access professional literature when using such psychotechnologies.
Mobile smart devices \textit{extend} people's ability to capture sounds and pictures and transmit them for others to witness and share. They can guide and convey patients' symptom reports and diary entries and will soon routinely monitor activity levels and psychophysiological values. They can \textit{augment} perception by explaining and commenting on what their GPS (global positioning satellite) components, microphones and cameras detect in users' environments, in order to enhance orientation, understanding and decision-making (Hainich, 2009; HeartMath, 2011). A smart device's clock enables personalized reminders such as to take medication, practice a physical or mental exercise, break out of an obsessive trend or relax. Sensors can sharpen patients' awareness of their emotional states and can support biofeedback training at locations and times where it may be maximally effective, rather than only in a therapy office.

Beyond talking with one person at a distance, the mobile devices \textit{connect} users with "social media" such as Facebook and Twitter that provide personal multimedia scrapbooks and virtual billboards that can be viewed by large numbers of strangers (Shirky, 2008) as well as access at any time to peer support groups of all sorts (Griffiths, Calear, & Banfield, 2009). For some, such communication has been their only escape from marked social isolation, while for others it may be removing them from more-intimate contact. In either case social media are already profoundly affecting how people relate to each other, and will continue to grow as an essential ingredient of therapeutic intervention.

Smartphones and tablet devices will sweep away concerns some psychologists have about using personal computers. These devices, though simple in appearance, offer exceptional power and diversity of applications, and reduce the downtime and extra privacy challenges of accessing third party technical support. Psychologists will routinely conduct not only therapy but also clinical assessments at a distance, write up clinical data, back everything up and securely share it
across devices and locations from their offices via cloud computers (see below) even when thousands of miles from their offices (Miller, 2009).

Some vendors already claim their smartphone videoconferencing devices are "HIPAA-compliant," meeting standards for privacy (e.g., O'Grady, 2011). Such secure communication can support variations on evidence-based practices such as exposure therapies. Better than handing out pamphlets, or recommending books and websites, clinicians can supply patient education materials to be accessed on mobile devices and, especially for anxiety and depression, evidence-based treatment programs and exercises (Barak, Klein, & Proudfoot, 2009). Solutions currently exist to accept debit and credit card payments for clinical services (Schropfer, 2010). Electronic wallets will be available in the near future, making payment easier and quicker.

Beyond speech recognition for dictation, smart devices can already recognize the meaning of spoken questions and seek answers from specialized databases (Sung, 2011), enabling psychologists to search clinical records and research publications "on the fly" or to find other psychologists who have made similar queries, thus creating new opportunities not only for collaborative work but also for discussion of current clinical issues or making referrals. The cameras and microphones in smartphones and tablets support multi-person videoconferencing that can be used for discussion with peers, senior clinicians and leaders in various fields to assist psychologists in training, special-skill development and even telesupervision.

The adoption of smart devices by psychologists and clients will allow for variations on old themes. Psychological test vendors will offer more of their assessment tools, modified and normed for computer administration (e.g., Digital library, 2011). Internet connections will make scoring much easier and more reliable, so that tailored reports will be available immediately after clients submit their data. Such assessments will also be inexpensive and housed in sensor-based
technology and software. They will permeate the consumer market, making clients able to use smart devices equipped with biosensors to measure, explain and intervene with individually-tailored therapies that appear on mobile phones in response to cardiovascular signals as piloted with Intel's Mobile Heart Health project (Morris & Guilak, 2009). Various home-based and wearable computers are also in development to assist psychologists develop interventions that will be available at the moment of need, rather than practiced then left in the therapy office (Morris, this issue).

Already, even clients with the lowest-quality equipment and electronic communication linkage can take advantage of symptom diaries, reminders and situation-relevant advice features available via ordinary cell phones. Even very low-end "user-friendly" telecommunication can augment traditional rehabilitation psychology services for individuals and families burdened with chronic conditions (Dollinger & Chwalisz, 2011; Dorstyn, Mathias, & Denson, 2011; Forducey et al., 2003).

Blogging and personal websites give psychologists a voice outside of mainstream peer reviewed publications to express their ideas and creativity, something long suggested by psychologists to their clients (Pennebaker, 1997). Barriers to publishing books, articles and multimedia presentations will continue to crumble, allowing psychologists to reach new audiences and to initiate lively discussions of their work online, as well as to create new risks from disseminating inaccurate or ill-advised information. Consumers with combinations of symptoms will not only be able to find each other in support networks, but also to communicate securely and share technology-accumulated data to contrast and compare symptom patterns.

**Cloud Computing**
An emerging technology that will enhance the impact of mobile smart devices on telepsychology is *cloud computing*. Consumers already use such distant coordinated arrays of computers for storage, data processing and other services beyond what is available on their personal computers, to give their mobile devices capabilities comparable to desktop computers and to yoke all their ICT devices at home, at work and on the go into an integrated array. Free Web-based email services such as *Gmail* and *Yahoo!* and photograph managing services such as *Picasa™* use cloud technology. *Apple, Inc.* users already keep the music, ebooks, videos and movies they purchase on the iStore cloud. In place of *Microsoft Office™* on one's desktop machine, *Microsoft Web Apps™* make document processing and data storage available on a cloud to any Internet-connected device. Rather than purchase, install, configure and upgrade programs, users now just lease a few milliseconds of data processing when needed, paying only for what they use, and sharing with hundreds of thousands of other subscribers the cost of highly sophisticated speech-processing (e.g., dictation) and statistical programs. For health care professionals, the cloud will make Bayesian-based diagnosis and clinical decision-support affordable, and pair these services with top-quality security.

The cloud model already facilitates communicating with a patient and family between in-person sessions, anytime, anywhere and using whatever devices are convenient or relevant at the moment. The cloud model also promotes an "ecological" perspective that facilitates integration of professional interventions with other activities involved in the patient's health, fitness, lifestyle, education, social function and general adaptation.

In the future, a clinician's cloud service can have clients' smart devices acting as virtual personal computers, dedicated to each client's mental health care. Though appearing like machines with which the patient is otherwise familiar, such "appliances" will accept ordinary
email, will be far less vulnerable to attack by viruses or hacking, and, when appropriate, will limit retrieval of Web pages to those approved by the clinician (or some reliable authority) as providing trustworthy information and advice. This could markedly reduce the risk of theft of sensitive information accomplished via "social engineering," which would be the greatest residual vulnerability after implementation of a sound cloud strategy. The virtual computer would be activated only after the patient and clinician have reliably authenticated their identities. All communication would be strongly encrypted, and after a therapy session or other dialog ends, the virtual computer would remain available to pick up where the patient left off using other healthcare resources. Even if a patient's real devices are infested with viruses, and if Internet access is via a public WiFi hotspot it could be possible for her smartphone or personal computer to function as a virtual computer safely.

Reliability of a cloud-based system is already excellent. Cloud computing offers automatic backup and expert maintenance of equipment so that the core service is unlikely to lose data or to malfunction. If one of a user's devices fails, or the Internet connection goes down, it is easy to substitute another device or connection, perhaps at a friend's or at a public library.

While security and unauthorized access to sensitive private information is a particular concern when transmitting and storing data remotely, cloud computing actually can ensure greater safety because the costs of maintaining highly sophisticated protection that is well beyond the capability even of large health care organizations are amortized among the large customer base of cloud service providers. The fact that major financial institutions are adopting cloud technologies attests to the security of this resource when correctly implemented. Health care administrators should be aware of the special security and ethical issues and should learn how to operate their ICT systems properly in ongoing collaboration with carefully selected cloud
providers (Devereaux & Gottlieb, in press). All these considerations suggest the cloud arrangement will become dominant in very few years.

**Virtual Worlds, Virtual Reality and Gaming**

Over the next five-years, gaming, virtual reality and virtual worlds are likely to gain prominence in mental healthcare. Gaming apps for smartphones are proliferating rapidly (Koekkoek, 2011). For the next generation of clients, who often play electronic games for hours each day, game formats may be preferred for home-based clinical as well as self-help interventions across a range of mental health issues (Lenhart, Lewis, & Rainie, 2011). Techniques in gaming design are currently successfully adapted to deliver virtual exposure sessions for veterans returning from war (Rizzo et al., 2011a). Patients experience a sense of immersion in what appeals to the senses as one's actual environment with which one interacts in real time so that one's responses and decisions seem to have immediate consequences. There are clinical applications of virtual reality for common anxiety conditions with results approximating those of *in vivo* exposure programs (Rothbaum et al., 2006). There are also effective Internet-based self-paced programs set in virtual worlds (Moore, Wiederhold, Widerhold, & Riva, 2002). Consumer-grade virtual world technologies have become readily available. As one example, in a virtual world groups can meet and interact online, with individuals depicted as animated characters ("avatars") behind which consumers maintain anonymity (Hoch et al., 2012).

As avatars improve in convincingly replicating human facial and bodily movement they will be used not only for gaming, but also to "populate" psycho-educational environments that support treatment resistant populations such as returning war veterans who need but refuse mental health care (Bush, Bosmajian, Fairall, McCann, & Ciulla, 2011; Rizzo et al., 2011b).

**Telepsychology Law, Regulation and Reimbursement**
In addition to educated guesses about where technology will lead, psychologists may anticipate where governance is headed. Licensing authorities are, of course, expected to protect the public from dangerous or inadequately trained care providers, but the fact that practitioners are increasingly treating clients at considerable distance, usually "below the radar" of authorities, raises new issues. Characteristic of telehealth, the "collapse" of distance, requires revision of licensure to both help control and ease cross-jurisdictional practice (American Telemedicine Association, 2011). Aside from the Nurse Licensure Compact (Puskin & Tipping, 2010), adopted by only 24 U. S. states, there is no inter-state portability arrangement. The closest approximation for psychology is that advanced by the Association of State and Provincial Psychology Boards (ASPPB), which offers licensure mobility solutions for psychologists. Out of these efforts, is the likely emergence of a national license for the several health professions as seen in Australia, perhaps limited to inter-state electronic services or permitting a “consulting exception.”

National (or international) licensure could coordinate standards, yet retain a sovereign state's ability to monitor practice, and dispense discipline to clinicians engaged in egregious behavior. Protection of the public may also call for requiring clinicians to demonstrate acquisition and maintenance of competence with at least some psychotechnologies and their optimal methods.

Today, every cell phone can be a medical device, but the U. S. Food and Drug Administration (FDA) is ill-equipped to deal with communications issues and the Federal Communications Commission is a relative stranger to health care. Hence the proposal by the Institute of Medicine (IOM) to create a new agency to regulate "mobile health" is also likely to bear fruit as technology increasingly permeates the healthcare landscape (Committee on Patient Safety and Health Information Technology, 2012). Any such new agency may face resistance
from the incumbents (See, e.g., Food and Drug Administration, 2011). Psychology and other professions will have to appropriately influence the precise mission, powers and composition of such an agency in the interests of itself and its consumers.

Privacy will remain a challenging problem, as technology transfers information and resulting power to consumers through social media and mobile devices. Although HIPAA, HITECH (Health Information Technology for Economic and Clinical Health Act, 2009) and analogous state statutes give government ample authority to police providers’ privacy practices, the plaintiffs’ bar will become increasingly active in seeking money damages in tort. Providers will need to stay abreast of technological developments improving the privacy, security and accuracy of their communications, and evaluate ethical and practice guidelines for informed consent and minimizing the extra patient risk inherent in treatment at a distance. The average clinician working at a distance will also need to better understand and manage access to local resources and emergency backup teams. As the psychotechnologies change the standard of care (such as by requiring certain distance care capabilities) and as reports of untoward events appear, malpractice carriers will develop new approaches, perhaps offering discounts on premiums for clinicians who have received special training in use of the psychotechnologies.

Third party reimbursement for telepsychology has been inhibited, perhaps by tight budgets, fear of abuse, or ignorance, but has been available from Medicare and Medicaid in rural areas. More general relaxation of restrictions on reimbursement will probably occur first in those federal programs, where data suggest that telepsychology is cost-effective care for management of chronic problems. Reimbursement for psychological interventions will also increasingly involve disease management. Even without direct third party action, Accountable Care Organizations (ACOs) may choose to deploy psychologists for the management of costly
physical conditions. Because of their expertise in designing and implementing assessment and interventions for future health maintenance, psychologists may have much to offer chronic care and primary care practices through "health homes" designed to help contain healthcare costs. Psychologists will be in good position to benefit from expansion in technology-related research to meet the increasing demand for more accountability and responsiveness to outcome measures.

Patients themselves are already willing to bear the cost of distance care online. This is consistent with the growing emphasis on patient-centered care, and will circumvent obstacles that the public increasingly sees as intolerable. However, clients have been turning to—and directly paying for—life coaches and other professionals who practice online, many of whom are inadequately trained for telemental health care and are unlicensed to practice in areas they service publically without regulation. What impact this trend will have on psychologists' practice is unclear, but the issue demands discussion.

Preparing Practice and Policy for the Future

As the psychotechnologies proliferate, so will increasingly complex issues. How will psychologists resist the inherent temptations of increased access, greater convenience, decreased costs, lack of an evidence base and lack of training to combat the lure of an ever-increasing array of gadgets available for service delivery? How do different technologies change interactions among consumers or with their psychologists about health, mental health and life-skills? Which competencies will the psychologist of the 21st Century need to possess for email, instant- or text-messaging, chat room groups, video, virtual worlds or virtual reality (Maheu & McMenamin, in press)? How much practitioner training and/or supervision is sufficient before embarking on professional services with any single new technology? Evidence of practitioner errors in judgment in their online behaviors is beginning to mount, such as outright profanity, boundary
infractions and other questionable behaviors (Cretien et al., 2011). Solving such issues by trial-and-error is sometimes warranted, but often unacceptably risky to clients. Such errors may create legal and ethical vulnerabilities for the clinician. Evidence-based data leading to professionally promulgated practice guidelines, themselves subject to continuing revision because of accelerating technological evolution, will soon assume paramount importance (Maheu & McMenamin, in press.).

The psychologist of the near future will be called upon to render services based on relatively minimal and increasingly inadequate scientific knowledge, training or legal guidance and protection. Psychologists (e.g., Belar, 1998; Glueckauf et al., 2003; Glueckauf & Lustria, 2008, Maheu et al., 2004; Maheu, Whitten, & Allen, 2001) have discussed the need for psychologist training in the delivery of telehealth at the graduate and postgraduate levels, in self-assessment and in continuing education regarding the complexities of intake, record-keeping, direct care, referrals, and emergencies in an effective and legally and ethically appropriate manner as technology continues to expand in all directions. Graduate psychology training should take a proactive approach to promoting psychology's inclusion in the general health care system (Reid-Arndt, Stucky, Cheak-Zamora, DeLeon, & Frank, 2010) as well as other areas of business, commerce and the arts.

Administrators should prepare themselves to be able to organize their information systems, task assignments, lines of responsibility, contracting procedures, financial arrangements and monitoring activities to optimize safety, cost-efficiency, clinician competence, user satisfaction and other aspects of telemental health within their domains. In particular they should learn how to use cloud computing resources safely and how to instill safe use of ICT among clients as well as clinicians for the sake both of clinical outcome and risk management.
Professional associations should provide specific guidelines for using psychotechnologies as they emerge, particularized for various clinical populations, conditions and circumstances; identify and set standards for required competencies not only in clinical training programs, but also in education, science, and policy. This oversight is also needed to assist regulatory bodies, third party payers and insurers to devise approaches, rules and procedures that reduce risk to patients yet support psychologists to advance the profession in systematic, safe and ethical manners consistent with efficient work flows and successful outcomes. Clear evidence-based guidelines, regulations and administrative norms for psychologists will enable collaboration with ITC developers to proceed with greater confidence in creating new products and services that are most likely to be effective, accepted, reimbursable and profitable.

What will be the role of future psychologists? Psychologists currently are at a crossroads. Their future depends on the speed with which they organize to make themselves more relevant in the current technological marketplace. To date, their involvement with ICT lags that of other healthcare disciplines (Maheu et al., 2001; Maheu et al., 2004) as well as non-healthcare groups online. Each individual psychologist needs to decide whether, when and how to leverage technology. Similarly, each professional association and organization needs to decide whether to allocate needed resources to shepherd technology adoption or take a back seat to other disciplines.
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