ann. behav. med. (2009) 38:4–17
DOI 10.1007/s12160-009-9130-7

ORIGINAL ARTICLE

Defining Internet-Supported Therapeutic Interventions

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Published online: 29 September 2009

Abstract
Background The field of Internet-supported therapeutic interventions has suffered from a lack of clarity and consistency. The absence of professional leadership and of accepted governing approaches, terminology, professional standards, and methodologies has caused this field to be diffused and unstructured. Numerous terms have been used to label and describe the activities conducted over the Internet for mental and physical health purposes: web-based therapy, e-therapy, cybertherapy, eHealth, e-Interventions, computer-mediated interventions, and online therapy (or counseling), among others.
Methods Following a comprehensive review, we conceptualized Internet-supported interventions, using four categories based on prime practice approaches: web-based interventions, online counseling and therapy, Internet-operated therapeutic software, and other online activities (e.g., as supplements to face-to-face therapy). We provide a working definition and detailed description of each category, accompanied by numerous examples.
Conclusions These categories may now serve as guiding definitions and related terminologies for further research and development in this emerging field.

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Introduction

The emergence of the Internet and its presence in society—including homes, workplaces, schools, and government—beginning in the mid-1990s introduced great opportunities for the helping professions. More than ever before, professionals in these areas can offer their helping services from a distance with much flexibility in terms of time and methods, and even provide treatment to anonymous people in need, as already documented a decade ago [1–4]. Although the provision of therapeutic interventions through the Internet has encountered considerable amount of opposition, especially on the grounds of ethical-related issues, this means of seeking and obtaining help has flourished. It seems that several factors have been responsible for the growth: increasing acceptability of the Internet as a legitimate social tool; continuous improvement of computer hardware and software (especially in relation to ease of use, privacy protection, and online communication capabilities); development of specific ethical guidelines by various professional organizations; growing research; and establishment of online training opportunities for professionals.

Despite its expansion, the field of Internet-supported interventions has suffered from a lack of clarity and consistency. Scientists and professionals have operated mostly independently with little intercommunication or accepted standards, which has brought about the use of numerous rival terms and applications alike—all of this typical of a pioneering area. Moreover, because of the lack of professional leadership and of accepted governing

approaches, terminology, professional standards, and methodologies, the area has been described as being inconsistent, diffuse, incoherent, and sometimes even perplexing.

Numerous terms have been applied to label/describe the activities conducted via the Internet for physical and mental health purposes. Several terms that have commonly been used include web-based therapy, e-therapy, cybertherapy, eHealth, e-Interventions, computer-mediated interventions, online therapy (or counseling), and the like. A number of publications have addressed this issue in an attempt to reduce the ambiguity and to promote clarity and consistency of terms and definitions [5–8]. It seems, however, that these efforts might not have been successful, perhaps because they referred to specific or limited types of Internet-supported interventions or aspects of thereof. Moreover, it seems that definitions, such as those cited above, focused primarily on *web-based* interventions while overlooking other modes of providing interventions via the Internet. At the same time, publications that focused on therapist–patient online communication considered this as a sole (or primary) Internet-supported intervention [9–11], overlooking other approaches. Yet, technologically based treatments that utilize cyberspace by means of sophisticated software considered this approach as prime provision of computer and computer-mediated intervention [12]. In addition, it seems that comprehensive listings, descriptions, and explanations of possible Internet-supported interventions vehicles [13–15] has not brought us closer to conceptualizing and utilizing this field sufficiently.

Part of the difficulty in unifying the terminology is due to the heterogeneity of web-based programs and online communication capabilities—in terms of what they offer, how they operate, and therefore, how dynamic they are. This same fact also makes it difficult to identify what the essential "defining" and "active" components of the programs and tools are. There is a very basic need to label, define, and categorize these diverse Internet-based health and psychological interventions consistently in order to advance the field in a purposeful, coherent, and understandable way. The purpose of the current article is to provide basic definitions, explanations, and clarifications of the professional conduct in the area of Internet interventions in order to offer both an explanatory tool and to establish some communication standards among professionals.

After conducting a comprehensive review of the field, our conceptualization that follows classifies Internet-supported interventions into four categories, based on their prime approaches: (1) Web-based interventions; (2) online counseling and therapy; (3) Internet-operated therapeutic software; and (4) other online activities. Naturally, these categories are not equal in terms of usage, research, feasibility, utility, or cost. However, as portrayed in Table 1, they separate the applications available through Internet-supported interventions into logical classes that reflect different intervention bases, on the one hand, and suit different patient needs, on the other.

Web-Based Interventions

In this category, we propose the term *web-based interventions* as the most inclusive relative to a number of other terms commonly used in the field. Terms that incorporate "therapy" and "treatment" are too restrictive, primarily as they do not include prevention, promotion, and education interventions. We provide both a definition of web-based interventions and a preliminary definition/categorization model.

A web-based intervention is:

> *a primarily self-guided intervention program that is executed by means of a prescriptive online program operated through a website and used by consumers seeking health- and mental-health related assistance. The intervention program itself attempts to create positive change and or improve/enhance knowledge, awareness, and understanding via the provision of sound health-related material and use of interactive web-based components.*

Based on this definition, three broad *web-based intervention subtypes* are identified: (1) *web-based education interventions*; (2) *self-guided web-based therapeutic interventions*; and (3) *human-supported web-based therapeutic interventions*. We also specify *four major web-based components* to encapsulate the essential ingredients that best represent an archetypal web-based intervention.

These key components form the basis of the definition/categorization model and are: (a) program content; (b) multimedia use/choices; (c) provision of interactive online activities; and (d) provision of guidance and supportive feedback. It is important to note that these four web-based components are not mutually exclusive. They are interdependent and interconnected and are discussed in more detail below.

Program Content

Program content is the backbone of a web-based intervention and considered to be the most basic and necessary component. Type of program content relates to the nature of the information disseminated within the program. In most cases, patients are required to read the content and navigate from webpage to webpage. However, variability exists in what type of "content" the web-based intervention program provides. Broadly speaking, there are two main types: content intended to *educate* and content designed to create

Table 1 Internet-supported interventions categorization/definition model

Internet-supported interventions	Web-based internet interventions			Online counseling	Internet-operated therapeutic software	Other online activities
Subtypes	Web-based education interventions	Self-help web-based therapeutic interventions	Human-supported web-based therapeutic interventions	E-mail, chat, or video-based	Robotic simulation, rule-based expert systems, gaming, and 3D virtual environments	Blogs, podcasts, online support groups, and online assessments
Key components						
1. Program content	Nonactive educational content	Structured behavior change content	Structured behavior change content	Absent to minimal, yet flexible counselor-determined content	Absent to structured program content	Absent to minimal program content
	Largely nonprescriptive, standardized, generic educative content	Treatment/prevention/ promotion content attempting to create positive cognitive/ behavioral change	Treatment/prevention/ promotion content attempting to create positive cognitive/ behavioral change	Free-flowing and fluid treatment/prevention/ promotion communications	No prescribed actual Internet-based content program (robotic simulation, 3D virtual environments). Structured treatment content (expert systems, virtual reality systems, therapeutic games)	No prescribed actual internet-based content program, yet free-flowing communications
2. Multimedia use/choices	Static–partially dynamic: one or two formats used			Moderate–highly dynamic: three or more formats used		
3. Interactive Online Activities	Static–partially dynamic: zero to two activities offered			Moderate–highly dynamic: three or more activities offered		
4. Feedback support provision	None–partially automated or human support	None–partially automated support	Partial human support	Minimal human support	None–partially automated support	None–partially automated or human support
	No feedback or receives partial automated or human support	No tailored feedback or receives reminder, corrective, confirmatory, and diagnostic automated feedback	Minimal provision of human support and largely consisting of reminders and program usage support (usually involving less direct contact). It can include bulletin board postings and chat room moderation	Limited/brief or ad hoc provision of asynchronous or synchronous textual support	No tailored feedback or receives reminder, corrective, confirmatory, and diagnostic automated feedback	No tailored feedback or receives reminder, corrective, confirmatory, and diagnostic automated feedback or none to minimal provision of human support
	Moderate–high support	Moderate–high automated support	Moderate–high human support	Moderate–high human support	Moderate–high automated support	Moderate–high automated or human support
	Moderate to high automated or human support	Receives moderate to highly tailored automated feedback (i.e., highly specific, prescriptive, and elaborative feedback)	Regular and/or substantive amounts of human support/feedback and/or more direct support (e.g., face to face) usually over an extended period	Regular and/or substantive amounts of support (e-mail, chat or video) usually over an extended period	Receives moderate to highly tailored automated feedback (i.e., highly specific, prescriptive, and elaborative feedback)	Receives moderate to highly tailored automated feedback or regular and/or substantive amounts of human support/ feedback

a *therapeutic change* (either cognitively and/or behaviorally) and are discussed in more detail below.

Multimedia Choices

The second component is the use of multimedia. Web-based interventions largely use text to disseminate program content; however, other multimedia options include pictures/graphics, animations, audio, and video. Considerable variability exists in terms of how many (and in what combination) individual web-based interventions use different multimedia to convey program content. For example, *the Panic Center* (http://www.paniccenter.net; [16]) is a highly text-based cognitive behavior therapy (CBT) web-based program for panic disorder, whereas *Sleep Healthy Using the Internet* (SHUT-i; http://www.shuti.net; [17]), a CBT web-based program for insomnia, provides text, pictorial, animation, and audio formats. The value and benefit of incorporating a variety of multimedia formats within a web-based intervention are still new areas of research investigation. Ritterband et al. [18] investigated the additional benefit of multimedia (in this case audio, graphics, and interactivity via navigational clicking) to their existing pediatric encopresis web program (http://www.ucanpooptoo.com) and found that the presence of these additional components was positive and preferred by participants. Overall, it is generally assumed that including a greater variety of multimedia formats is advantageous and most probably makes the web-based intervention more engaging and dynamic [18–20].

Interactive Online Activities

The third component relates to whether the web-based intervention offers a patient the opportunity to participate within the program in a more interactive way (e.g., use self-assessment and self-monitoring tools) such as in the interactive web-based program *Weight Loss Maintenance* [21] or web-based CBT for social phobia [22, 23]. Evidence indicating the relative value of including interactive online activities is also a new area of research; however, it is widely considered that, by offering multiple interactive online activities, patient interest and engagement with the program increases [18, 20, 21]. It is likely that interactive online activities enhance patients understanding of program content in a way that makes it more personalized and potentially facilitates a greater sense of ownership and connectedness to the program itself [19, 21].

Guidance and Supportive Feedback

Guidance and supportive patient feedback is the fourth component in our definition of web-based interventions and it relates to a mechanism whereby patients can obtain "external" information about themselves and their progress. Although all web-based interventions require patients to act by themselves to some extent, the type and degree of feedback offered can vary considerably; from *none* (no guidance or supportive feedback mechanism provided) to *high* (provision of sufficient amounts of tailored feedback). The guidance and feedback provided is generated by either automated programming (based on a series of algorithmic programming sequences; see *Down Your Drink*: http://www.downyourdrink.org.uk; [24, 25]) or by a human [26].

Web-Based Interventions Subtypes and Components

The three web-based intervention subtypes will now be discussed in relation to the above four web-based components.

Web-Based Education Interventions

Web-based education interventions are programs essentially designed so that health and mental health consumers are able to access information about a particular problem area (e.g., diagnosis of a disorder/condition, the meaning of specific symptoms, its causes, effects, and how to treat). By nature, educative content is relatively therapeutically "inactive," as it aims to improve/enhance knowledge, awareness, and understanding of matters of health- and mental health-related significance. Although some web-based education interventions may also include content containing generic "active" behavior change techniques (e.g., how to apply a breathing control technique), the provision of this type of information is not comprehensive and does not form a highly structured treatment/prevention program. Web-based education interventions that also provide some minimal generic therapeutic information are considered as primarily educative, yet still relatively therapeutically "inactive." A recent meta-analytic study demonstrated that some web-based education interventions achieved medium–high mean effect sizes [27].

Web-based education interventions vary the use and number of multimedia formats and interactive online activities provided, yet many are relatively *static* websites (i.e., use one to two multimedia formats and very few, if any, online interactive activities). *PTSD Information Online* (http://www.ptsd-online.org) is an example of a relatively *static* web-based education intervention. It is a four-module psychoeducation program for posttraumatic stress disorder, which contains referral links, yet no online activities or supportive feedback.

Although most web-based education interventions do not provide a central supportive feedback mechanism, the provision of *partial* support (either human or automated) is not uncommon: some programs may offer simple self-assessment quizzes whereby patients receive generic auto-

mated diagnostic feedback. Alternatively, consumers may be able to access a moderated online forum or chat room as a means to receive feedback. The use of "informed supporters" (i.e., peer supports) to provide more tailored feedback is now also emerging. For example, this approach is used in one version of the *Bipolar Education Program* (http://www.blackdoginstitute.org.au/public/bipolardisorder/onlinebipolareducationstudy.cfm; [28]), a web-based education intervention for people with newly diagnosed bipolar disorder.

Self-Guided Web-Based Therapeutic Interventions

Both self-guided and human-supported web-based therapeutic interventions are deliberately designed to create positive cognitive, behavioral, and emotional change. The content is formulated in a comprehensive manner and presented in a modularized and highly structured format. The content is informed by theory (e.g., CBT) and frequently modeled on effective face-to-face treatment/prevention programs, but disseminated via the Internet [29]. Behavioral change content is regarded as "active" (e.g., provides patients with specific detail/instruction on how to challenge their thoughts).

Like web-based education interventions, self-guided programs also vary the use and number of multimedia formats and interactive online activities provided, yet many are *moderately to highly dynamic* (i.e., use several multimedia formats and multiple online activities). Additionally, many self-guided therapeutic interventions provide some degree of automated feedback support, displayed largely via text or in graphical form through pop-up boxes or automated e-mails/SMS. The sophistication of the software and the algorithms developed determines the degree to which feedback can be specifically tailored. Automated tailoring ranges from *none* (i.e., no tailored feedback) to *partial* (i.e., fairly generic/simple reminder, corrective, confirmatory, or diagnostic feedback) to *high* (i.e., reminder, confirmatory, corrective, diagnostic, explanatory, prescriptive, and elaborative feedback responses, including specific recommendations for change) [30].

For example, partially tailored responses, such as confirmatory feedback, involve informing the patient whether they answered a question correctly and diagnostic feedback provides patients with information as to where their score fell in relation to certain norms after completing a self-assessment questionnaire [31]. Highly tailored feedback can include the above responses, but in addition, provides feedback more akin to human-like feedback responses. With automated feedback, the frequency and quantity is dependent upon predetermined algorithms (i.e., each time the patient responds to a certain question/task) and the timing of automated feedback is usually immediate (see eCouch: http://www.ecouch.anu.edu.au).

Recent meta-analytic studies [27, 32] support the effectiveness of self-guided therapeutic interventions. Examples of *highly dynamic* self-guided web-based therapeutic interventions are *MoodGYM* (http://www.moodgym.anu.edu.au; [33]) and *Internet Beating the Blues* (http://www.ultrasis.com/products/product.jsp?product_id=1; based on [34]). Both programs (developed for consumers with anxiety and/or depressive symptoms) use a variety of multimedia formats to convey treatment information, contain numerous online interactive activities, and provide a high level of automated supportive feedback.

Human-Supported Therapeutic Web-Based Interventions

Like self-guided interventions, human-supported therapeutic interventions also provide behavior change content designed to create positive change. Furthermore, human-supported programs vary the use and number of multimedia formats and interactive online activities provided, yet many are also *moderately to highly dynamic* (i.e., use several multimedia formats and multiple online activities).

Human-supported web-based therapeutic interventions incorporate a human (usually a health/mental health professional or, in some cases, peer supporters) to provide support, guidance, and feedback. Although some human-supported therapeutic interventions may also contain automated features, they are still primarily a human-supported intervention. Human support provided by peers is generally viewed as an adjunct to the intervention (e.g., consumer participation via communication through online support groups or by posting/reading bulletins). Support provided by health/mental health professionals is considered as a more central component of the web-based program and is usually offered on a one-to-one basis (e.g., via e-mail, instant messaging sessions, webcam). In comparison to automated feedback (where tailoring varies considerably), human feedback is regarded as relatively tailored. However, the major sources of variability include amount/quantity, frequency, and immediacy of the response [19, 35].

The total amount of feedback provided to a patient can vary from a couple of minutes (e.g., [36]) to several hours of human support (e.g., [26]). Related to this dimension is the frequency of feedback, which can range from once or several times a day, to a "once off" over the course of the treatment/prevention period. Immediacy of response is dependent upon which communication modality is being employed. E-mails and forum postings generally provide delayed feedback, whereas chat room/instant messaging sessions, Skype/telephone calls, webcam, and face-to-face meetings all provide the patients with immediate feedback; yet these different communication modalities also vary in the degree of direct human contact.

However, the total amount of supportive human guidance and feedback provided (measured in total amount of human support time provided in minutes) is the variable most frequently discussed [35, 37]. For example, the correlational analysis by Palmqvist et al. [35] demonstrated that a positive association between the amount of therapist time and between group effect sizes existed, and Klein et al. [37] found that the frequency of therapist e-mail contact did not affect treatment outcome using *Panic Online* (a human-supported CBT web-based therapeutic intervention for panic disorder).

Human feedback, therefore, is broadly classified as *partial* (limited amount of contact time and usually consists of answering generic/simple patient questions and providing reminders; yet also included are moderating and posting ad hoc responses on bulletin boards) to *high* (substantive amount of contact time and largely consists of providing supportive therapeutic support and feedback) during the intervention period. An example of a *highly dynamic* human-supported web-based therapeutic intervention is *PTSD Online* (http://www.swinburne.edu.au/lss/swinpsyche/etherapy/programs.html; [38]). *PTSD Online* is a ten-module CBT program for people with a DSM-IV diagnosis of posttraumatic stress disorder. It contains a variety of multimedia formats to convey program content, offers activities and a high level of therapist support. Recent meta-analyses [27, 32] indicate that human-supported programs obtained larger effect sizes than self-guided programs.

In contrast to human-supported interventions, self-guided therapeutic interventions, like web-based education interventions, are often open websites that provide an invaluable public health function due to their broad reach [14, 39, 40]. Self-guided therapeutic interventions, however, usually require screening and registration (and, in some cases, payment) to gain access. Most human-supported therapeutic interventions have been designed specifically to treat a specific health condition/disorder and are usually controlled, password-protected websites that require registration and assessment (and, in some cases, payment) to gain entry. Although human-supported interventions have a smaller reach than self-guided programs, they provide individualized clinical treatment, similar to traditional face-to-face services.

Overall, human-supported and self-guided web-based therapeutic interventions have their respective advantages and disadvantages (i.e., differing degrees of broad reach capability, anonymity, levels of treatment efficacy, and cost) and functions (i.e., individual clinical treatment vs. public health prevention programs), yet both serve important roles (as do web-based education interventions). In the future, the integration of all three types of web-based interventions in a stepped care approach will be of inestimable benefit in increasing access to physical and mental health treatment and significantly reducing health care costs [39].

Online Counseling and Therapy

Various technical options exist for interpersonal communication through the Internet. These possibilities include four basic communication modalities: individual or group contact, using either synchronous or asynchronous communication mode. These four modalities generally determine the ways people interact with one another using text and, accordingly, these ways are adopted for professional-consumer communication online [4]. The exploitation of online communication for therapeutic purposes began in the mid-1990s, when computer software and hardware, Internet communication technology, and advanced web design made distant interaction efficient and relatively convenient [2, 41]. Although resistance to online counseling was strong, especially at the beginning, its subsequently pervasive use and success showed that opposition was based on prejudice and myth rather than on reality [42]. Nontextual communication means—use of audio and webcam—were included later, when these technologies became popular and inexpensive. Online therapy allows clients to contact a counselor from any distance and at any time, at their convenience, and from their home (or other locations); in this way, the traditional office-bound, always prescheduled, face-to-face counselor–client appointment has become irrelevant, while writing has become the main vehicle of communication (rather than talking).

Clients may locate an online counselor by a simple Internet search or a hypertextual referral (web link) or through a recommendation. There are also dedicated websites ("virtual clinics") that list online therapists with their profiles, including professional background and fees, and, therefore, clients may search for and compare numerous possible therapists (e.g., http://www.liveperson.com/experts/professional-counseling). Many online therapists maintain their own websites where they post information regarding their services and different areas of expertise. It should be mentioned, however, that many of these sites do not follow professional guidelines, and they may provide only partial and mediocre information [43–45]. Online counseling may be related, in many instances, to online assessment, as evaluation of various clients' characteristics—such as personality factors, attitudes, abilities, and interests—is an important part of the therapeutic process (see the "Other Online Activities" section).

Procedures and Technicalities of Online Counseling and Therapy

The use of Internet-based communication for therapeutic purposes is no different from any other online interpersonal interaction. That is, the technical use of e-mail, instant messaging (e.g., MSN Live Messenger, ICQ), or chat in

online therapy is very similar to their use in other online-generated contacts. However, because these communication means may be exploited for professional counseling, their use should be bound by certain guidelines and rules in order to prevent abuse or deviation from what should be expected from a constructive professional relationship [46]. Guidelines can be modified and adjusted to the particular client and therapist's circumstances and expectations, communication modality, and type of problem. The guidelines refer to several basic areas, not least those pertaining to fees and payment procedures, and include scheduling, length and quantity of correspondence, technological details, and emergency contacts.

As online counseling is usually conducted in textual relationships, several limitations and difficulties make certain adjustments necessary to enable good understanding between the parties communicating. In face-to-face contact, people might find it unnecessary to be prolix, as they communicate through nonverbal communication cues in parallel with or to complement their verbal expressions. Using textual communication solely, however, necessitates the use of more words and verbal expressions to clarify messages and have them understood accurately. One of the aids available online for this purpose is emoticons, which enrich messages by caricaturing a missing intonation or gesture [47, 48].

As online counseling is delivered in a unique way, it is of great importance that the therapist makes sure a client fits this type of counseling in terms of technical and writing skills, lack of extreme pathology, and nature of the problem area [49, 50]. Various therapeutic approaches may be applied online, among them dynamic, cognitive behavioral, and client-centered [51], and each in a way that uniquely exploits online textual, virtual, and distance communication to best serve its ends. Furthermore, as mentioned earlier, the Internet can be used either for individual therapy or for group therapy. It should be stressed, however, that invisibility may cause group therapy to be more complicated and limited than individual counseling [52], though the feasibility and special contribution of the former have been documented [53, 54]. It seems, though, that the online group format is more applicable to providing emotional support than therapy [55].

Professional Issues in Online Counseling

The lack of a "time and place" for counseling, in addition to invisibility and the total reliance on a textual relationship, makes online counseling very different from traditional counselor–client contact. First, there is the lack of nonverbal communication cues, including body language and voice qualities, which as some have argued demotes counseling communication to be inadequate. In order to overcome this significant limitation and to maintain accurate and more complete understanding, the parties communicating have to take several steps, such as extended wording, various stylistic procedures for emphasizing text, and using emoticons. In addition, clients should be well aware of the fact that messages may be misunderstood, hence the need for more probing and clarifications than in face-to-face sessions.

Second, expression of feelings—though possible and effective in online communications [56]—is not as automatic and autonomous as in face-to-face relationships. This means that therapists should take special action, especially employing words and expressions that might not be used in face-to-face contact, to communicate empathy, care, concern, and warmth toward their clients. Similarly, clients have to be aware that their feelings are not as obvious and vivid as they would be in a face-to-face relationship. Therefore, clients have to communicate their emotions in more explicit ways, sometimes even describing what could easily have been visible (e.g., crying, sweating, laughing). Third, because of the distance nature of online therapy, therapists should be concerned with making emergency provisions should they identify a dangerous deteriorated state, such as a client's being suicidal, being high on drugs, or having a severe physical condition. Unlike face-to-face situations, these cases necessitate identifying and locating clients and appealing to use external help from a distance. Fourth, because of the above-mentioned subjects, as well as others, the practice of online therapy necessitates that counselors receive specialized training covering all the unique characteristics of online clinical work and that professionals be equipped with special skills to enable the provision of quality service [57–59].

Research on Online Therapy

Online therapy has attracted quite a few studies, which have made use of both qualitative and quantitative methodologies and focused on process or outcome issues. In terms of process and contrary to common myths [42], most studies showed that close, empathic, warm, and allied therapeutic relationships can be created and maintained online through various types of technologies. Barak and Bloch [60] and Reynolds, Stiles, and Grohol [61] showed, for instance, that online counseling sessions have a substantial impact on clients. Lewis, Coursol, and Wahl [62] found that both clients and counselors engaging in online therapy go through many experiences that are similar to face-to-face counseling (besides some unique experiences, too). Cook and Doyle [63] and King, Bambling, Reid, and Thomas [64] demonstrated that therapeutic alliance is similar, or even higher, in offline and online counseling.

Quantitative-outcome research on online therapy has been relatively sparse, for the reasons formerly mentioned;

hence, the literature offers mainly detailed case studies (e.g., [65–67]). Despite the methodological difficulties, published quantitative studies provide much support to the claimed effectiveness of online therapy in various distress areas, such as anxiety [68, 69], loneliness [70], and smoking cessation [71]. Online communication has also been shown to be very beneficial in patients' aftercare [72–74].

Ethical and Legal Issues in Online Therapy

Online therapy is characterized by specific issues related to its very nature that make its use somewhat problematic and complex. There are a number of concerns: the ability of clients (and therapists) to conceal their true identity or even to impersonate; the problem of providing emergency assistance if needed; the heavy reliance on technology; the digital divide; the difficulty in communicating accurate messages and feelings; cross-cultural misunderstandings, which relate to the borderless nature of the Internet; and difficulties with billing and fee collection. In addition, unique legal questions related to online therapy present themselves, too, such as licensing (compulsory in some countries), adherence to professional standards, professional negligence, privacy (that necessitates use of encrypted communication), and more.

For these reasons (and some others), professional associations such as the International Society for Mental Health Online, Health On the Net Foundation, and British Association for Counselling and Psychotherapy have developed specific ethical guidelines. These set down basic rules for the training of online therapists, as well as for the provision of professionally accepted therapy administered online.

Internet-Operated Therapeutic Software

The third group of Internet interventions refers to therapeutic software that uses advanced computer capabilities such as artificial intelligence principles for (a) robotic simulation of therapists providing dialog-based therapy with patients, (b) rule-based expert systems, and (c) gaming and three-dimensional (3D) virtual environments.

The earliest example of robotic software was "Eliza" [75], which was designed to support a nondirective therapy conversation with a user and hailed as one of the first programs to pass the "Turing Test" (that is, users are unable to tell the difference from talking with a person). In recent years, Eliza has been extended and transformed to operate through the Internet; see for example http://www.manifestation.com/neurotoys/eliza.php3. Typically, such chatterbot or chatbot programs are programmed to learn simple vocabulary, pattern matching, and conversation rules and are dependent on text in and text out communication. More recent developments, however, such as the Artificial Linguistic Computer Entity program (A.L.I.C.E.; see http://www.alicebot.org) have demonstrated that it is possible to train a program to recognize a particular voice and to produce spoken responses rather than text [76]. Progress has also been made in developing computer applications for detecting, labeling, and reacting to the emotional and social needs of users and for emulating empathy to create a perception of caring (e.g., [77, 78]). Such applications have been shown to be associated with improved compliance with treatment [79].

A second subgroup of Internet-operated therapeutic software relates to expert systems which include rule-based systems for assessment, treatment selection, and progress monitoring. While such systems have been slow to penetrate psychotherapy, many are available in behavioral health. For example, the Computerized Exercise Expert System creates tailored exercise plans for older adults by first gathering information on the person's health status, clinical factors, and exercise determinants that characterize specific barriers or incentives to exercise and then developing individualized exercise prescriptions [80]. Another example of an expert system, Drinker's Check-Up, consists of integrated assessment, feedback, and decision-making modules that are sensitive to the individual's level of readiness for change, ranging from at-risk drinkers to those with alcohol dependence [81]. Such Internet-operated systems hold promise in terms of promoting psychological and behavioral change, although quantitative outcome data are still relatively scarce [76].

New gaming programs and 3D virtual environments constitute a third subgroup of Internet-operated therapeutic software. The popular *Second Life* (http:/secondlife.com), for example, includes over 15 million registered "residents," (as of September 2008) who are represented by "avatars" that participate in public events (games, conferences, parties), discussion forums, blogs, news resources, shopping, information exchange, and more. For individuals with health and mental health issues, *Second Life* provides opportunities to share similar concerns and interests, gain information, have their questions answered, acquire new skills through a large virtual community, and even receive therapy [82]. On a smaller scale, therapeutic computer games are also used effectively as health interventions particularly for children and adolescents [83]. For example, *Personal Investigator* is a 3D computer game based on Solution Focused Therapy for adolescents with anxiety, depression, behavior problems, or social skills difficulties [84]. Until recently, increases in the cost, time, and technical expertise required to develop therapeutic computer games prevented most health practitioners from engaging with this form of Internet-operated therapeutic software. However, an authoring tool, *PlayWrite*, has recently been developed to enable clinicians to develop their own therapeutic games utilizing different theoretical

models and targeting a range of disorders and conditions [85]. Existing popular computer games may also hold promise as therapeutic aids. British researchers have found that participants who played the computer game "Tetris" shortly after viewing traumatic images of injury reported a significant reduction in the frequency of distressing flashbacks, leading the researchers to suggest that the use of the game may hold promise as novel treatment approach to preventing PTSD [86]. Taken together, this suggests that the potential of gaming software to facilitate healthcare is considerable, but more research is needed to demonstrate efficacy.

In contrast, the efficacy of virtual reality clinical applications is amply demonstrated. Successfully used over the last 10 years for the treatment of anxiety disorders, specific phobias, eating disorders and obesity, male sexual dysfunction, and drug use and pain management [76, 87], virtual reality programs are particularly suitable for exposure therapy. A recent meta-analysis of 21 studies across six conditions (PTSD, social phobia, arachnophobia, acrophobia, panic disorder with agoraphobia, and aviophobia) found statistically large weighted effect sizes (Cohen's d=0.87 to 1.79) in terms of reduction of symptoms [88]. Despite strong evidence of efficacy, however, diffusion of the approach has been limited due to high costs and lack of technical expertise among clinicians. Customarily built to run on stand-alone computers, applications in recent years have been specifically designed to be delivered via the Internet, allowing therapists to share the online virtual space with their patients and thereby accompany them through threatening situations, modifying the interaction as indicated by therapeutic need. An example is *NeuroVR* (http://www.neurovr.org), a free open-source virtual reality platform for nonexpert users, which allows customization of the virtual environment by choice of stimuli or stressors from a database and the use of patients' personal photos or movies to maximize the potential of exposure efficacy [89].

The therapeutic potential of Internet-operated therapeutic software is substantial; however, there are also risks and limitations which must be taken into consideration. For example, excessive use of 3D virtual worlds may create an over-reliance on cyberspace-based interactions at the expense of real face-to-face relationships, and the advantage of anonymity afforded by most Internet-operated applications can also allow potential safety breaches. Empirical data providing guidance as to best practice and efficacy must be a priority.

Other Online Activities

The fourth category of Internet interventions consists of online activities such as the publication of personal blogs, participation in support groups via chat, audio, or webcam communication channels, the use of online assessments and accessing health-related information via information sites, wikis, and podcasts. These activities may be used as stand-alone functions by individuals or prescribed by therapists as supplements to the main treatment modality, whether a traditional face-to-face intervention or another online intervention.

Personal blogs and twitters offer individuals the opportunity to publish their thoughts and experiences as an online journal and receive responses from others. They require minimal technical skills, are accessible at any time of the day or night, and are popular with over 70 million blogs existing worldwide. Every day, approximately 120,000 new blogs are created and 1.5 million "posts" made to existing blogs [90], a significant proportion of which are medical/health-related. Younger online users are especially familiar with their use with nearly 80% under 28 responding that they regularly visit blogs and 40% creating their own [91]. While there is plenty of evidence about the therapeutic benefits of paper-and-pencil writing about emotional experiences (e.g., [92, 93]), research into the use and evaluation of blogging in health care is in its infancy. Efforts to analyze blogs have been hampered until recently by limitations in existing text analysis programs which are compromised by the ambiguities and repetitions of the informal, natural speech used by bloggers (for recent developments, however, see [94]). On face value, blogs seem to have potential health benefits, especially as adjuncts to psychological and behavioral treatments, as they encourage users to engage in reflection, knowledge sharing, and debate [95, 96]. There are also suggestions that they also aid in the construction of meaning [97]. Similar to wikis and podcasts, blogs facilitate participation, community, conversation, and education. However, the advantages of utilizing these tools in health care must also be juxtaposed against their potential for poor quality and abuse, of which there have been several examples.

A second subtype of online activities relate to online support groups and networks. A range of online groups is available in either synchronous or asynchronous formats, including web-based discussion forums or bulletin boards, live chat rooms, e-mail lists. As distinct from therapy groups, their purpose is offer relief, empathy, and emotional support, and they tend to be more fluid with people joining or leaving at any time. Online support groups can be moderated (facilitated by a leader who answers questions and filters out inappropriate messages) or unmoderated, and they are popular with patients because of their ease of use, accessibility, privacy, and inclusion [98]. In 2005, 36 million people in the US have participated in an online support group for a medical condition or personal problem [99] with higher levels of online participation found in

groups associated with stigmatizing conditions such as alcoholism, AIDS, depression, and with conditions less responsive to medical care alone [100].

Newer social networking tools such as MySpace and FaceBook, which have high social acceptance, are also being used within health and indeed the most popular communities on MySpace are those relating to chronic illness [101]. Specific health networking tools modeled on the MySpace concept are also emerging, such as Health Exchange (http://hx.values-exchange.co.uk) which offers users the opportunity to review their health goals, monitor their health history, exchange stories with others, get advice from experts, get help from buddies, and blog their health.

There is much descriptive and anecdotal information about the benefits of electronic support and networking groups including social connection and comparison, access to information, encouragement, support, and advocacy. Rigorous research evidence, by comparison, is limited. A systematic review of 38 studies of virtual communities for disorders including depression, eating disorders, obesity, and diabetes, conducted with and without facilitation by a health professional, found that most were offered as part of complex interventions making it difficult to isolate the effect of the online support groups [102]. While some showed evidence of benefit, many failed to show any increased health effects. However, no evidence of harm was found. Barak, Boniel-Nissim, and Suler [55] suggest that the lack of demonstrated health and mental health benefits from online support groups is due to their fostering nonspecific components of personal empowerment, such as emotional relief and a sense of control, rather than specific health outcomes. Measurement difficulties caused by self-selection of participants, small sample sizes, and weaknesses in the research designs further limit our understanding of how and under what circumstances support groups are helpful. Nevertheless, studies of the patterns of discourse in these groups indicate that participants communicate in similar ways to face-to-face communication, e.g., high levels of mutual support, acceptance, and positive regard [103], and under the veil of anonymity, they tend to engage in high levels of self-disclosure, the "online disinhibition effect" [104, 105].

Online activities are also used by clinicians as adjuncts to standard treatments. For example, a health practitioner may ask patients to try out behavioral exercises online through chat rooms, dating sites, or immediate messaging software, to write a blog which the clinician monitors, or to access online information from information sites, wikis, and podcasts. Another common therapeutic use of the Internet is to request reports from patients, typically delivered by e-mail, about relevant conditions between face-to-face sessions. While the rationale for the use of such supplements appears obvious, their effectiveness is still not clear. For example, a meta-analytic study of the use of e-mail, forums, websites, online audio features, or chat as supplements to either a web-based intervention or online counseling revealed that they failed to make a significant contribution to therapy outcomes [27]. Some clinicians require patients to carry out homework tasks online such as completing a daily mood chart [106] or a journal of negative thoughts [107]. Condition-specific web-based monitoring programs are also increasingly used (for example, http://bed-wetting-solution.com).

Another common option is for clinicians to prescribe the use of online tests, such as psychological tests [108, 109]. Most of the well-known tests are available online, although not all have received accompanying research demonstrating their psychometric properties when Internet-delivered. Issues to be considered when administering, completing, scoring, and interpreting online assessments include variations in the layout of material on the webpage resulting from different web browsers, incomplete submissions, misrepresentation of self, repeat participation, low attentiveness or engagement, linguistic competence, and when people from different countries take part in the Internet assessment, culturally driven interpretations of material [110, 111]. The equivalence of offline and online measures should not be assumed, as there is evidence of variation in the distribution of scores and in psychometric properties such as factor loadings (e.g., [112]). How critical the differences are has yet to be determined, although there are important implications when clinical cut-off points are to be generated from the data.

In summary, there are many potential benefits for Internet-supported activities such as support and networking groups, virtual reality applications, online assessment and monitoring tools, e-mails, and blogs, either when used alone or professionally monitored by therapists in parallel with traditional face-to-face or Internet-delivered interventions. While initial findings provide support for the use of such applications, more studies are required to demonstrate efficacy with particular client groups and health conditions and to isolate the specific impacts of the different applications.

Summary and Conclusions

Internet-supported interventions have been increasing tremendously for the past decade and now offer a real alternative, or supplement, to traditional, face-to-face therapeutic interventions. It is important to note that therapeutic applications offered through the Internet in no way attempt to replace traditional therapy. Rather, Internet-supported interventions allow a broadening of the scope and diversity of opportunities for different methods of interventions, ways of approaching and reaching out to

different clientele, and possibilities of treating diverse problems and distress areas, perhaps with the aid of diffusion of innovations theory [113]. Traditional, face-to-face interventions will remain and probably develop, too, as obviously not all people and not all problems can be treated online. The ability to develop feasible and effective alternatives by exploiting the Internet for clinical work—alternatives that suit many people and distress areas—should be regarded as broadening and expanding the availability of professional help, especially for those who feel comfortable in the virtual environment.

Our definition of Internet-supported interventions is constructed by four categories that functionally classify various types and methods of interventions. It should be kept in mind, however, that this categorization is not based on an accepted empirical model or on a theoretical conceptualization but on a practical basis. These categories, however, seem to be mutually inclusive and provide an efficient means of classifying Internet-supported interventions. Actually, by using this category system in the broad context of complex therapeutic approaches, one can more easily understand the nature and characteristics of the use of the Internet, since each category is significantly different from the other. We believe that, by accepting this definition, professionals and lay people alike will be able to comprehend the field better and will refrain from relating to it as one-dimensional and narrow. This definition can, therefore, be used when preparing training courses and designing research studies, for example, as well as for communicating more accurately what Internet-supported interventions mean.

It is clear from our brief review that, while the first two categories of Internet-supported interventions have received much development and research attention, the latter two have received relatively little. This fact, though, does not mean that the latter pair of categories is less successful or less important. Actually, it seems that growing awareness and acceptance of these applications have resulted in increasing usage. Second, that these two categories have rarely been addressed actually points to the fact that development and research are greatly needed to advance these applications and to make them more effective and efficient. The latest developments and breakthroughs in the area of artificial intelligence and virtual reality applications, for example, will definitely contribute to the growth of Internet-supported interventions of the third category. Similarly, the rapid development and social acceptance of various Internet tools—such as social networks, blogs, and 3D advanced graphical environments (such as Second Life and Massive Multiplayer Role-Playing Games)—in addition to more traditional chat rooms and forums, provide creative opportunities for therapists to integrate these tools into traditional therapy, thus expanding the use of the fourth category. Recent research findings showing that the Internet can be used effectively for practicing and experiencing problematic interpersonal behaviors and generalizing awareness and behaviors to the offline environment [114], for example, paving the way for numerous ways of exploiting the Internet as a supplementary tool for therapeutic advancement. Finally, it is clear that the Internet rapidly penetrates all areas of human life and numerous professional operations, creating a "virtual society." The helping professions have gradually joined this trend, and employing online functions for various purposes has become standard practice. It seems obvious that growing numbers of professionals, as well as more therapeutic approaches, will endorse and exploit Internet-based activities as a normal part of more traditional approaches.

Unlike the two categories discussed above that have been less well addressed, the categories of Web-based interventions and of online counseling and therapy have increasingly been investigated qualitatively and quantitatively. Generally, research shows that these two approaches not only are possible and feasible in terms of creating meaningful changes in people's lives, but they are also effective in doing so in comparison to either no-treatment or parallel face-to-face interventions [27]. Undoubtedly, more research and development is needed in these areas, too; however, it seems that the Internet provides a durable, workable environment in which complicated interventions can successfully be applied, thus enabling advanced professional services to be provided to remote or disabled populations, as well as to people who prefer not to be visible and exposed.

The Internet has altered society to a great degree. Changes are apparent in every aspect of human life, simultaneously with adjustments and innovations in the provision and consumption of professional services. Internet-supported interventions are consistent with this development and follow the course of improving services while exploiting new technologies and bringing about changes in people's expectations and habits. The transformation in deploying interventions is not only professionally challenging, it also raises other important issues with which we have to struggle and prevail.

Acknowledgements Judith Proudfoot is grateful to the National Health and Medical Research Council (Program Grant 510135) for the salary support.

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