EMERGING INFORMATION TECHNOLOGIES

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Contents

Introduction

As advancements in information technology are introduced at what often seems like a dizzying pace, it can become difficult for those not embedded in the field to remain aware of, let alone delve deep enough into, which trends are most likely to be beneficial. Ignoring these innovations until a clear "winner" is declared, it's a risky venture, especially for organizations. To delay (or even ignore) these advancements can mean losing out on methods which might facilitate and further missions and goals. Additionally, hesitation creates possibility of an organization becoming irrelevant due to communication techniques that are increasingly outdated or obsolete. It's simply not a smart option.

CP Consulting has authored a special report for the **American Psychological Association** on the following currently-emerging information technologies:

- Ubiquitous computing
- Personalization
- Social computing
- Mobile computing
- Cloud computing

The discussion will focus on how these can contribute to the APA's internal focus of developing psychological professionals (and thereby the profession in general), as well as its external focus on ensuring the public has easy access to relevant information and resources about psychotherapy and psychological issues. We view the technologies as bridges between the following:

- Professional : Professional
- Professional : Public
- Professionals : APA : Public
- Public : Public

To the right is a diagram of these overlapping relationships which will be referenced throughout the report.

Included in the analysis are various practical applications, as well as a discussion of potential trouble spots and ethical issues when using these techniques in the highly-confidential, face-to-face world of psychotherapy. Ultimately, our report offers ways the APA and individual professionals can use the available technology to deliver and exchange information as well as how professionals and the public will benefit from easy access to content generated by the APA. We believe that this solution must address how technology can facilitate both development/delivery of information as well as reception, addressing the opportunities and experiences for developers and receivers. Our report is specific to the APA's needs and concerns with advice and ideas unique to the association.

1.0 Overviews

1A Overview of Ubiquitous Computing

Ubiquitous computing has been a topic of research and discussion since the late 80's when, in 1988, Mark Weiser was the first to use the term. Ubiquitous Computing is the seamless and "invisible" integration of technology into our daily lives such that its use is natural, almost invisible. Applications of ubiquitous computing result in the movement from active to passive use as information is delivered to or for the user with minimal, if any, action on his or her part. Communication becomes seamless, perhaps even unintentional, as information is gathered via embedded devices with processing power. Writes Adam Greenfield, "…there are powerful informatics underlying the apparent simplicity of the experience, but they never breach the surface of awareness" (Greenfield, 2006, para. 5). Examples of this innovation include "smart" medicine bottles which alert users to take their medication and "smart" homes which can monitor the environment and adjust temperature, lights, and other setting automatically or by the homeowner (remotely).

This technology poses significant concerns beyond the technological development. As computer scientists push forward, academics from all fields have begun to discuss the social, philosophical, political, and other impacts this integration will have on our world. "There should be little doubt that its advent will profoundly shape both the world and our experience of it in the years ahead. As to whether we come to regard that advent as boon, burden or blunder, that is very much up to us, and the decisions we make now" (Greenfield, 2006, para. 26). We will discuss some of these concerns in the Ethics and Implications sections.

1B Overview of Personalization

At first, personalization might seem like a questionable inclusion on our list. For example, variable data printing which produces direct mail pieces with our names incorporated throughout the text and the ability to change the fonts, colors and other aesthetics on a site or to configure a home page with exactly the apps and feeds we want seems pretty common, certainly not emerging. However, the technology of personalization that we'll be discussing goes far beyond being just "personal." In fact, the idea of personalization varies depending on the field.

For our purposes, we're looking at the personalization as defined by Fan and Poole, "…a process that changes the functionality, interface, information access, and content , or distinctiveness of a system to increase its personal relevance to an individual or a category of individuals," (2006, p. 183). To wit, personalization is more about making content *relevant* to an individual than about peppering it with personal information already provided; it's about taking that data and making conclusions about that person based on users with similar profiles.

Note that there is a difference between personalization and customization. The latter has to do with user-defined changes, such as altering the font size, background colors, and/or actively setting up preferences for how the site will look. Personalization, on the other hand, has to do with software that tracks activity and then creates content for a user based on that activity — with the user taking no extra steps to help generate that content.

> To truly boil it down, we view **personalization as passive** on the part of the use while we view **customization is an active** endeavor.

Personalization technology can increase the draw of a person to a site as well as guide them to options they might not have previously considered but would be interested in.

"Personalization is first and foremost a business strategy, and is an attempt to counter-balance the anonymity that typically characterizes interactions between consumers and large businesses, especially over the Internet" (BroadVision, 2004, p. 1).

This can be used by many different companies for different reasons. For example, in retail, personalization shows up in the "Recommendations for you" feature on sites which are tracking both what you purchase as well as what you browse and cross reference that information with similar shoppers and comes up with product offerings while might be appealing, illustrated below.

Example of Personalized Recommendations from Amazon.com

Personalization can also be used in information settings, where articles can be cued up based on your browsing history or the creation of an increasingly relevant-to-you home page which serves up content based on which areas you visit the most.

All of these outlets aim to create a better, more fruitful experience for the user which in turn can create loyalty to the site, the company/organization, or the products.

1C Overview of Social Computing

If there is one technology on our list with which almost everyone has first-hand experience, it is likely social computing/social software. Social software is not just the creation of virtual environments on which to post content and "talk" to others. Social software allows for collaborative content creation and refinement, directed not by an over arching group but by the users themselves. Social software enables these interactions, but the activity itself is dictated by users. It is dynamic, decentralized, and interacted with via comments and tags by users Parameswaran & Whinston**.** While we discussed the passive nature of personalization and ubiquitous computing in other sections, social software is extremely active in nature. While there have been examples of groupware going back several decades, social software as we currently understand it can be seen as taking hold in 2002 when the first Social Software Summit was held (Allen, 2004). Since then, social software has become a common means of communication, used for both business and personal matters, marketing and reporting, education and entertainment (and "edutainment") on such sites as Facebook, LinkedIn, Twitter, Blogger, YouTube and Wikipedia.

1D Overview of Mobile Computing

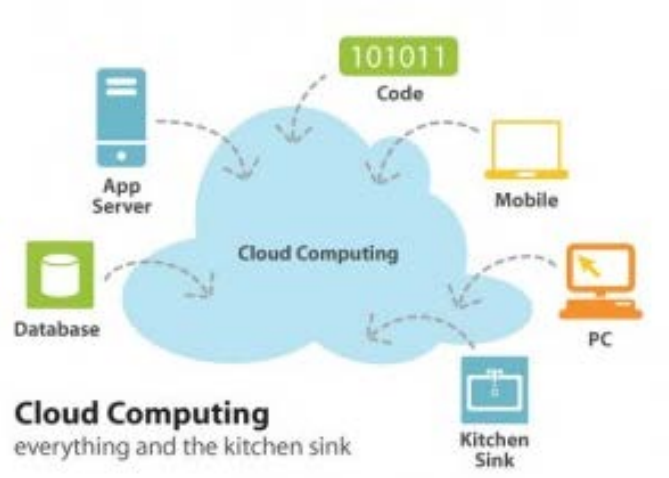
Mobile Computing is the ability for users to connect with each other any time, anywhere, through a variety of hardware and software applications. It is powered by advancements in telecommunications which make the transfer of data faster, easier, and increasingly available. Mobile computing releases the internet from desktop computers and puts in laptops, smart phones, and tablets. These portable devices add to the ease of use: accessing the internet via a laptop can be inconvenient in many locations, where slipping out a phone or a tablet is quick and easy. As such, mobile computing has created unprecedented opportunities to communicate, collaborate, and express oneself any time, anywhere.

Mobile computing has created many opportunities for collaborative efforts. While remote collaboration used to be somewhat limited to conference c

alls, today there are a plethora of methods with which to interact real-time. From instant messaging/video/phone services such as Skype, join.me, and instant messenger programs to software systems designed with "the meeting" in mind such as WebEx, GoToMeeting, Acrobat.com, the ability to synchronously work together with colleagues from around the world is easier than ever. With mobile collaboration, project teams are not limited by location, enabling the "right" team to be formed, not just the proximate one.

1E Overview of Cloud Computing

The term, "the cloud" has been increasingly prevalent in technology discussions over the past few years, now making its way to mainstream media and marketing (e.g., Apple's iCloud). Many people might be initially confused about the term, wondering what cloud computing is and why it's important (and how it's different from the internet). The good news is that you've probably already started using the technology: if you have used Gmail, hotmail, or yahoo mail, you have used a cloud-based service. In those applications, you can access your account from any computer because your messages and associated files are all stored online ("in the cloud). However, cloud computing has progressed beyond the ability to access your data from any location. It offers viable business solutions that need to be considered.



Cloud Computing Diagram from TheTechLabs.com

Cloud computing, one of our emerging technologies, is a method of leveraging the power of the internet to deliver technology services. It can take the form of shared software, data storage, and/or shared services. Craggs lists five core characteristics of cloud computing, "a shared pool of IT resources, on-demand usage, elasticity, networked access, and user-based metering" (2009, p. 3). Cloud computing can offer businesses technology solutions that might otherwise be financially preclusive as well as the ability to use the services as needed, rather than purchasing them only to find they are rarely used and therefore not earning a high ROI.

Cloud computing breaks down into the following three categories:

1. Software-as-a-Service (SaaS)

2. Platform-as-a-Service (PaaS)

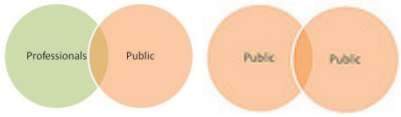
3. Infrastructure-as-a-Service (IaaS)

One of the most recognizable examples of cloud computing is Google Apps, an example of PaaS. Google Apps allows users to create, share, and participate in live collaboration via the platform using software for content/file creation , email, chat, calendar, and storage functionality. Access is customizable and can be different for every document, group, or site. Controlling access is an important aspect of cloud computing. Using the cloud does not mean that information stored there is public. It can be as public or private as necessary, an important requirement for confidentiality needs. It can also be scaled to include whatever components are desired, as simple as a piece of software and as complex as fully-customized infrastructure. Additionally, because these systems are essentially "renting" the technology, users are often afforded greater amounts of storage space than traditional servers offer and are backed up by multiple data centers, loss of information is greatly decreased and down-time should be minimal.

2.0 Applications

In this section, we'll discuss specific applications for each emerging technology. These suggestions have been made with the psychological community in mind and as such represent very real opportunities for implementation.

2A Practical Applications for Ubiquitous Computing



Professional : Public | Public : Public

As with any medical field, the prescription and monitoring of medication is an important aspect of some patient care. The use of medication in treating psychological disorders, such as bipolar disorder, schizophrenia, OCD, and depression, often results in improved quality of life. However, it is important that the medication be taken properly and consistently to ensure best results. Enter the "smart pill bottle." Developed by Vitality, this bottle has a cap which reminds patients when they have missed taking their medicine. Further, should the patient not respond, the technology in the cap can contact a third party to let him or her know (in this case, the solution also becomes a Public : Public solution because it can be used by patients to help themselves or each other independent of a professional). By helping patients remember to take their medicine on time, these caps increase the overall efficacy of treatment. Additionally, by delivering information to one's physician about when a dosage is taken, these pill bottles contribute to the trend of clinical integration, a movement in healthcare to start to gather data about patients from all of their healthcare providers in order to get a comprehensive view of their medical state for the purposes of improved (often proactive) care. For more information on the Vitality bottle, you can view a short video by clicking *here*.

Additionally, professionals can consider using Livscribe Pens. This pen is a way for professionals to take notes during a session and record the session as well, thereby ensuring that they don't miss anything and can easily mark important points during the recording which might be revisited at a later time. Conversely, patients might also wish to use the pens for the very same reason, able to make notes about discussion points, suggestions, and/or advice shared with them. Obviously, this technology has many other applications (e.g., business meetings, classes, lectures, etc.), hence making it a low risk option to be adopted.

Echo SmartPen by Livescribe

2B Practical Applications for Personalization

Personalization technology can be used by members of the association as well as the association itself in a few ways that would benefit both psychological professionals as well as their direct patients and the public in general. Because personalization can foster loyalty and even help a person feel a relationship with provider, including personalization techniques in a field which focuses to heavily on relationship building is prudent.

At the practice, we think that personalization techniques can create a highly-useful website for patients. (See the Professionals : Public Personalization Practical Applications for more on this topic. In terms of the APA harnessing this power at an organizational level, we see similar tactics on their site which would foster better communication with both members and the public, discussing these in the Professionals : APA : Public Personalization Practical Applications topic.

Professionals : APA : Public

The APA already has a robust website, offering information under such categories as, “Psychology Topics,” “Publications,” “Psychology Help Center,” “Research,” “Education,” etc. By adding some personalization technology to the site, users can be offered additional content based on their activity. For example, users browsing the Publications section, users might be pointed to material related to their activity (or the activity of similar users). Searching within the education section might generate content suggesting certain programs which might be of interest. Additionally, the site could be configured to default to the page a user spends the most his/her time.

Professionals : Public

There are also opportunities for personalization options at the office level. Here, more specific data can be gleaned from patient-provided information to create a password-accessible page which is configured specifically for that patient. Here, content could include appointment and medication refill reminders, best practices and techniques for coping with that person’s specific conditions, as well as additional readings, links, and helpful information. This content could change as treatment progresses based on therapist notes and/or additional input via questionnaires from the patient. The value of such a site would be the ability to communicate with the patient outside of a session, including patients who have discontinued therapy but would still benefit from some of the features. It also allows for a continued relationship outside of the therapy session; the benefit here is that it could minimize any perceived barriers to making an appointment should his or her needs change.

2C Practical Applications for Social Computing

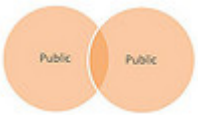
Opportunities for in the field of psychology abound in social computing, from professional collaboration to patient treatment to self-help opportunities.

Professional : Public.

Social software could be applied to specific cases of social anxiety or agoraphobia, allowing patients to practice engagement within the safety of their homes.

Professional : APA : Public

There are two primary areas of particular relevance to the APA: therapist rating and feedback areas as well as virtual group therapy. Given the importance of finding a therapist with whom a patient clicks is imperative to creating the open, trusting relationship needed for effective therapy. Therefore, it behooves the APA to offer as many tools as they can to help patients find the right match. Currently, there is a psychologist finder page on the site which could be developed to include patient ratings, feedback, and discussion so as to help each other better understand the psychologists. While there are several sites which offer similar opportunities, the APA is an intuitive and credible location for people to visit looking for this kind of information.



Public : Public.

Social computing enables individuals to leverage the experiences of others to help themselves. As such, other opportunities for social software include group therapy. This can take several forms, from synchronous sessions which mimic traditional therapy to online communities which offer help and support via discussion boards, blogs, commenting features, linking, videos, etc. Again, while several such sites have sprung up around the web, sites created under the APA umbrella would benefit from the reputation of the organization as well as possible moderation by psychology professionals who can intercede and post relevant articles and recommendations to the group.

2D Practical Applications for Mobile Computing

Perhaps the biggest opportunities for the APA are within the realm of mobile collaboration. This includes collaborative efforts between professionals as well as new ways of offering therapy.

Professional : Professional.

From a professional-to-professional viewpoint, these technologies offer improved opportunities for collaboration on studies, experiments, and cases. Being able to work together with previously un-reachable professionals opens the door to research and discovery previously unavailable due to the limitations of location. For example, laptops, smartphones, and tables such as the iPad or Samsung Galaxy enable professionals to collaborate anywhere they can get online, often using wireless services to do so (either through a plan they have purchased or taking advantage of the numerous locations which offer free wifi). This means professionals are still able to work together and keep up with their own projects when they are out of the office. This is ideal for those who travel frequently but need to maintain productivity while doing so.

Additionally, the improvements wireless services with connection speeds that are constantly getting faster means that viewing relevant videos is more effective, hence using video as a tool for collaborating on projects is a viable option regardless of the type of connection (plugged in or wifi) being used.

Professional : Public.

From a professional-to-patient viewpoint, there are opportunities for more effective remote therapy (aka, “e-therapy,” or “Interapy”). While remote therapy is not new, increased access to mobile collaboration tools enable more people to access therapy when it is otherwise impossible due to such factors as location or physical limitation. Further, the improved technology allows for an experience that can approach face-to-face therapy via video chats. Compare this to other methods of therapy in which the therapist cannot see the patient (e.g., telephone, mail, email, etc.) and the dangers of missing important visual/non-verbal clues (Lange, 2003).

2E Practical Applications for Cloud Computing

Cloud computing presents both businesses and individuals with cost-effective opportunities to expand their technology options as well as making data more easily accessible (an aspect of cloud computing which has some consequences, as we discuss in the Ethics section. Additionally, because of the recognized and respected companies currently offering solutions (e.g., Apple, Google, Amazon), it’s easier than ever to find a solution that meets the need while feeling comfortable working with a new technology offered by an familiar (and proven) partner.

We see several practical applications for the psychological community, as outlined below.

Professional : Professional

FOR THE PRACTICE

Cloud computing offers both financial and collaborative benefits to psychological professionals. Through scalable solutions, cloud computing enables technology solutions that could otherwise be cost-prohibitive for small or individual practices. For example, the Google Apps could meet the needs of these often-small practices easily. Many of the recommendations that we make throughout this report involve websites, either the APA site, a site which represents several practices, or a site for an individual practice. Google Apps allows for relatively easy creation of a website. The additional services of file storage and content creation tools such as documents, spreadsheets, and presentations (Google Docs), calendars (Google Calendar), as well as Email and chat, voice, and video conferencing (Gmail) add up to a fairly complete solution. Additionally, the price is reasonable. As of the publication of this report, Google is offering the small business solution for $5/month for each person on the account. Consider this cost against the costs to purchase individual licenses for each of these technologies as well as the IT support needed to get them running and sustained.

FOR PROFESSIONAL COLLABORATION

Using a cloud computing solution also facilitates online collaboration, another topic we visit frequently throughout this report. Consider that when using Google Docs, two or more people can be online and working together on the same document making changes live. The ability to use Gmail to communicate in a variety of manners (e.g., email, chat, video conferencing, audio conferencing), further enables collaborative efforts between professionals.

Professional : APA : Public

We see several options for the APA to leverage the opportunities cloud computing offers. First and foremost, we see the organization being able to use online hosting to offer a library of resources online, benefiting both their professionals as well as the public. Cloud computing can enable data collected through various experiments to become more readily available to other researchers, thus fostering collaboration on research and experiments beyond the immediate team doing the work. This is how knowledge is built and progress is made in the field. Cloud computing can be a significant accelerant to that end.

Cloud computing applications can also enhance many of the other emerging technologies and opportunities discussed in this report. For example, cloud computing can further enhance the benefits of mobile collaboration, eliminating the need to be at one's main computer to access relevant documents, software, email, etc. See the Practical Applications section for more in that regard.

3.0 Ethics

Any advancement must be considered in light of ethical implications. In this section, we present some of the ethical considerations that the APA will need to think through when considering which opportunities they would like to take advantage of. However, we strongly recommend that ethics continue to be considered as the technologies are developed and used in new ways. This continual assessment will ensure that technology is used prudently and professional standards and patient confidentiality are always a top consideration.

3A Ethics of Ubiquitous Computing

Ubiquitous Computing presents us with computing power that is "invisible," negating the need for user input. What is gained in convenience is lost in control. Here we must consider what is being transmitted/processed by the technology vs. what is lost by allowing a computer to do this for us. Some applications present relatively benign tradeoffs. Consider the simplicity of a room which senses when you have entered and turns on the lights and adjusts the temperature for you. It saves you the time of doing this yourself (and might also help control your energy bill by turning the lights off and the heat down when you leave), but perhaps you don't always want that response. In such cases, convenient becomes a bit inconvenient. From here, we can move to more invasive technologies which might measure and pass along intimate information and can lead to elimination of choice. Perhaps a steering wheel can read the amount of endorphins in your system and "decides" you are too charged to drive. While this might be motivated by safety concerns, consider that the reason why your endorphins are racing is because your wife just went into labor.

Ubiquitous computing should not overly inhibit the ability to choose and any implementation should be done after serious consideration of the question,

> "Just be we can, does that mean that we *should.*"

The relevant examples cited for the APA include smart pill bottles which are able to not only remind the patient to take his/her medication, but can go so far as to alert a third-party of a dosage is missed. While that final step can help patients with diminished capacity, it's difficult to draw that line and remove the individual's choice to take or not to take prescribed medication. Furthermore, the third-party notification can serve to decrease personal responsibility on the part of the patient, unnecessarily relying upon others to keep them on track. Finally, such notification has privacy issues involved.

3B Ethics of Personalization

As with any passive configuration of web pages that relies upon past activity and/or the activity of similar users, the user is being followed. Often, this is occurring without the user's consent (i.e., you have not created an account on a site but your movement is still being tracked and feeding configurations designed specifically for you). Due to the highly-personal nature of psychological issues, personalization and tracking of user activity on the APA site (as presented as an option in the Practical Applications section) needs to be undertaken with these concerns in mind. Not only should the nature of the movement tracked be contemplated (e.g., tracking visits vs. activity) but what is done with that information. The issue is how to be responsibly proactive.

Some patients might welcome personalization on the site and/or receiving information based on their online activity, others would be horrified by it — and such alienation could be devastating for certain psychological issues (consider the affect this would have on individuals suffering from paranoia). These same concerns exist in the office environment as well; extending personalized information beyond a private session with the

therapist could be deeply upsetting and leave the patient with a feeling of exposure while others might appreciate follow-up information, activities, options delivered by a third-party and based on notes from his/her session and/or any paperwork that was filled out.

Reckless adoption of personalization techniques could result in user hesitation to use the site for fear that research on certain issues will be tracked and acted upon (e.g., sending emails with further information based on a search, configuring the page with such information) and the consequent exposure to outsiders and/or nuisance communication. Additionally, on the practice level, it could result in losing the patient to another provider or leaving therapy altogether.

3C Ethics of Social Computing

In addition to some of the identity concerns listed in the Ethics in Mobile Computing section, social computing presents some interesting philosophical issues.

First, there is the issue of social computing in the realm of therapy itself. As discussed in the Practical Applications section, social computing presents some interesting opportunities for self-help, group therapy, and peer-to-peer assistance. However, it should be noted that the nature of social computing with its short responses and anonymity might not be conducive to responsibly addressing psychological needs. While it can create a community around an issue and offer support from a variety of perspectives (e.g., those suffering from the issue, those living with people suffering from the issue, professionals who have treated the issue, etc.), these communities might be a viable supplement to 1:1 therapy rather than a replacement.

While such sites as Facebook operate on the user approving and building their network by hand, able to grant access to only those they know, discussion groups, chat rooms, and other public sites do not offer those options. True, some may allow the user to block individuals, but this is a passive response and leaves the person exposed to strangers who may not have the same motivations and respect for one's privacy that "friends" would have. In anonymity, there exists the freedom to behave in manners one would not engage in otherwise. For the solutions offered in relation to social computing, balancing the need for confidentiality and anonymity with the desire for quality communication is essential.

Further, there have been discussions regarding how this medium can affect communication skills (e.g., patience, fidelity, honesty, tolerance, and perseverance). Social Computing can help some patients learn to engage however, for others, it might foster a tendency to keep a distance and remain "safe" behind a computer and keyboard, able to easily disengage and/or create a somewhat dishonest presence.

Finally, social computing issues always involve questions around privacy. While individuals can post anonymously, the information is still out there and can always be taken and shared outside of the site. Further, if individuals are posting as themselves, the risk of exposure increases either through inadequate privacy settings or members of the group who take the content and share it elsewhere.

3D Ethics of Mobile Computing

While Mobile Computing presents many opportunities for previously unreachable patients to receive therapy as well as for professional collaboration among psychological professionals, there are serious ethical issues which need to be taken into consideration.

Identity authentication is an issue for both patient and therapist. Unless video conferencing is being used, it can be difficult to ensure that the person on the other end of a post, email, chat, etc. is really the patient and/or the therapist. Further, online psychological professionals aren't subject verification of their listed credentials so patients risk working with therapists of questionable status and ability (Ragusea, 2003).

Privacy can also be an issue if patient data, including session notes and diagnosis information, are stored on mobile computers such as laptops and smart phones. These devices could be stolen and/or have information accessed if they are not properly secured (both physically as well as through password protection). Note that this becomes an opportunity to explore cloud computing to store information rather than on the device itself. See the discussion of pros and cons in the Ethics section.

COMPROMISED DIAGNOSIS

Loss of face-to-face treatment and the additional non-verbal clues that provide the therapist with more information than a patient's answers alone can be lost. These clues are part of a therapist's overall assessment of a patient's state of mind and missing them can compromise the efficacy of a recommended course of treatment. Unless they are using a video conferencing system, these cues are lost when engaging in therapy/consultation over mobile devices or using mobile technologies.

3E Ethics of Cloud Computing

Ethical issues surrounding cloud computing tend to focus on privacy and security issues, significant concerns for all businesses, but especially so in the medical fields. We also think that caution should be taken when using some of the software solutions, ensuring that the choice is the right choice as much as the economical one.

Professional : Public

PATIENT INFORMATION SECURITY

Each step that confidential medical information takes away from the patient increases the risk of compromised confidentiality. For decades, records have been kept on site and in hard copy, however records are increasingly being digitalized and paper files are moving toward obsolescence. Cloud computing can offer an additional level of concern, moving this data away from a local server. While it is true that there are different levels of security that can be offered to protect information and restrict access, the risk is there. However information stored on the cloud puts it in a universal location rather than on individual hard drives which can fail, be stolen, or accidentally erased. This concern is echoed in Pew's Future of the Internet Survey:

> Some respondents observed that putting all or most of faith in remotely accessible tools and data puts a lot of trust in the humans and devices controlling the clouds and exercising gatekeeping functions over access to that data. They expressed concerns that cloud dominance by a small number of large firms may constrict the internet's openness and its capacity to inspire innovation - that people are giving up some degree of choice and control in exchange for streamlined simplicity (2010, para. 13)

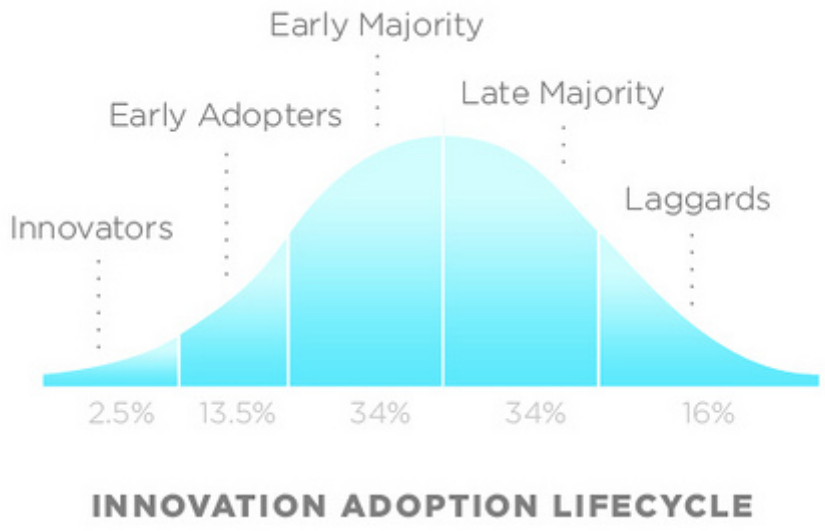
In order to effectively use Cloud Computing to collaborate on and store patient information, users need to work with IT service providers to ensure that all appropriate security measures are taken to balance the benefits and opportunities this technology presents with the potential risks.

SOFTWARE SHARING

Cloud computing can also involve shared software opportunities so as to alleviate some costs of software and/or purchasing robust versions which contain far more functionality than is necessary. Here again, financial prudence and convenience should not compromise the quality of the deliverables. For example, Google Docs offers software for word processing, spreadsheets, and presentations which share many characteristics with those for sale by Microsoft. While the word processing version might easily suit the needs of psychologists writing simple reports, letters, and other communications, the spreadsheet offering might not be the best solution for billing solutions or complicated data collection during research. As with any decision to adjust processes, hardware, software, etc., each must be considered from all angles and remembering the primary purpose of the endeavor. For psychologists, that should be the quality of patient care and all solutions should contribute to that.

4.0 Adoption

By nature of being deemed "emerging technologies" the innovations we are discussing are still in the early stages of adoption and widespread diffusion. Some are being adopted by a huge number of people in specific applications (e.g., social computing for personal networking in forums such as Facebook) but are still only tentatively being embraced in other applications. Others are still gaining acceptance are in the earlier states of adoption. To understand how technology moves through the various stages of adoption, consider Rogers' Bell Curve depicting the innovation adoption lifecycle below.



Rogers' Bell Curve

For each of the technologies, we discuss the adoption trends, including current statistical data gathered from such organizations as **Pew Research**, as well as projections for adoption generated by firms, including **Gartner**, **Forrester**, and **Technology Futures, Inc.**. It should be noted that these statistics are general, describing behavior and activities of the general public, rather than the subset of those involved in psychology. Therefore, these results cannot be assumed to hold true for the smaller group.

In light of this, it is important to understand the technology behaviors of the psychological community lest assumptions be made about their level of technological savvy and interest in technological innovation. A 2003 report noted, bluntly, that, "Psychotherapists are not known for being technologically sophisticated," (Ragusea & VandeCreek, p. 95), likely due on part to the nature of the face-to-face, conversational core of psychotherapy. In addition to the generally non-computerized nature of the practice, the implications in terms of liability when engaging in non-traditional forms of therapy such as virtual therapy, online help groups, and other technological opportunities discussed in this report, can serve to shy away psychologists, thus slowing down adoption rates. However, while psychologist may cling to more traditional methods, the industry must take into consideration that the public is moving forward anyway. Consider Roger Gould's comments on this when interviewed about online therapy options:

> The therapy field is in chaos. If it's ever going to advance in knowledge - which it hasn't because it's been repeating the same old things in different languages for the past 40 years - you have to have some stake in the ground that says this is what psychotherapy is, rather than hundreds of varieties multiplied by thousands of people putting their spin on it (2001, para. 9).

4A Adoption of Ubiquitous Computing

As discussed in the applications section there are many examples of ubiquitous computing on the market (e.g., smart pill bottles, livescribe pens, smartboards, smart homes). These products are still in the early stages of adoption, likely due to somewhat recent releases and the corresponding high costs associated with purchasing the product, training, as well as any retrofitting needed to incorporate the devices (e.g. **SMART board integration**).

It should be noted that the smart pill bottle discussed in this report has had made some progress in adoption. These bottles sell for about $100, but there is increasing evidence that bottles foster taking medication as recommended, which means the medication is apt to be more effective. As such, there is interest from insurance companies to cover a portion of the cost as it may result in fewer medical bills long term as a result of not taking dosages as recommended.
Overall, research generated from such groups as Gartner predict the inevitability of "invisible" computing.

4B Adoption of Personalization

In 2004, a study conducted by Jupiter Research showed that 35% of the companies surveyed planned on implementing some sort of personalization techniques that year. By 2010, the number of companies creating personalized web content such as the type we discuss in the Practical Applications section was 6% (23% among Best-in-Class companies) (Michiels, p. 19).

Currently, personalization techniques are being leveraged by businesses, particularly in retail, seeking to gain a competitive advantage by offering:

- Greater Customer Loyalty
- Higher conversation rates
- Reduced costs
- Boosts in productivity
- Operational efficiency
- Profitability

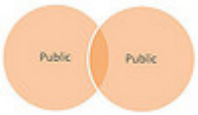
(Broad Vision, 2004)

Most of us are familiar with how retailers are harnessing the technology to generate sales. In these instances, items are recommended to returning customers based either on their history or the browsing history of like-minded (i.e., shoppers/browsers showing similar habits). However, personalization is starting to be leveraged by businesses outside the retail industry to increase client service and satisfaction as well as customizing virtual educational environments. Various levels of personalization are now seen on websites in a wide-range of industries as businesses and organizations have learned from early adopters how this technology can positively affect the customer experience and power unexpected (but relevant) product or information/content offerings.

As personalization becomes more prevalent, its presence will become expected by all three groups involved in the APA. Here, then, a failure to include these techniques prudently (see the Ethics section for important considerations) might results in missed opportunities to contribute to the APA's mission.

4C Adoption of Social Computing

Social Computing is, without question, one of the most embraced technologies. Of those adults who engage in online activity, more than half are engaged in social computing, namely 65% use social networking sites, 71% use video-sharing sites. These statistics show a steady rise in adoption, hinting at a technology that is in the later stages of diffusion. As such, any solutions the APA chooses to develop using social computing are likely to be easily accepted by a public already familiar and engaged with these platforms. To wit, seeking information on health issues, is already on the rise: 20% of users have sought out online other users with similar concerns. To further underscore the evolving influence of social computing, consider the fundraising efforts in the 2008 election, "In February 2008 John McCain attended fund raising events for his presidential campaign and raised $11 million. In the same period Barack Obama attended no such events. Instead his campaign team used social networks to raise $55 million in 29 days" **(**Technology Convergence, 2010, para. 15).



Public : Public

Online group therapy options are already presenting themselves. For members of the public who are not ready or not able to engage in live therapy, these offer a viable alternative. To ensure they select groups that are most apt to be reputable, users should investigate what, if any, professional affiliations the site/group has, including moderation by professionals. Additionally, looking at the quality of the content helps to screen for sites that are most relevant to the person's needs.

4D Adoption of Mobile Computing

As mobile devices such as cell phones, laptops, tablets and the like continue to be adopted by the public, mobile computing continues to rise and changes from a novelty to a simple aspect of everyday life, seamlessly facilitating communication and collaboration. At present, the statistics gathered by **Pew Research** look like this in the United States:

Smartphone ownership and internet use summary

% of smartphone owners, cell owners and all adults who...

	% of smartphone owners who...	% of all cell owners who...	% of all adults who...
Own a smartphone	100%	42%	35%
Use the internet or email on smartphone	87	36	30
Use smartphone to go online on a typical day	68	28	23
Go online mostly using smartphone	25	10	8

Source: The Pew Research Center's Internet & American Life Project, April 26 – May 22, 2011 Spring Tracking Survey. n=2,277 adult internet users ages 18 and older, including 755 cell phone interviews. Interviews were conducted in English and Spanish.

Smartphone ownership and Internet use summary (Pew, 2011, para. 12)

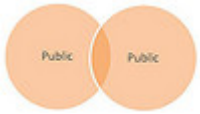
When designing strategies to integrate this usage into APA-supported programs, the demographics of the users must be noted in order to ensure the right programs are targeted at the right people. The largest group of adopters are:

- Well-educated (at least a college degree)
- Upper middle-class (earning at least $75,000 per household)
- Under 45
- Urban or suburban dwellers

Note also that in addition to the hardware used to access the internet, mobile computing includes the wireless services used to get online. In 2007, the number of these plans purchased numbered in the billions and was growing (Campell & Park, 2008).

These demographics roughly match up with psychological professionals. As such, solutions aimed at the Professional : Professional and APA : Professional relationships would have an increased likelihood of success due to pre-existing technology adoption

Professional : Public relationships could employ mobile computing solutions, however the professionals would be wise to consider their particular patient sets to determine how the demographics match up with the current and rapidly emerging adopters.



Public : Public solutions would need to take the lower-level of adoptions from rural adoption into consideration (note how this impacts solutions which employ methods of virtual or eTherapy designed to reach such groups).

4E Adoption of Cloud Computing

According to Pew Research's most recent Future of the Internet Survey, cloud computing solutions will dominate the technology landscape in fewer than 10 years. By 2020, they predict that -the majority of users will have moved away from the personal-hard-drive-centric systems which are now prevalent (i.e., housing all software and applications on one's own machines), using technology that is hosted by third-party vendors. This shift is motivated in part by financial constraints which have resulted in IT budget cuts — both in terms of staffing and hardware/software solutions. Cloud computing is being increasingly adopted to fill the gaps created by these changes. Additionally, the proliferation of mobile computing devices creates an increased demand for attaining information regardless of location.

In a report released in November of 2011, IBM reported on the growing adoption of cloud solutions, citing the following:

- Eighty-seven percent of respondents believe open source and open standard technologies will play a key role in the future of application development.
- During the next two years more than 75 percent of organizations will engage in cloud computing.

Jim Corgel, general manager ISV and Developer Relations, stated,

> The results are clear. Mobile computing, cloud computing, social business and business analytics have gone beyond niche status and are now part of any modern organization's core IT focus (2011, para. 9)

However, in terms of cloud computing, the Pew research doesn't quite support the "now" aspect of that assertion. Note that the predictions of widespread use by 2020 do not equate widespread implementation today. Consider the following statistics found in a recent article on Datamation.com:

- Adoption of cloud computing in organizations is low and only a few have crossed the finish line.
- 29 percent of the SMBs are paying for one or more cloud services. This is expected to increase to 39 percent in the next three years
- Only 11 to 19 percent have finished implementing various cloud solutions *including SaaS, PaaS, IaaS, and hybrids

As such, we see an opportunity for psychology professionals to be early adopters in this area, gaining experience and expertise in a technology that is predicted to become dominant before the decade is out.

5.0 Implications

Members of the APA will soon find themselves, if they haven't already, encountering the technologies discussed in this report. These encounters will be both direct and indirect, in both professional and personal atmospheres. In order to leverage the opportunities each technology presents, members must at least be ready to react to the emergence of these technologies and at best, harness their power proactively to best meet the needs of their profession, their individual work, and their patients. Given some of the ethical issues at play, incorporation of technology should be prudent, constantly measuring the benefits vs. ethical considerations and modifying solutions implementation accordingly. Most importantly, psychological professionals must accept that their industry is not immune to these technological advances and they will need to bring themselves up to speed, both in terms of the technologies discussed here but, as is necessary, the more basic computing skills needed to harness these technologies.

It is important to remember that implications change as technologies are adopted and then manipulated to the needs of the individual. As such, revisiting the state of each technologies (and scanning to see which others are arising) on a regular basis will ensure a more proactive approach to technology incorporation.

5A Implications of Ubiquitous Computing

Although ubiquitous computing will be increasingly sewn into our lives, the implications could mean decreased responsibility and/or increased privacy issues. Any time a device is sending information without the user intentionally doing so, we start to lose some control. Of course, we are surrounded by devices that do this all the time and it's often little cause for concern. However, as these technologies expand, we can expect to accept a somewhat shared responsibility for our lives, depending on these technologies to remind us to do things or simply take care of those things for us.

Additionally, movement in this direction can begin to create a significant divide between those whose lives are increasingly supported and enhanced by ubiquitous computing and those who are not. We are not necessarily looking at those who intentionally chose to live either partially or fully "off the grid" but those who have no access at all to the technological advancements which will fundamentally change our behaviors. This could cause difficulty in relating to one another, fostering a different cultures : those that are integrated technologically and those who are not, a divide that can increase significantly as technology radically changes communication and behavior.

While all of the technologies described in this paper face the same sort of concern, ubiquitous computing and its ability to act for us, often in a very personal way, changes behavior (including senses of self-responsibility) significantly. This is more than a modification/evolution of communication, it can begin to eat away at the things we do for ourselves, removing a set of things we "need to worry about" which might also create mental space to be concerned with other things. Consider how the incorporation of microwave ovens changed both the amount of time as well as the methods used to cook. Implications here have meant that many people now have far fewer cooking skills but also that they have more time to focus on other things. As such, the types of devices that the field of ubiquitous computing is turning out will result in more space to focus on other things.

5B Implications of Personalization

Personalization is finding its way into our lives in increasingly sophisticated manners, especially online. As more and more businesses discover the power of personalization and how it can affect sales and loyalty, it's safe to assume its presence will continue to grow. The more we encounter these tailored solutions, the more we are likely to expect them. Furthermore, because of the opportunities to create user loyalty, psychology-based sites that effectively employ personalization technology are more likely to have repeat visitors who may come to rely on the site for information. This is significant. Do members of the APA want such loyalty given to possibly irresponsible and/or non-professional site creators or would they prefer to have that loyalty given to member-generated sites and/or APA-sponsored sites?

Professional : Professional

On the professional level, personalization techniques can foster professional development by offering suggestions on relevant research, experiments, or therapeutic techniques which match up with the user's profile and activity. As such, this may change some methods of how professionals educate themselves on developments in the industry as well as seeking out assistance from similar colleagues.

Professional : Public.

As the nature of psychological treatment is intended to be totally personalized, implications for the profession center on experiences and opportunities peripheral to the counseling experience. Here professionals would be well-served by anticipating an expectation of seamless, personalized online interactions, including sites which patients interact with to make payments, schedule/check appointments, and/or e-therapy opportunities.

5C Implications of Social Computing

Social Computing has already begun to change how we interact with each other. By offering virtual forums to easily share ideas, information, photos, etc., the social networking sites have opened the door to mass communication with friends, colleagues, and even the world. It has changed what we share and when (e.g., consider whether you would know as much about your Facebook friends if each status update had to be conveyed to you in person). This can help to build relationships that might otherwise be difficult or impossible as well as opening the door to public (or semi-public) expression and feedback.

The photography which once lived only in the amateur photographer's photo album is now on flicker for the world to see. The snarky comment about someone's outfit is on Facebook for your "friends" to see. In many cases, not only are we expressing more and more often, the filter is off — facilitating communication (both positive and negative) that might not happen face-to-face. There arises a feeling of safety being able to hide behind a computer screen. These behavioral changes impact the psychological field not only in how they can expect to interact with each other and their patients, but it may also change the nature of the conversation in therapy sessions, with such issues as cyber bullying, privacy issues (hacking, shared content that was supposed to be private), and cyber stalking.

There are also implications for self-perception and identity. These applications allow users to create profiles, opening the door to choose how to define oneself rather than having oneself defined by others based on their behaviors, demonstrated interests, and demeanor. Online, we choose what we will say, with the ability to perfect a reaction or idea before posting, emailing, texting, or tweeting it. We can choose which photos to upload, likely those which we think are the most favorable to us, and who says we can't photoshop our profile picture to get rid of a few blemishes or wrinkles. The question then must be asked is how authentic our online selves are? And, taking it further, how authentic are our online relationships?

In addition to how social computing has and will continue to change our communication and relationship behaviors on a personal level, it has opened new ways to collaborate with each other in a professional manner. Users who are on Facebook anyway could look there for psychological information as the number of professional and organizational Facebook pages increases, designed to engage members of their target audience already on Facebook. YouTube also increasingly offers videos that focus on serious issues, not simply amateur parodies and entertaining content. People can follow twitter feeds from their university (e.g., "Don't forget to register for the spring semester!") which might be more effective than sending the communication in other ways (i.e., email, e-newsletters, snail mail)

Essentially, social computing is profoundly impacting how we communicate which will therefore affect the conversations happening in therapy sessions: how those conversations happen as well as what they are about. Further, it can change where interactions are taking place. A research study might use YouTube to post videos on progress or create a discussion group for studied subjects to use for documenting their reactions to an experiment.

5D Implications of Mobile Computing

The implications of mobile computing are widespread and contribute to many of the emerging technologies discussed in this report. For example, consider how many people post to Facebook via their cell phones or check their email on their iPads. Consider the productivity loss during business trips ten years ago when laptops were much rarer and connection to the internet was slow and often limited. Now, we can access our favorite sites, look at content we've stored in the cloud, send emails, chat (both text and video) virtually anywhere we can get a signal. Additionally, this ease of access is constantly increasing as both the hardware and wireless communication networks continue to evolve.

The hardware used has been (and likely will continue to be) seen as a status symbol and possibly an extension of one's personality. Because the type, color, accessories can all be chosen by the individual, each device can serve as an expression of their tastes; for some this can be as much a communication of personal style as clothing, shoes, and hairstyles. While interesting, the meaning for the psychological community lies in the fact that these devices can be another non-verbal clue about patients ideas about themselves. As the choices continue to multiply, this trend may become ever-more revealing as each person has increasing options to make these devices their "own."

Mobile devices are also giving rise to texting, another way professionals can expect to be communicating (though likely not for therapy or collaboration) and they should also be aware that that texting is a means by which many people are able to carry on multiple conversations at once, at any time (due to the ease with which one can discreetly send a text on these small devices, it's easy to communicate with others at remote locations during times when it would have been impossible or inconvenient before (e.g., during class, during a seminar, at a meeting, etc.). In short, we are expecting that we can have an audience anywhere, any time.

And that expectation starts to change how much attention we are getting and as a result, perhaps how much we "need."

Finally, there is the "personalization of public space" as illustrated by carrying on phone conversations in public spaces, "carv[ing] out personal territories by erecting illusory perimeters that have been described as 'symbolic fences'" (Campell & Park, 2008, p. 378). Campell and Park see this as a major consequence of mobile computing, resulting in almost-forced eavesdropping due the proximity or volume of the person on the phone, embarrassment for the other/embarrassed by the situation, as well as "absent presence" on the part of the speaker who, while physically there, is mentally focused elsewhere.

This technology has resulted in a connected society (which, though there are massive adoption rates, is still a portion of both the American and Global communities). This fact can be easily forgotten which is also an implication of the widespread usage. Without realizing it, we can forget that not everyone is engaged in these activities and create assumptions and structure solutions that exclude them.

5E Implications of Cloud Computing

Implementation of cloud computing solutions will change how we communicate, store data, and purchase technology. We see some significant implications for professionals, outlined in the Professional : Professional Cloud Computing Implications section, as well as how adopting such technologies might impact solutions created by the association itself, discussed in the Professionals : APA : Public Cloud Computing Implications section, both below.

Professional : Professional

Cloud Computing options are beginning to flow out of the realm of IT professionals "in the know" and into mainstream. For example, current iPads, iPods, and iPhones offer iCloud software that makes use of the technology. As such, professionals will find themselves facing radical changes (and opportunities) in how they obtain, store, and use technology. The IBM Tech Trends Report discussed the results of a survey which spanned 93 counties. (See the Adoption section for details). This means that professionals wishing to collaborate with international counterparts are likely to encounter cloud computing options — this is not just an American trend. As such, professionals need to be prepared to work this way.

Moving away from a model that is personal-hardware-centralized, has implications for the type of computers professionals will use. For example, in a model where virtually all data is stored on servers hosted by third-party vendors, the storage space on the computing devices used in the practice will minimize.

Additionally, there arises a question of who owns or controls the information created/stored in the cloud. While we discussed the risks of local storage in the Ethics section, there exists a certain sense of ownership (and responsibility) when you have all of *your stuff* on *your computer*. Moving information does put that data under someone else's control. While security measures are part of all cloud computing solutions, the fact remains that a level of control has been removed. In matters of healthcare, this can create an uneasy feeling for patients who do not know where their information is going and who can look at it. Psychological issues can be matters of even greater concern. As such, moving sensitive psychological information from paper to pixels, from the PC to the cloud, needs to be seriously considered and possibly discussed with patients so they understand where their information is.

Professionals : APA : Public

Cloud computing also has implications for areas which may not have ready or reliable access to the internet. Consider the findings of Department of Commerce's National Telecommunications and Information Administration: 30% of Americans do not use the internet or are using slow connections which impede activity (Laser, n.d.). Widespread movement to cloud computing solutions would mean professionals who fall into this category would be essentially cut out of the information network and/or are not able to offer the solutions other practices are benefiting from. So, while cloud computing solutions offer many opportunities, it cannot be assumed that all professionals *can* take advantage of these solutions. Therefore, cloud solutions which are implemented to affect the entire community (either the professional community or the public) cut out this group. We see the greatest risk being those solutions sponsored by the APA due it the reach the association has.

6.0 Action & Response Plans

Given the opportunities presented in this report, it is our hope that professionals will urge the APA to begin developing action plans to harness these technologies. While we have discussed the opportunities for specific audiences within the APA, the recommendations for Actions & Response Plans are targeted to the APA itself. However, it should be noted that these suggestions can be implemented by individuals as well, which might itself serve as a means to push the association to formal action. As the organizing body which therefore has the greatest reach to both the professionals and the public, action plans initiated here and delivered to the different sub-audiences will be most effective. Overall, the APA should be providing information on these technologies and recommendations for the specific applications it deems most significant for both professionals and the public.

6A Action & Response Plans for Ubiquitous Computing

In order to address the opportunities represented by Ubiquitous Computing, we have specific recommendations for both the APA as well as Professionals.

Professional : Public

While smart pens discussed here are a means to enhance the professional's ability to take notes during a session and effectively organize and reference them afterward, this technique really only touches the patient in terms of increased focus during a session (i.e., the psychologist can spend more time listening than making notes). However, smart bottles are a technology that professionals should investigate in order to ensure that any medication associated with treatment is taken regularly and therefore optimized to have the maximum impact the dosage is intended to give. These smart bottles could well be only the first signs of integrated technology and continuous scanning of the marketplace for other options to help increase the effectiveness of treatment should be considered.

Professionals : APA : Public

As discussed in the Practical Applications section, we see opportunities in smart pill bottles. The APA can lead implementation by providing information on the following:

- Real-world case studies of application in psychological settings. By gathering input from professionals who may have already used these bottle with patients, the association can open a dialogue among professionals about the effectiveness and/or risks they have experienced
- The costs associated with these bottles, including the reimbursement options offered through traditional health insurance as well as through the health savings plans which are being increasingly adopted in the United States. This is significant information that patients will want to know in order to make a well-informed decision.

6B Action & Response Plans for Personalization

In this section, we'll present ideas on how members can prepare for and respond to the personalization trend.

Personalization is not a project that is implemented once and is 'done'. Personalization is an ongoing, iterative process, by which organizations plan how to influence site users to achieve measurable and profitable online behavior. (BroadVision, 2004).

This means that our recommendations will only be successful if they are continually revisited, evaluated, and adjusted as more information is gathered on the users as well as the impact of the techniques are measured. Before any implementation can begin, it must be determined exactly what type of response is being sought after. In this case, that could include patient outreach, professional development, increased professional collaboration, etc. See the Action & Response Plans sections for the Professionals : APA : Public and Professional : Public audiences for specific recommendations.

Professional : Public

We do think that offices should begin offering web sites with personalized pages for patients. Here, patient consent is needed and it more likely to be given considering the site's association with their known therapist. Development and maintenance of such a site can be costly, so we recommend that offices consider pooling resources. By working together, one site may cover several therapists (who may or may not have any official affiliation). Here the home page could direct patient's to their therapist's landing page which could offer a personal note from the therapist and any updates. There, patients may log in to get to their pages. In order to make this work effectively, some information will need to be moved to electronic versions which can be loaded into the system at regular intervals.

See Action & Response Plans for Cloud Computing for more information regarding websites and digitization.

Professionals : APA : Public

We discussed personalization options for the APA website, a way in which the site can reconfigured for each user, be it a professional or member of the public. To achieve this, the APA would likely employ the assistance of programmers who can update the site accordingly. In consideration of the ethical issues at play, it would be prudent to start with limited personalization features, avoiding offering content about searched-out illnesses and focusing more on information that is freely provided by the users and therefore more likely to be "safe" to act upon.

6C Action & Response Plans for Social Computing

We suggested several significant opportunities using social computing to help with psychological issues. Here the APA plays a critical role in ensuring such usage is done ethically and responsibly. Because anyone has the ability to set up discussion groups, websites, recommendation systems, etc., the APA is positioned to be the most reliable source for these sites. Here, the association can embark on two different paths to developing and helping professionals and patients find reliable services. First, the APA can sponsor sites. In this case, they would be responsible for the site development and maintenance. However, it's likely that demand may exceed their ability to provide services so there are secondary opportunities.

Professional : Public

To better understand social computing and the opportunities it presents, professionals can involve themselves in online group therapy/discussion groups by serving as moderators for groups and/or starting groups they feel would be of value to their patients or one focused on their specialization. The former would be seeking out such sites and getting involved, a logical first step, while the latter would best fit those who already have a level of familiarity with such sites and possess the tech savvy to set one up.

Additionally, working together, professionals can help build out areas on the APA site which recommend high-quality online discussion groups, group therapy, or other social computing sites relevant to their field. They could also facilitate setting up a system where patients can offer feedback on professionals so as to help each other find the right person for their needs, possibly by encouraging their own patient to participate.

Professionals : APA : Public

In the immediate future, the APA can enlist the help of members to research existing sites which provide psychology-related social computing opportunities. This research will increase the organizational knowledge around social computing and allow the association to leverage the work of others by linking to it. It also gives members time to develop their own sites which can then be linked from the APA site.

Recommend sites sponsored by other groups. These are sites the association has investigated and has determined meet the standards the APA upholds. These sites could be linked to from the APA's website as well as having some APA-recommendation on the site for those who reach it directly (this would also show up in searches).

Provide psychological professionals with blueprints for setting up a site that would meet their standards, listing best practices as well as examples of sites which meet the standards.

Encourage professionals to participate in monitoring and/or facilitating discussions on sites to further enhance the level of professionalism being offered as well as extending their own experience and comfort level with social computing and psychology.

6D Action & Response Plans for Mobile Computing

Professional : APA : Public

The instances and quality of professional collaboration are significantly increased through implementation of new mobile computing tools and techniques. By minimizing obstacles through instant messaging, email, video calling, and free online calling professionals who might previously have avoided collaboration can now do so, resulting in new partnerships and research. To facilitate this, the APA should consider sponsoring a conference which highlights interesting new research which was carried out making heavy use of mobile computing. As such, the conference could provide attendees with psychological research results but is an opportunity for them to showcase successful instances of mobile collaboration. Part of the conference could also involve a session outlining the numerous technologies which can be used, information which can be provided via their website after the conference for continued access to these methods and best practices. The APA could also sponsor some such studies to foster their development.

For collaboration between the professionals and the public, the APA could sponsor workshops and research which teach professionals when and how to effectively use the technology. Additionally, providing information to the public about the opportunities here and how they could benefit them can be posted on the website. Of particular interest might be personal stories about patient experiences (these could be submitted to the APA and posted anonymously to protect privacy).

Professional : Professional

In order to leverage the collaborative opportunities, professionals can being to initiate this collaboration on a small scale in order to help them learn how to use the technology effectively before embarking on larger projects where inadequate knowledge might compromise results. Such limited engagements include consults or paper reviews with remote colleagues (especially those with whom one might wish to work with more intensely in the future).

Professional : Public

Remote therapy might not be right for all patients and situations. Therefore, professionals should make sure to evaluate implementation on a case-by-case basis, considering the nature of the issue, the reason that such therapy might be valuable and why it might be detrimental, and the patient's technological savvy. In the right situations, professionals can begin to implement slowly, starting with this practice as an enhancement to traditional therapy. From here, in the right cases, it can evolve into the sole method of therapy and any appropriate combination of traditional and e-therapy that best serves the patient's interests.

6E Action & Response Plans for Cloud Computing

Professional : Professional

As outlined in the Practical Applications section, we see many opportunities that professionals should start taking advantage of now, opportunities that can pose cost savings for professionals in small practices as well as result in better collaboration.

Below, we outline a few ways to make this happen.

First, the APA could direct information on opportunities to office managers and/or IT professionals who oversee an office's or department's IT needs. This could take several forms, such as APA-sponsored reports, seminars, webinars, and/or discussion groups, to name a few. These offerings can be based on industry research, but also by reaching out to practices which are early adopters of cloud computing, which may yield further ideas on how cloud computing can benefit them. Educating office managers and IT professionals on the possibilities in terms of both costs savings as well as collaborative opportunities can result in case-by-case analysis of whether such solutions will work for them. We think that this is the best audience to target. While psychological professionals would use and benefit from these solutions, reaching out to them directly might not yield optimal results; they might consider this to be just an "IT" or "Finance" or "Office Manager" issue and thus not as central to their area of focus. Quite simply, it's possible they might not view it as a valuable use of their time. By getting buy-in from office or IT managers who can then present a specific solution and benefits for that practice, it's more likely that such solutions will be implemented or, at the very least, given fair consideration.

Second, professionals themselves could start using these technologies in measured amounts, testing out their ease-of-use, opportunities, and limitations in a small scale before considering a full implementation for their staff. This can be done as easily as using iCloud to start syncing information between their devices or using Google Docs for a presentation they are developing with a remote colleague. This is an easy way to use the technology and requires fairly little research or time-investment to start doing it.

In our recommendations for responding to advancements in personalization, we discussed personalized web sites and pages and the requirement of moving from hard copies to electronic versions of certain records. Here the cloud comes in extremely handy. For example, many therapists use hard-copy appointment books which are housed at the office. By creating a virtual appointment book and hosting it in the cloud, therapists (and others, as necessary) are not only provided access to the information regardless of location (and possession of the book), but it enables this information to be loaded onto the sites discussed in the personalization section.

Conclusion

Even in a profession where emphasis is placed on face-to-face interactions, technology is advancing to facilitate results and meet the increasingly diverse needs of our global culture. From online therapy to pens able to record sessions while taking notes, there are many opportunities for psychological professionals to harness the power of emerging technology to enhance their delivery of services to the public as well as setting up opportunities for the public to help themselves. This paper outlined some of the most significant new technologies, including ideas for implementation and preparation for use.

CP Consulting recognizes that technology never stops refining itself. As such, this study merely represents the opportunities arising today. No doubt, there will be advancements tomorrow that psychological professionals will need to understand. We recommend that in addition to taking advantage of the opportunities outlined here, that psychological professionals urge the APA to engage in continuous scanning of emerging technologies and how they might impact the field. Seeing the trends and considering applications early will ensure that psychological professionals never get caught behind, missing out on ways to increase the efficacy of their work as well as ensuring the public has as many relevant and effective ways as possible to seek education and help for their needs. This is the heart of the APA's mission statement.

About CP Consulting

With over 12 years of experience in the field of corporate training, graduate studies focusing specifically on emerging technologies in information design, and published work in the **Journal of Behavioral Management** which focused on an assessment, recommendation, and implementation of desired change initiatives, CP Consulting CP Consulting is ideally situated to work with the APA on this special report. We know the terrain and how to help you navigate it successfully.

Gretchen Kriesen, the principal at CP Consulting, holds a BA from Nazareth College, an MS from Rochester Institute of Technology, a Master Certificate in HR from Villanova University, and is pursuing an MS in Information Design and Technology from SUNYIT.

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