

MTherapy: a Mobile Based Therapy

Habib M. Fardoun
Information Systems Department
Jeddah, Saudi Arabia
King Abdulaziz University (KAU)
hfardoun@kau.edu.sa

Daniyal M. Alghazzawi
Information Systems Department
Jeddah, Saudi Arabia
King Abdulaziz University (KAU)
2nd E-mail

Sami Ali Delgado
Information Systems Department
Jeddah, Saudi Arabia
King Abdulaziz University (KAU)
sdelgado@kau.edu.sa

ABSTRACT

This article describes and analyses mTherapy, a new rehabilitation process support system accessed via a mobile device. The patient can be diagnosed, receive therapy, manage therapy sessions and also be monitored through the recovery process using mobile technology. As a cloud computing application, mTherapy functionalities aim at providing direct communication and active contact with a therapist. Cloud computing provides diverse services and features, in this case, information storage, information management, platform services and customizable user interface appropriate for the patients' needs. MTherapy portability and customized access support patient's rehabilitation via a mobile device anchored in cloud technology. Such device supports and improves the communication with the therapist and thus, aids the patient to receive the needed care within the rehabilitation process by receiving direct instructions via videoconference, personal assistant or primary care at critical times such as panic attacks, anxiety or stress.

Categories and Subject Descriptors

K.4.2 [COMPUTERS AND SOCIETY]: Social Issues—Assistive technologies for persons with disabilities.

General Terms

Design.

Keywords

Mobile Therapy, Mobile Rehabilitation, Anxiety Therapy, Therapy Management, Cloud based application.

1. INTRODUCTION

Nowadays, people live in a world where instability and uncertainty govern aspects of labour, economic, political and social life. This uncertainty can sometimes cause the person to suffer a state of confusion in which the search for balance and stability become a life priority. This uncertainty and confusion becomes a problem for a person when he feels overwhelmed by the situation generating a physical response, which is commonly

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

PervasiveHealth 2014, REHAB workshop, May 20–23, 2014, Oldenburg, Germany.
Copyright 2014.

known by the term anxiety. [1]

Anxiety is one of the most common disorders in the society we live. Many people suffer from anxiety or stress without any knowledge of what their symptoms may be or what anxiety consequences might be. Anxiety can be related to stress, panic, eating disorders [2] or leading to depression. It mainly affects women [3] and children.

Usually, anxiety can be treated by specialists who are fully trained in mental health problems such as psychiatrists, psychologists or counsellors who can provide some ideas on methods and techniques so to manage anxiety disorders and related symptoms.

2. STATE OF ART

Psychological therapies are based on the study of human behaviour as well as mental activity related to human behaviour. These therapies typically explore concepts such as perception, attention, motivation, emotion, brain function, intelligence, personality, relationships, consciousness and the unconscious.

Depending on the mode they are realized, the following psychological therapies modes are distinguished among others, as in the following sections.

2.1 Physical Therapy

In physical therapy the psychologist sees his patients in his office; therefore, the patients are obliged to be physically there and be treated in the psychological cabinet. One patient sees the psychologist or therapist in his office or therapy room, and the rest wait their turn in a waiting room.

This is the most traditional process of acquiring psychological support [4]. The psychologist and the patient are meeting face to face; they have personal discussion and review the discussion material together, so that the psychologist provides personalised instructions to the patient. Proximity and contact are the predominant features of this mode.

2.2 Online Therapy

The online psychologist offers the same services as with the traditional psychologist, however, from a distance [5]. Therapist and patient are not in the same locus but they contact each other by electronic means; their relationship is established via computer-mediated communication. Here, distance and borders do fall; however, this mode suggests that the patient's relationship with the psychologist is not as warm and close as with physical therapy.

Depending on the communication and technology used, this mode of therapy can be realized via synchronous or asynchronous

communication tools such as Email / Chat / Conferencing (Skype) etc.

2.3 Virtual Reality

Simulation is a numerical technique that conducts experiments using a digital computer, creating experiences similar to reality [6]. Simulation functions are based upon predefined limits and have many advantages. For example, in "Technical Exposure", the therapy is more personalized and aids in coordinating and controlling situations that could not be done in the real world, improving the space-time relationship.

2.4 Mobile Application

Nowadays, applications are designed to provide basic information about anxiety and stress including meditation and breathing techniques as well as offline reading or graphic material that is accessible by the interested user [7]. In some applications, a user can find him/herself out of the suggested and normal stress level, based upon the results provided by an assistant. Here, there is no interactivity and no real and functional utilisation, nor can we understand it as a process of rehabilitation, as it does not offer a professional therapy service.

3. MTHERAPY: 21th CENTURY'S THERAPY

The research question in this research is the following: 'In what ways can we offer professional online service, that does not only get therapist and patient into contact, but also assists the patient on demand, even in cases the patient cannot contact the therapist?'

The proposed solution is a mobile application that has several features not available yet, taking advantage the extensive use of technology in the process of psychological rehabilitation. First, its basic functionality is to assist people with stress or anxiety so that these users can evaluate the degree of professional assistance acquisition using this application. In case they do not require professional assistance, the application would help them by suggesting appropriate ways to relax providing them theoretical material and an assistant available for such purpose.

If professional help is needed, the application assists the user in searching for a professional psychologist in order to acquire mobile therapy, also through web navigation from another device. This would help the patient in all stages of the rehabilitation process and would actively support a better diagnosis by monitoring the follow-ups throughout the rehabilitation process. Lastly, the mobile platform is easy and comfortable to use for both the patient and the therapist.

The next section describes the functions that distinguish, characterize and highlight the proposed mobile application as mTherapy, compared to other current applications. These functionalities are provided by the innate properties of the mobile device, as for example, portability and accessibility from any location the user finds himself, such as by GPS on specific geographic locations or the use of a camera as a means of visual contact in a live connection between patient and therapist. Also as a cloud-based application, mTherapy facilitates the complete and customized rehabilitation for the patient, as it is located and managed anchored in the flexibility and efficiency of the cloud computing technology.

MTherapy functions and related sections are described next.

3.1 Diagnosis

MTherapy features a section using a support assistant wizard to detect and identify stress and anxiety levels. Based upon specified and pre-programmed levels, that exceed the threshold of the normal levels, the software recommends the user several relaxation tools, including indications and techniques that reduce the levels of anxiety and stress the user finds him/herself.

Based on the wizard's results that reveal certain degrees of anxiety or stress levels, the application automatically shows the user the possibility to opt for a professional service therapy.

MTherapy not only does provide the user with the convenience of going to a therapist, but also facilitates practical and anonymous access to therapists so that the patient can contact the one s/he prefers.

Once the wizard completes the initial estimation, the patient can proceed to the basic registration of a series of concise data. After that step, the application suggests a number of therapists geographically nearby the user, accessing a professional network or use the mobile GPS function. These multiple choices provide the user with the flexibility and freedom to choose a face-to-face, blended (face to face and online) therapy or therapists offering their services exclusively online, regardless their geographic location. Such recommendations also accompany explanations on the benefits and convenience of an online therapy with respect to traditional therapy. For this purpose, the device accesses a therapists' database offering suggested services and simultaneously, it stores the users' persona details in a database so to choose a convenient and affordable way to access therapy.

The diagnostic wizard records observations and specific questions obtaining the maximum information possible regarding the type of anxiety disorder; this result is provided to the therapist for assessment when seeing the patient.

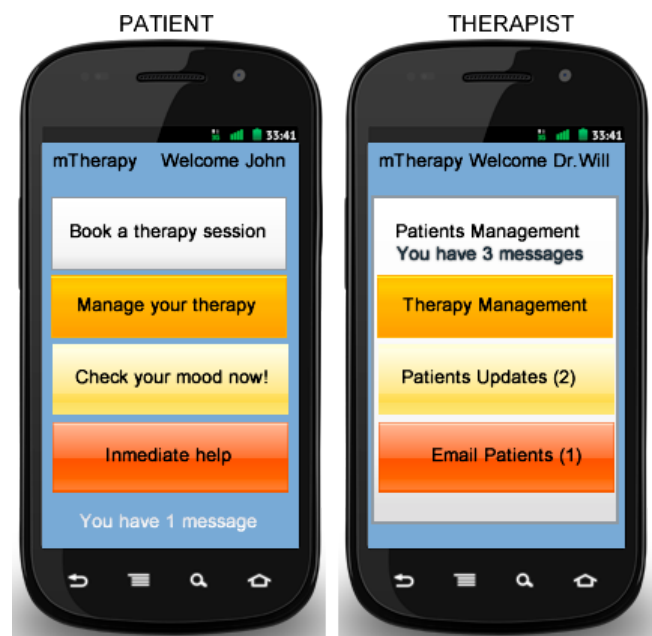


Figure 1. Patient and therapist service access.

3.2 Therapy

Once the user has chosen the therapist using mTherapy and after agreeing to undergo a therapy in short or medium term in order to

solve his/her problems, sessions are scheduled via a mobile camcorder, also offering an option to use any other preferred device.

Once the patient initiates the session, the application provides him with the option to start the therapy session previously booked through an appointment system. As such, the patient and the psychologist may have direct contact and establish a visual communication so to provide the therapist and the patient with all information possible towards therapy [8].

The therapy module offers the therapist and the patient the following options for each scheduled session:

- Videoconferencing Section: establish direct communication between patient and therapist, the first with the possibility of using a camera phone as an option for a video recording and to resources optimization available on the mobile device.
- Notes section: here, the therapeutic psychologist's advises and patient's concerns are collected.
- Files section: these are provided by the therapist, as for example, documentation, schedules or tasks, so to enhance the therapy process. They can be viewed and downloaded on the internal or external phone memory for later patient's review and consideration.

3.3 Therapy Management

3.3.1 The patient's view

The patient can view the session's history, wherein each session can be re-displayed as extracted from the video conferencing files. This provides a very practical approach to the rehabilitation process because it allows the patient to remember where and how the therapist's instructions were provided. Those video files are downloadable from the mobile device.

Also the patient can view the therapeutic entries based on specific information received. Likewise, the patient may note and record any concerns, problems, reflections, experiences or thoughts, on a draft for the next query. Thus, the patient has no need to write them manually or remember them for later use.

Also, the patient can access the attachments files uploaded to the cloud by the therapist with the possibility to download them at any time for a later review.

Lastly, the system provides an internal messaging system supporting specific and agreed communications between the patient and the therapist.

3.3.2 The therapist's view.

In addition to displaying the content (e.g. video, notes and attachments / documents / tasks) provided to the patient, the therapist views the patient's history, as for example panic attacks or critical moments, both in frequency and intensity; these collected by the assistant for primary patient care; the latter is used to assist the patient in situations in which the patient is not able to contact the therapist for any particular reason. The information serves to monitor the patient incidents, enquiries and steps during the rehabilitation process.

3.4 Monitoring

MTherapy provides access and use on demand at any moment so that the patient can not only take advantage of the information received from the therapist at any time and place and revise it through his mobile, but in addition, s/he can receive primary support and assistance in any situation as it occurs.

For this purpose, and for the benefits of the patient, even if the patient does not have Internet connection at the moment in need, the patient can access an assistant (downloadable and updatable cache from the cloud) as for example in critical intensive anxiety or panic attacks.

In occasions of emergency like these, the wizard provides the patient with interactive breathing patterns so to coordinate the patient breathing using the screen so to calm the patient down. It also suggests distraction techniques or therapy reminders, which the therapist has already customized depending on the situation and knowledge on the patient. The patient can access and use these resources in order to overcome these critical situations. It is therefore a customized, and thus, not a general self-help information service.

Likewise, whenever the patient responds to the primary care assistant, the discomfort levels he has experienced are recorded, so to be reported to the therapist along with the frequency of these unpleasant situations the patient goes through. This information is used by the system to provide the therapist with a visual graph of such incidents.

These notifications are sent to the therapist mobile platform as alerts, so to aid the therapist in learning more about the patient's problems. Such information is critical for the therapist to decide on immediate or less immediate contact with the patient so to supervise his condition enabling a progressive patient monitoring.

The therapist can also provide consultation to the patient about the usefulness of the advices to assist for the patient's primary care, and correct or modify any of these as necessary. Also, the patient can transmit the support service, or any other issues, derived from both the automated assistant and the therapist. This is to improve, introduce or serve as feedback in order to improve the application and supporting services.

Any wizard assistant change and modification is updated from the cloud and downloadable for offline use.

4. mTHERAPY: A CLOUD MOBILE APP

MTherapy resources are constantly available to the user, regardless user's time zone and location [9]. The documents are not physically stored on the user's mobile but are retrieved via the Internet. All that is needed is a mobile device or any other device connected to the Internet [10] [11].

Features and rehabilitation services are provided at large via cloud technology, therefore, they do not require the patient or the therapist being in a specific physical location, but may be at home, enjoying the convenience of the service incorporating an improved quality life.

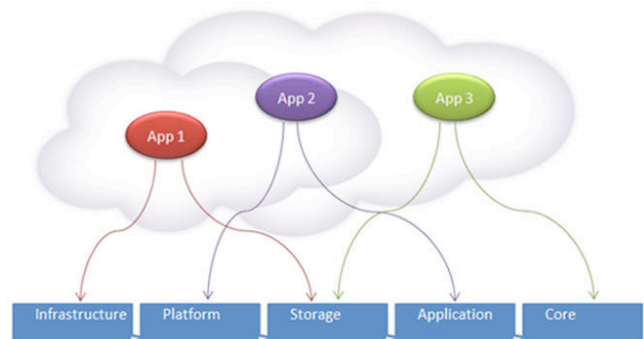


Figure 2. Structure of the mTherapy cloud

Also, in relation to the interface and content customization of the patient module, these are easily achievable, and as the location of the content is on the cloud, both the therapist and the patient do not have to worry about file management and storage. This custom service takes place without the need for significant financial or technological effort [12].

Regardless the mTherapy introduction and the cloud-based mobile application, mTherapy may also be accessed via a computer through an enabled web browsing [13].

The technical details related to this cloud-based application refer to the following characteristics that support mTherapy to be an easy to use tool to support the rehabilitation purposes:

- The information (videos, database, users, and documents) is stored in a cloud.
- Data can be downloaded promptly (in this case, video of each session and material provided by the therapist) for offline access.
- Support for different user needs, as for example, application cloud data backup with different characteristics such as data compression, security, and backup schedule [14].
- Web browser access and use [15] and / or a mobile version via applications installed on Internet-connected devices, such as desktop computer and mobile phones.

5. CONCLUSION

This paper presented the concept of rehabilitation support using a cloud-based mobile application to improve the interconnectivity of both the patient and the therapist in the field of psychological therapy. MTherapy aids the communication, information sharing and maximum availability of a patient through the use of a mobile device. MTherapy is a prime candidate for psychological and different scope therapies developed to support a comfort and continuous patient care so that the patient will always feel accompanied in the recovery process.

Internet and cloud-computing technology are the mTherapy key elements, and unlike other existing applications, it is not a self-help option but provides a full rehabilitation service using mobile basic functions. As such, the mobile device development opens new opportunities for the patients' rehabilitation process.

Mobility, user interface and services may be improved in the future; as such, additional resources may be needed to meet any arising needs towards the mTherapy access and use by both patients and therapists.

6. REFERENCES

- [1] Rojas, E. (2000). La ansiedad. Debolsillo. Ding, W. and Marchionini, G. 1997. A Study on Video Browsing Strategies. Technical Report. University of Maryland at College Park.
- [2] De Alda, Í. O., Espina, A., & Ortego, M. A. (2006). Un estudio sobre personalidad, ansiedad y depresión en padres de pacientes con un trastorno alimentario1 A study about personality, anxiety and depression in parents of patients with an. *Clínica y Salud*, 17(2), 151-170.
- [3] Arenas, M. C., & Puigcerver, A. (2009). Diferencias entre hombres y mujeres en los trastornos de ansiedad: una aproximación psicobiológica. *Escritos de Psicología*, 3(1), 20-29.
- [4] Esparcia, A. J. (2008). La psicología de internet y la psicología en internet. Regulación deontológica y ética de la intervención psicológica a través de internet. *Psicología en Revista*, 8(12), 11-23.
- [5] Soto-Pérez, F., Franco, M., Monardes, C., & Jiménez, F. (2010). Internet y psicología clínica: Revisión de las ciberterapias. *Revista de psicopatología y psicología clínica*, 15(1).
- [6] Perpiñá, C., Baños, R. M., Botella, C., & Marco, J. H. (2001). La Realidad Virtual como herramienta terapéutica: Un estudio de caso en las alteraciones de la Imagen Corporal en los Trastornos Alimentarios. *Rev. argent. clín. psicol*, 10(3), 227-241.
- [7] Paules Ciprés, A., Fardoun, H. M., Alghazzawi, D. M., & Oadah, M. (2012, October). KAU e-health mobile system. In *Proceedings of the 13th International Conference on Interacción Persona-Ordenador* (p. 29). ACM.
- [8] Pérez Villar, J. (1985). El Análisis de la Comunicación en Psicoterapia (II Parte). *Revista del Hospital Psiquiátrico de La Habana*.
- [9] Burdea, G. C. (2009, June). Rubber ball to cloud rehabilitation musing on the future of therapy. In *Virtual Rehabilitation International Conference, 2009* (pp. 50-50). IEEE.
- [10] Fardoun, H. M., Altalhi, A. H., Cipres, A. P., Castillo, J. R., & Albiol-Pérez, S. (2013, May). CREhab: a cloud-based framework for the management of rehabilitation processes. In *Pervasive Computing Technologies for Healthcare (PervasiveHealth), 2013 7th International Conference on* (pp. 397-400). IEEE.
- [11] Fardoun, H. M., Cipres, A. P., & Alghazzwi, D. M. (2013). Distributed User Interfaces in a Cloud Educational System. In *Distributed User Interfaces: Usability and Collaboration* (pp. 151-163). Springer London.
- [12] T Ograph, B., & Morgens, Y. R. (2008). Cloud computing. *Communications of the ACM*, 51(7).
- [13] Miller, M. (2008). *Cloud computing: Web-based applications that change the way you work and collaborate online*. Que publishing.
- [14] Kaufman, L. M. (2009). Data security in the world of cloud computing. *Security & Privacy, IEEE*, 7(4), 61-64.
- [15] Wang, L., Tao, J., Kunze, M., Castellanos, A. C., Kramer, D., & Karl, W. (2008, September). Scientific Cloud Computing: Early Definition and Experience. In *HPCC (Vol. 8, pp. 825-830)*.