



Önermek UAE-Hasta Portal: Sağlık Hizmetlerinde Yeni Bir Yön

Proposing UAE-Patient Portal: A New Direction in the Health Services

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Özetçe—Bu Hasta portalı, hastalara kişisel sağlık bilgilerine güvenli ve güvenli bir şekilde erişebilmesini sağlayan ve önemli işlevler sunan bir web sitesidir. Bu yazıda, BAE'deki sağlık hizmetlerinin geleceği için, operasyonel ve insani gayret tasarruflarını teşvik etmek için yeni bir sağlık hizmeti düzeyi tanıtan bir taslak sunulmaktadır. Bu, UAE'lerin portalları benimseyen hastalar üzerinde önemli etkiye sahip olabilecek faktörleri ortaya çıkarmak için farklı teknikler benimseyen bir çerçeve önererek başarılmıştır.

Anahtar Kelimeler — hasta portalı; UAE; sağlık Hizmetleri; PHR; kullanılabilirlik testi, TAM

Abstract— Patient portal is a website that provides patients a safe and secured access to their personal health information and offers some significant functionality. This paper proposes an outline for the future of the health care services in the UAE which will introduce a new level of health care to encourage operational and human effort savings. This is accomplished by proposing a framework which adopts different techniques to reveal the factors that may have significant influence on UAE- patients adopting the portals.

Keywords — patient portal; UAE; health services; PHR; usability test, TAM

I. INTRODUCTION

Electronic Health Record (EHR) has wide range of definitions, components and directions based on the inserted functionalities and associated tasks [1]. A broad description of an EHR is divided into three main parts: (1) Patient, (2) Physician/ Doctors, and (3) Health provider/management part. In general, there are two main barriers to effectively reaching the client population

through these parts [2]: (a) clients must have access to the technology; and (b) the technology must be user-friendly and facilitate retrieval of information that is clearly presented, well organized, and relevant. In UAE, the first barrier has been eliminated due to the technological evolution in the country. The statistics [3] showed that the number of internet subscribers increases significantly from 0.4M in 2005 to 1.2M subscribers in 2015. Also, 90% of the individuals has internet access at home in 2014 and around 48% were using the internet in their workplace in 2010. Yet, in 2010, only 16.8% were getting some health services using the internet where more than 35% were reading/ downloading newspapers and magazines.

The above facts influence this research to attempt predicting an outline for the future of the health care services in the UAE, especially for the patient side: patient portal, the first part of the EHR. The main objective of this research is to propose a UAE-patient portal, which will introduce a new level of health care to encourage operational savings and may replace some in-person visits and human efforts from different sides. To accomplish this objective, an investigation will be carried out using different techniques to reveal the factors that may have significant influence on patients adopting the portals and isolate the factors that have no effect. This paper is just a roadmap for such investigation and will be the base for more future work.

The next section covers an essential background for the participatory design technique. Section II focuses on different countries using the portals from the literature. Section III introduces a three-stage framework that integrates a methodology used in information system discipline with methods from empirical research being used in social science disciplines. The framework (Analysis – Design - Test) suggests the roadmap for the



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future directions. A conclusion and recommendations are presented at section IV.

II. LITERATURE REVIEW

A. Patient portals: Cases from the past

Patient portal is a website that provides patients a safe and secured access to their personal health information and offers some significant functionality such as online appointment scheduling, lab results, history comparisons, and other self-management tasks. It was discussed in different studies, such as [2] and [4], that patient portals produce desirable results including better chronic disease management, patient satisfaction and empowerment, efficiency, and better patient-consultant interaction.

Different portals (customized or readymade) have been developed and used in different countries alongside electronic patient health records (PHR) [5] depending on the needs, desires and economic status. For example, in the United Kingdom and Germany, the health organizations are using the Microsoft HealthVault for patients. Microsoft HealthVault was also launched in the United States as an integrated PHR system, in October 2007 in the United States [6]. In Canada, TELUS offers HealthVault-powered service to launch their own PHR system which is built on Microsoft HealthVault, and was hosted on Canadian servers renamed as “TELUS health space”. TELUS health space is “the first Canadian online consumer health platform helping patients take an active role in managing their health” and “empowers users to electronically store and share health information in one secure, private and easy-to-use place, before sharing it with family and physicians.” [7]. This software relies on a variety of networks to connect hardware (computers, servers, networking device etc.) to share and manage health information and access the Internet.

In Europe, an e-health portal project called “epSOS” was developed that “facilitates secure cross border exchange of patient data.” [8] This is done by establishing an effective communication channel between patient data and the treating doctor via “automatic translation of relevant electronic data” [8]. It provided a single access point to Danish healthcare services from which users can avail of a variety of services such as: book GP appointments, order medications and renew prescriptions, review their medication data and communicate with healthcare authorities. In addition, the portal offers, e.g., directory services, general and disease-specific health information, access to national guidelines, basic information regarding hospitalizations. The project includes about 20 countries from the region. In Denmark, for example, the public National Health Portal was launched in December 2003 and was merged with epSOS in 2013.

III. RESEARCH METHODOLOGY & ROADMAP

In this research, three-stage framework is introduced to tackle new challenges in the health services in general, and UAE in particular. The framework integrates a methodology used in information system discipline with methods from empirical research being used in social science disciplines. First, a set of functionalities and components are expected to emerge from the participatory design approach which will use the recommendations of the stakeholders. Then, these functionalities are utilized to design a set of prototypes for the user-interfaces used in the patient portal that satisfies the patients, doctors, management, and other stakeholders. The prototypes are iteratively developed and tested to solve any problem found in the initial design in order to improve them. Finally, different usability testing techniques and methods are used to predict the acceptance of the patients in the near future and to have different points of view in order to maximize the benefits from such portal.

A. Stage 1- Analysis:

The objective of the analysis stage is to define the degree that the new PHR facilitates the ability of patients to perform the main health tasks online through the suggested portal. This will be achieved through analyzing the existing PHR requirements in the relevant literature in modern countries. These requirements will include two main issues: The patient interaction process of PHR along with their perceptions toward this technology, as well as, the technical infrastructure of the existing PHR that could be integrated to the new user interface. Understanding these issues will help in defining the scope of the suggested PHR in UAE.

Initially, the information collection starts from the patients accessing process through the portal; each portal provides a password-protected access to enter identification process. Kim and Johnson [17] evaluated the functionality of 11 PHR portals, whereas Hoyt *et al.* [18] chose 12 main functionalities for the patient portals as essential ones. In general, they have the same functions (as shown in Figure 1) in allowing patients viewing the medical history and entering new medical conditions (nonspecific symptoms, general systemic disorders, and specific etiologic diagnoses). In addition, they allow patients to find information about laboratory tests, medications information related to immunizations and diagnostic studies. Providing recommendation actions instead of having the lab formulations and scientific feedbacks suggest increasing the effectiveness of the portal [19]. Also, providing executive dashboard for the management empower the quality and performance indicators [19] which increase the effectiveness of the portal.

Also, extra requirements will be determined using the participatory design approach to focus on the special issues in the current environment. This is done by having collaboration between experts from the domain to highlight

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their main recommendations. Also, some health mid-mangers and regular users are included to ensure the integration between the managerial and user services in the portal. Specific design improvements and general design guidelines for older WWW users are discussed with experts and regular users.



Figure 1. The Use Case for the main functionalities for a patient portal for the patient

Participatory design [9] is an integrated approach that focuses on full and active participation of the stakeholders and end-users throughout the design and development process, rather than designing a system “for” them. This will result in creating more appropriate, and user friendly products or services [10]. The most common understanding of the participatory design philosophy enunciates three principles [11]: (a) the goal of participatory design is to improve the quality of life, rather than demonstrate the capability of technology; (b) the orientation of participatory design is collaborative and cooperative, rather than patriarchal; and (c) participatory design values interactive evaluation to gather and integrate feedback from intended users, thereby promoting design iteration.

This very high level of collaboration and joint decision making power capture user information and feedback ideally at every stage, with input from everyone involved; users, designers and other important stakeholders [10].

B. Stage 2- Design:

Defining the requirements of PHR architecture in the previous stage will determine the components and

boundaries that enable customizing and adding new features to design a prototype of PHR in UAE. The prototype has to include the visualization of PHR tasks and components, such as the primary windows to manage, browse, retrieve, and store the health information of patients. The suggested functions, services and additional issues are designed into interfaces’ prototypes. The prototypes are iteratively tested and developed to solve and improve any problem found in the initial designs.

C. Stage 3- Testing:

Finally, the proposed prototype will be tested for its usability to predict an outline for the future of the health care services in the UAE, especially for the patient side. Different methods will be used to examine the proposed user-interfaces for any difficulties, defects, disappointments, or/ and expectations. Three types of testing will be used to evaluate the prototype of the PHR interface.

a) Usability testing:

Usability testing is a well-known technique that focuses on the user experience while using freely a new system or prototype to evaluate any design issue that may cause user errors or difficulties [12]. In our research, different methods of usability testing are used to examine the proposed user-interfaces for any difficulties, defects, disappointments, or/ and expectations. The following were identified to be the most suitable usability testing approaches for the health domain:

- SUS:

The System Usability Scale (SUS) [13] is a “quick and dirty” survey scale that would allow the usability practitioner to quickly and easily assess the usability of a given product or service [14].

- Heuristic Usability Test:

The heuristic evaluation is one of the most widely used usability evaluation methods. Heuristic Usability Test requires a number of professionals to examine the usability of a system based on a set of “heuristics” rather than some specific rules. In general, when selecting the set of heuristics, there are generic heuristics which are usually easy to apply and understand, or specific heuristics which can detect more specific usability issues related to the domain. [16]

b) Technology Acceptance Model (TAM)

The technology acceptance model (TAM) is a prediction model for the adaptive behavior of the future users toward a specific technology [15]. Simply, TAM concentrates on the main four perceptions that will predict actual usage of a technology: (a) perceived ease of use, (b) perceived usefulness, (c) attitude toward use, and (d) behavioral intention.

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Figure 2. The technology acceptance model (TAM) [15]

c) Quantitative Methods

A survey for patients will be designed according to the usability heuristics principles and Technology Acceptance Model (TAM). Patients have to browse the suggested PHR interface and fill the survey questions according to TAM factors and its related Likert scale items. Random sampling will be conducted through UAE health organizations such as Hospitals and Clinics. Statistical tools will be used such as CFA, Regression and ANOVA to answer the main study questions.

IV. DISCUSSION AND FUTURE DIRECTIONS

Not surprisingly, the Arab countries' roadmap in the regards of patient portals seems to be small and not recognized. The majority of literature that does exist is limited mostly to countries and projects from different sources but the Arab world. At least, there is little to no information available in the literature giving specific attention to patients' portals in the Arab countries. For example, a PubMed search performed in January 2017 using the parameters "(Patient portal AND Arab OR patient health record AND Arab)" shows no studies to date.

Therefore, the endowment of this study is its distinction in the Arab countries and UAE in particular. It will contribute to society by enhancing the awareness of a group of people there. It also contributes to the related healthcare policy makers and developers alike in UAE in their planning for health technology applications in the future. Accordingly, they have to build on this type of study to craft strategies that focus on the technology-generation in the usage of patient portal [20].

In this paper, a new framework for developing patient portal has been proposed. The framework has identified three main stages; determine the main functionalities (analysis), developing suitable prototypes (design), and testing the usability of the proposed system (testing). Each stage will be formed by well-known techniques and methods. Participatory design approach will be used in the analysis stage to determine the main functionalities with the help from the main stakeholders based on the main facilities in the literature. Then, different usability tests will be conducted to test the proposed layouts and prototypes. Finally, a comprehensive evaluation through the application of such portal will be performed. This framework will be shared between the patients and the medical bodies (doctors, consultants, and health providers); and hence strengthening further the adoption of such system in the UAE.

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