

As a human factor, the attitude of healthcare practitioners is the primary step for the e-health: First outcome of an ongoing study in Morocco

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Abstract

In the healthcare area, information and communication technologies (ICT) cannot improve performance of the involved stakeholders if they aren't completely accepted and used. The resistance to end-user ICT by professionals in this area is a well-known matter. To help raise their acceptance in Morocco, we have to better appreciate why a number of practitioners adopt a positive attitude toward ICT use, while others are still reluctant.

The study conducted in Souss Massa Draa province, located in south of Morocco, attempts to understand the attitude of healthcare professional, especially those who are directly involved in the process of patient care. This communication examines especially the intention of physicians to better appreciate the interaction between them and ICT. It highlights the first finding as far as physicians concern in terms of attitude which is the first step to e-health when it is positive. The main purpose is to communicate the progress of the research work conducted currently in Morocco.

1. Introduction

The reluctance to the use of information and communication technologies (ICT) by professionals in the healthcare area is a well-known matter. E-health as a new vision of the healthcare system often defined by the use of ICT by practitioners, citizens and all healthcare stakeholders allows health professionals, especially physicians, to handle their acts and tasks in efficient way.

The government of Morocco fixes a strategy based on ICT in order to achieve economical and social objectives by 2012. The Moroccan e-government named e-Morocco, as a major part of this strategy attempts to develop the administration information process in order to allow citizens, professionals, and the use of ICT [1]. The relationship between these stakeholders is shaped by a matrix of three rows and three columns. For instance, the government to government named G2G. It concerns the communication and the sharing of information between institutions and diverse departments of the government. The services supplied by companies to governments named B2G (business to government). As far as citizens concern, they are involved, for

companies, access the government services in on-line manner. The global objective lies in the improvement of the service's quality and the diminution of delays. The main purpose is to understand how physicians, nurses, midwives, administrators, and students in medicine deal with the information and communication technologies in the health context in south of Morocco. By Using the Zhang and Li framework [24], the study conducted examines human factors. It analyses mainly the attitude and the anxiety of practitioners, particularly the ones of physicians in order to better understand the interaction between these practitioners and ICT. It highlights a first outcome as far as physicians concern, particularly the attitude which is the first step to e-health when it is positive. The main purpose is to provide the progress of the research work conducted currently in Morocco.

2. An outline on the e-government

E-government is a quite recent form of public services that involves different stakeholders such as citizens, companies, associations, and governments [18]. It's usually defined as the use of information and communication technologies (ICT) in public sector [6]. It refers to the use of these technologies, particularly the Internet, by government agencies in order to enhance the effectiveness and efficiency of the governance [16][20]. According to the World Bank, e-government leads to enhance the effectiveness, efficiency, transparency and accountability of government.

In general, the research conducted focuses more on the organizational and managerial aspects of e-government, social relations among different stakeholders and political issues related to

instance, per the request of some certificates and documents using mainly the Internet technologies (C2G, citizen to government) and/or when they use the Web via e-commerce solutions in order to do their shopping.

The e-government applications involve different actors and include four main steps as far as their implementation concern. The first one is the

information implementation, the second is the interaction step, the third is the transaction stage, and finally the integration one [8].

The information implementation is based on the consultation of pages of portals that can reduce calls and the direct contacts with citizens, while the interaction stage mobilizes electronic exchanges with them. The transaction one corresponds to online processing of transactions, which relies on structured databases. The fourth phase is described by the integration of inter-organizational and intra-organizational processes within a given organization. It requires a strategic view as it is intended to ensure alignment with the global strategy [21]. The government strategy has to be thus designed to evolve toward a system including different features such as flexibility rules, social values, technology use, and level of alphabetization.

3. E-health as a major field of the e-government applications

Healthcare as an important element of the public sector, characterized by the complexity [17] and high intensity of information, has an actual need to employ these technologies. At the beginning, in healthcare, ICT were used in the financial system to sustain the book-keeping and reporting system [9]. Then, the clinical division started investing in technologies in order to support some in-house activities such as radiology, laboratory and pharmacy [2], and recently, the purpose turned toward wide global projects covering clinical system including a completely computerized electronic patient medical record [12].

Nevertheless, ICT adoption by healthcare industry is still very slow, compared to other industries [10], even if healthcare organization is significantly infected by the use of those technologies [3]. This impact is due to the outward appearance of a new paradigm [19] for healthcare, called e-Health which involves new mechanisms, new rules, and new ways of accomplishment tasks in the healthcare area.

E-health is defined as *“the application of Internet and other related technologies in the healthcare industry to improve the access, efficiency, effectiveness, and quality of clinical and business processes utilized by healthcare organizations, practitioners, patients and consumers in an effort to improve the health status of patients”* [15].

It includes solutions based on ICT for health authorities and professionals, as well as personalised health systems for citizens. Applications include health information, telemedicine services, health portals, electronic health records and ICT based tools assisting treatment, diagnosis and prevention. E-health can benefit not only citizens but all the staff

employed in the health sector including nursing, care and administrative staff. Furthermore, e-health can contribute to achieving a safer working environment for health practitioners.

The infrastructure that supports e-health involves several dimensions [7]. According to Deluca and Enmark these dimensions are: (1) Telecommunications: the physical and technical layer that enables the connections and interchange of information through various media (cable, satellite, wireless...). (2) Systems of access to data as Internet, Intranet or Extranet: based on protocols that deliver access to internal and external data to all participants in the healthcare delivery process. (3) Core data systems: function-based systems that support the key processes of the enterprise. These may be financial, clinical or administrative systems at any of the partners in the e-health arena. (4) Hardware: computers, telephones and other hardware provide the physical support for this infrastructure. (5) E-mail: exchange of information between partners using some combination of the Internet, Extranet and Intranet.

The interaction of these layers permits the exchange of information and transactions that provide the environment for e-health. The fast development of new technologies is also reflected in the adoption of many tools, often significantly less expensive than the prior generation [5].

E-health tools and applications can provide fast and easy access to electronic health records at the point of need. They can support diagnostic by non-invasive imaging-based systems. They support surgeons in planning clinical interventions using digital patient specific data, provide access to specialised resources for education and training and allow radiologists the possibility to access images anywhere. Electronic health records also enable the extraction of information for research, management, public health or other related statistics of benefit to health professionals.

Successful implementation of e-health requires cultural features and business processes in terms of the way healthcare is delivered. It also requires clinical practice and process reform to enhance delivery of health care, and provide more integrated and timely access to health information.

Broderick and al. [5] consider that e-health applications involve several concerns as safety, quality and legal issues. With high speed communication methods available, the absence of effective safeguards can diminish the credibility of the e-healthcare that's why a global strategy of communication safety is required. The quality of e-healthcare delivery depends on different factors as

level of interactivity, content and design of the website. Legal issues are related to the practice of the healthcare professionals, such as physicians and nurse practitioners, through electronic dissemination of healthcare information. These issues are also related to the privacy of individuals disclosing personal, sensitive, and identifiable health information.

E-health is derived from the expansion of health care informatics and biomedical computer, when the development of ICT is especially for managing the complex work and different services of hospital.

Nowadays, e-health encompass the simple use of applications ranging from simple administrative tools, or technology for assistances prevention, diagnosis, and health monitoring [22], it covers integrated information tools that allow secure access to personal health data, and includes complex clinical application that support clinician in diagnosis and treatment, and support citizens in their own environment. For the time being, in this communication, the definition of e-health is reduced voluntary to its practical and concrete meaning. E-health is subsequently defined as a manner of delivering and achieving better health out comes through effective and innovative use of health information [11]. It discusses the use of ICT, particularly internet, to improve the access, efficiency, effectiveness and quality of any process (clinical or business) related to healthcare [15].

To sum up e-health can be conceived as a paradigm shift away from traditional healthcare system to the new one, characterized by the move to data, information, and knowledge [5] to practitioners, patients and consumers.

E-health becomes an integral part of present health care delivery. Referring to British Columbia [4]), it offers many benefits to the large number of healthcare stakeholders¹, such as the improved access to a broad range of health information for citizens, the higher quality of services enabled by the availability of health information for patient, the timely patient clinical decision for care providers, delivered by the correct and the necessary information.

E-health is promoted as a mechanism to bring growth and process improvement to healthcare [13][14]. It is used to reduce errors, waste and rising healthcare costs [6]. It allows health professionals to manage their activities more efficiently by receiving relevant timely updates, and enables them to collaborate and share their knowledge about patients, and ensure that the best coordination is provides.

¹ Healthcare stakeholders are: patients, citizens, providers

E-health is a quite recent paradigm leading to a new vision of the health system, including the use of ICT by practitioners, citizens and all healthcare stakeholders. It is a set of computerized tools and methods to get better the healthcare system in terms of cost reduction, inaccuracy diminution, and information quality improvement. It lets health professionals, especially physicians, to handle their performance more efficiently by getting pertinent, applicable and timely up to date information. It makes collaboration and sharing knowledge concerning patients possible between these professionals and make sure that the best health service is granted.

This becomes possible if ICT are totally accepted [23] and used correctly by all the actors performing in the health area, especially those who are involved directly in the patients care process. Physicians, nurses, midwives, and administrators of healthcare should be convinced that the adoption of these technologies would help them providing a better quality health services to their population.

In order to understand the perception, in Morocco, of each of these actors, in terms of ICT uses, the authors started a research work since four year. The main purpose of this communication is to provide the first findings using Zhang and Li framework[24]. According to these authors, in management information systems (MIS) studies and research, human factors concerns the way how he interacts with the information, technologies, and tasks, and this within defined context such as business, managerial, organizational, and cultural. Studying a sample of published research papers in the most famous MIS journals, Zhang and Li make available a framework to study the importance of human factors.

4. Zhang and Li model overview

Zhang and Li (2004) interested in the concept of 'Human Computer Interaction' (HCI) as a discipline concerned with the human use of ICT and that analyses the organizational and social focus of this use. They confirmed a shift in the field of management information systems from a technocentric view to a focus that includes the organizational and social dimensions.

Their study mobilizes the MIS literature between 1990 and 2002 through two well-known journals: 'MIS Quarterly' and 'Information Systems Research'. It selects and classifies this literature by the use of different topics related to the study of HCI and represented in the model shown in appendix 1.

The framework gives importance to human factors as a central element in the study of ICT use in organizations.

The human component in Zhang and Li model explores characteristics that allow the comprehension of human and his interaction with ICT. It's based on four categories of issues: demographics as gender and age, physical or motor skills, cognitive aspect and emotion issues like fear, affectivity and anxiety.

The second dimension referees to technological aspects that include hardware, software, data and information. The interaction between the two components represents traditional studies concerned with design, implementation and usability of technology. The authors noticed that this interaction is narrow because it doesn't allow understanding neither the use of technology by users in real contexts nor the impact of technology or its evaluation by actors.

In fact, the third component of the framework represents the nature and characteristics of tasks supported by the use of technology. These tasks are carried out in a specific context that "imposes constraints or significance for doing and completing the tasks". Zhang and Li identified three categories of context: organizational context, social context and global context.

The task and context components are essentials to the dynamic of interaction between human and technology. It highlights the role of context factors that influence not only the use of technology but the way that actors complete tasks in the organization.

Results of Zhang and Li Study confirm the importance of these dimensions of analyze as studies interested in ICT use, evaluation and impact represent 82% of the overall topics. In this area of studies the most important approach used by authors is related to behaviors analysis (27.7%). Researches about performance count about 12.4% of all approaches used in this area.

5. Research methodology and data

A 150 questionnaires were distributed to a sample of physicians, administrators, nurses, midwives, and students completing their medicine study, working in public hospitals, private clinics, and Doctor's offices, and other health institutions, located in south of Morocco, in Souss Massa Draa area.

During two months period, 120 filled questionnaires were received. This represents a high return rate of 80%. Only 80 of them were selected for being analyzed one by one. The incomplete ones were not retained for the analysis.

Sphinx software was used for data assessment. Human factors, Context, tasks, and technologies

were retained in four distinguished categories. Human factors elucidated by individual features such as attitude, self efficacy, anxiety, and intention. The context is explained by organizational issues for instance management support, the infrastructure complexity, and working conditions, while tasks are described by usefulness. The ICT are explained by the ease of use. Except for the anxiety that is measured with the degree of disagreement, each of the all other variables was measured using the degree of agreement.

For instance, the "Attitude" as a variable is explained by three items (1) A1: The ICT use for the management and the patient care is a good idea (2) A2: The ICT use for the management and the patient care is beneficial (3) A3: The use of ICT for management and patient care is satisfying

6. First research finding and conclusion

In the population studied, generalist physicians were predominant among the returned questionnaires (table 1), followed by specialist physicians. The both accounted for more than 56 % of the overall questioned population retained for the analysis. Nurses represent 15%, administrators 10%, midwives 10%, and students almost 9 %.

As shown in table 2, **23.8%** is the percentage of agreement that specialist physicians responded and for whom the use of ICT for management and healthcare of patients is a good idea (A1). **22.5%** is the percentage of agreement corresponding to "The ICT use for the management and the patient care is beneficial" (A2), and **21.3%** notifies the agreement for "The use of ICT for management and patient care is satisfying" (A3). The Attitude to use ICT by Specialist physicians represents then an average of 22.53% of the whole replies retained. The 27.1% is the average for generalist physicians, 9.6% for administrators, 12.93% for nurses, and 5.03% for midwives.

Of 19 specialists almost 95% have positive attitude when it comes to the use the information technology and communication. 53% of them are not anxious for the use of these technologies. As a first finding, in Morocco, in relation with other human factors considered in the Zhang and Li model, ICT are perceived differently within the actors of healthcare process. For instance, 76% of specialist physicians consider that the human factors is the most important for them, the information and communication technologies comes second with 64 %, then tasks with 55 %, and finally the context that represents 38% only.

Table 1: breakdown of retained replies

category of population	Break-down of retained replies	Percentage
Specialist physicians	19	23,8
Generalist physicians	26	32,5
Administrators	08	10
Nurses	12	15
Midwives	07	10
Students completing their medicine study working in hospitals	08	8,7

consider other variables such as intention and self efficacy. This is will be handled in future research work. Healthcare professionals questioned in this study are, on the contrary, less aware of factors associated with context.

The first results of this ongoing research provide a view on the positioning of practitioners in the field of health in South of Morocco, in relation with the four dimensions of Zhang and Li model. With regard to specialist physicians, human factors are perceived as being the most important among the four factors of the model. Note that the human factors are tested only by the attitude and the anxiety; it still needs to

Table 2: The percentage of degree of agreement for retained replies

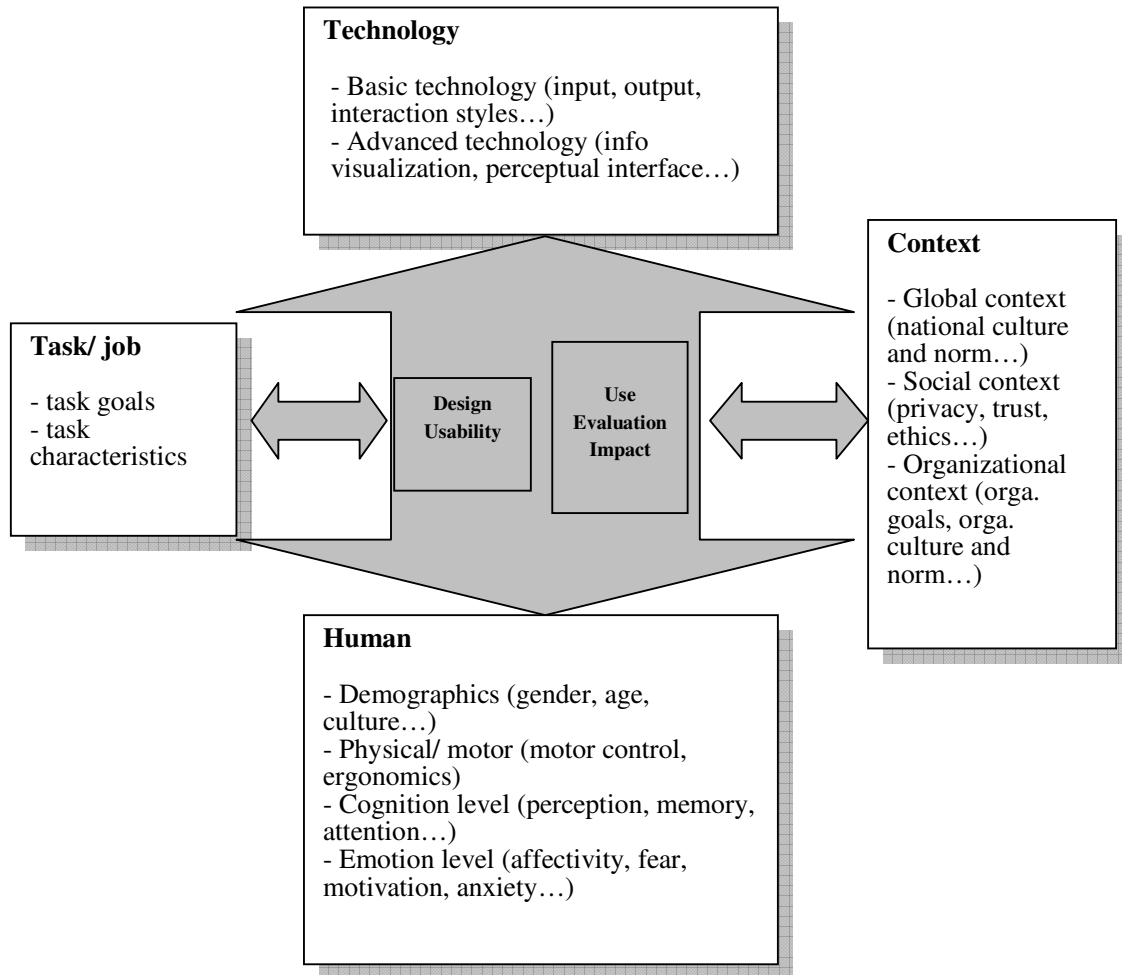
	Specialist physicians	Generalist physicians	Administrators	Nurses	Midwives	Others	Total
A1	23.8	28.7	10	15	7.5	8.8	93.8
A2	22.5	26.3	10	13.8	3.8	8.8	85
A3	21.3	26.3	8.8	10	3.8	6.3	76.3
Average	% 22.53	27.1 %	9.6%	12.93%	05.03%	7.97%	85.03%

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Appendix 1



Framework of broad HCI issues and concerns, (Zhang and Li, 2004)