LEARNING READINESS ASSESSMENT FRAMEWORK IN PROMOTING E-HEALTH ENGAGEMENT AMONG LIBYAN NURSES

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by

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LIST OF ABBREVIATIONS

AB	Ability
APP	Appreciation
BTS	Bartlett's Test of Sphericity
C	Connectivity
CPD	Continuing Professional Development
EHR	Electronic Health Records
EHRAF	e-Health Readiness Assessment Framework
EHRAM	e-Health Readiness Assessment Methodology
EFA	Exploratory Factor Analysis
ENG	Engagement
HA	Hardware Availability
HR	Human Resources
ICT	Information and Communication Technology
IT	Information Technology
KMO	Kaiser-Meyer-Olkin
LRAF	Learning Readiness Assessment Framework
MOT	Motivation
N	Networking
NS	Not Sure
OITIRS	Organizational Information Technology, Systems Innovation Readiness Scale
ORC	Organizational and Functioning Readiness for Change
P	Policy
PCA	Principal Component Analysis
PEHF	Provincial e-Health Framework
SAV	Software Availability
SD	Strongly Disagree
SA	Strongly Agree
SOA	Service Oriented Architecture
TS	Technical Support
VIF	Variance Inflation Factors
VMC	Video Mediated Communication
WAP	Wireless Access Protocol

KERANGKA KERJA PENAKSIRAN KESEDIAAN PEMBELAJARAN DALAM MENINGKATKAN PEMBABITAN E-KESIHATAN DI KALANGAN JURURAWAT LIBYA

ABSTRAK

Penggunaan perkhidmatan e-Kesihatan oleh kerajaan Libya telah menerima perhatian yang tinggi kebelakangan ini. Kajian ini memfokuskan kepada cara faktor-faktor utama atau unsur-unsur keupayaan bekerja dari segi persekitaran struktural, ketersediaan teknologi, dan isu-isu lain yang berkaitan dengan kecekapan mempengaruhi penglibatan jururawat dalam penggunaan e-Kesihatan. Oleh itu, kajian ini bertujuan untuk membina Rangka Kerja Penaksiran Kesediaan Pembelajaran (LRAF) untuk hospital di Libya berdasarkan adaptasi perkhidmatan e-Kesihatan dalam pendidikan kejururawatan. Sebanyak 255 soal selidik telah ditadbir dalam kalangan jururawat di tiga hospital wilayah di Libya. Selepas penyaringan data, hanya 200 soal selidik telah didapati sah untuk penganalisisan. Keputusan Analisis Faktor Eksploratori (EFA) menunjukkan bahawa kesediaan struktur dijelaskan oleh lima faktor (dua faktor setiap satu untuk sumber manusia dan ketersediaan perkakasan, dan satu faktor untuk polisi). Kesediaan teknologi dijelaskan oleh lapan faktor (satu faktor untuk menyemak perisian, dua faktor setiap satu untuk sokongan teknikal dan rangkaian, dan tiga faktor untuk penyambungan). Walau bagaimanapun, kesediaan kecekapan dijelaskan oleh enam faktor (satu faktor peningkatan, tiga faktor keupayaan, dan dua faktor motivasi). Seterusnya, faktor-faktor tersebut telah disahkan bawah domain-domain kesediaan struktural, kesediaan teknologi dan kesediaan kecekapan. Tambahan lagi, kesediaan struktural, dari aspek sumber manusia dan ketersediaan perkakasan; kesediaan teknologi, dari aspek

ketersediaan perisian, jaringan, penyambungan dan sokongan teknikal; dan kesediaan kecekpan dari aspek keupayaan dan motivasi, berkorelasi secara signifikan dengan penglibatan jururawat menggunakan e-Kesihatan. Kesimpulannya, jelas bahawa pelbagai pihak yang berkepentingan perlu mengambil bahagian dan terlibat dalam proses pembangunan strategi e-Kesihatan untuk kejayaan pelaksanaan inisiatif e-Kesihatan dalam sistem penjagaan kesihatan.

LEARNING READINESS ASSESSMENT FRAMEWORK IN PROMOTING E-HEALTH ENGAGEMENT AMONG LIBYAN NURSES

ABSTRACT

The use of e-health services by the Libyan government has become of high concern recently. This study focused on how the main factors or elements of working capacity in terms of structural environment, technological availability, and other competence-related issues may influence nurses' engagement in e-health. Therefore, this research was established to build a learning readiness assessment framework (LRAF) for Libyan regional hospitals based on the adaptation of e-health services in nursing education. A total of 255 questionnaires were administrated among nurses in three Libyan regional hospitals. After filtering the data, only 200 valid questionnaires were analyzed. The exploratory factor analysis (EFA) result showed that structural readiness was explained by five different factors (two factors each for human resources and hardware availability, and one factor for policy). Technological readiness was explained by eight factors (one factor for software availability, two factors each for technical support and networking, and three factors for the connectivity), whereas competency readiness was explained by six factors (one factor for appreciation, three factors for ability, and two factors for motivation). Subsequently, the factors were verified under the main domains of structural readiness, technological readiness, and competency readiness. In addition, structural readiness, in terms of human resource and hardware availability; technological readiness, in terms of software availability, networking, connectivity, and technical support; and competency readiness, in terms of ability and motivation, were significantly correlated with the nurses' engagement to use e-health.

In conclusion, it is clear that the various stakeholders should participate and be involved in the e-health strategy development process for the successful implementation of e-Health initiatives in the health care system.

Chapter 1

Introduction

This chapter briefly elaborates the main idea of this research, provides an answer to the question of why the study has been conducted, and the main elements involved in the study. The first sub-topic describes the overall idea in this study through the introduction and the background that led to implementation of the whole research. In addition, the problem statement, objectives, research questions, significance, research framework, and scope of the study explain the research topic. The last sub-topic summarizes the chapter goal.

1.1 Introduction

Currently, learning in the field of health promotion, wellness, and illness is recognized as an essential component of nursing practice. There has been continuous development and emphasis on the role of nurses in this area over the last century, as evidenced by a focus on nurses' learning and the increasing sophistication of current learning programs delivered to nurses.

In the past, services for healthcare, such as e-Health, and telehealth have been recognized as a secondary need (McKone Sweet, Hamilton, & Willis, 2005). In contrast, now the factors influencing the development of the healthcare sector are becoming an effective element, driving the economy. Therefore, research indicating the level of learning readiness in different healthcare sectors is needed (Nollet & Beaulieu, 2003). People's healthcare services requirements have increased; they should be provided efficiently and made fully accessible to all (Nykänen, 2005). E-

Health has been identified as an amalgamation of the healthcare system and information and communication technology (ICT), enabling better learning practices (Suomi, 2006). In addition, Silber (2003) identified e-Health as an "application of healthcare practice supported by electronic processes and communication" (p.4). Other researchers have identified the e-Health implication regarding virtual reality, multimedia components (e.g., software enabling nurses to process a definite task, such as Adobe tools), digital imaging, chunked information–based surgery, other systems for monitoring records, and health portals. It is an emerging field that allows various medical informatics tools to be adapted for learning purposes. In addition, it enhances healthcare services and information delivery processes through the internet and other tools (Eysenbach, 2001). The field of medical informatics is also emerging; this refers to the organization and delivery of health services and information using the internet and related technologies. In a broader sense, this term characterizes not only technical development, but also a new way of working: a motivation, and a commitment to network, global thinking, to improve health care locally, regionally, and worldwide (Pagliari et al., 2005). E-Health implies different types of services, such as: 1) electronic medical records (which include patient information, records about administration systems, digital imaging and archiving systems, e-prescribing, e-booking); 2) telemedicine and tele-care services (including health information networks); 3) decision support tools; and 4) internet-based technologies and services.

Further, there are few challenges in adopting e-Health services in healthcare sectors. This includes the shortage of health workers, the ability to upgrade, and appropriateness of the current policy which may potentially be mitigated through the wide deployment of e-Health. In addition, the successful adoption in any healthcare

depends mainly on the structural readiness of organization for managing different healthcare services (Ahn, Lee, & Hwang, 2010): especially in developing countries such as Libya.

The use of e-Health services by the Libyan government has recently received much concerned interest. This includes healthcare services, and the main factors or elements that may influence working capacity in terms of the structural environment, technological availability, and other competence-related issues.

Before electronic learning emerged in the Libyan healthcare sector, learning occurred through programs to educate nurses with best practice, which was delivered by the healthcare ministry in Libya through a medical team of professional nurses. Currently, the ministry of healthcare has decided to increase nurses' abilities by engaging them with different learning activities that are fully or partially carried out through e-Health systems (El Taguri et al., 2008). Kumar and Arteimi (2010) reported that learning standards for nursing care in Libya is inadequate due to poor quality nursing education, usually coming without technological support (such as troubleshooting, software installation and internet monitoring). They also explained how nursing practices depend on expatriate staff; they are not citizens of Libya. As such, several healthcare sectors in Libya are willing to use electronic solutions as an alternative learning tool for supporting nurses learning in these programs. The Libyan healthcare sector is currently making strong attempts to identify and disseminate innovative electronic learning practices. Therefore, the use of e-Health may have potential opportunities and much promise in promoting nurse engagement (Demiris, 2004).

1.2 Research Background

The main potential of using e-Health tools in healthcare sectors is to enable nurses' engagement with various technological tools, including internet-enabled applications for identifying diseases that would increase nurses' awareness about the current status of self-care techniques (Silber, 2003).

Despite the advantages of e-Health, there are several barriers that nurses face: lack of adequate resources, and the lack of skills and support while conducting learning programs. These difficulties can potentially impede learning (Borzekowski et al., 2009; Norman & Skinner, 2006; Simon et al., 2007). This can also be seen in different educational factions for impeding the nurse's ability to deliver the required services. In addition, obstacles to learning can exist when different learning frameworks, developed for other learning purposes, are used. These can negatively affect a nurse's ability to attend to and process information. One example is the use of e-learning frameworks for nurses who have different characteristics from university students. Therefore, numerous researchers have justified the most common barriers interfering with the nurses' ability to conduct their roles in the environment (e.g., Casey, 1995; Chachkes & Christ, 1996; Duffy, 1998; Glanville, 2000). They addressed the key organizational, environmental, educational, and clientele factors affecting the educating of others, which includes a lack of time to learn. This challenges nurses' ability to process learning effectively: patients are usually hospitalized for a short period of time, affecting nurses' engagement with patients (Melnyk & Fineout-Overholt, 2006).

The current textbook approaches for preparing and guiding nurses in the learning process are no longer realistic, and do not assist them to use new technology in their career (Gallagher, 2004). Nurses must know how to adapt to efficient and expeditious approaches in their care practices. To do this, it is important to adequately assess nurses and adapt the suitable instructional methods and tools at their disposal, such as e-Health services.

Studies have revealed that the principles of learning are unclear to a large number of practicing nurses (Bastable, 2003). Many nurses admit they do not feel competent and confident to improve their working skills during the learning process. Additionally, nurses in many Libyan hospitals are mostly unfamiliar with e-Health services (Khalil & Al-Bousify, 2008). This may be due to a lack of integrating a suitable readiness model to identify the effects of technological adaptation in healthcare sectors.

In contrast, a lack of structural elements such as space, human resources, and policy in various environmental settings where nurses are expected to learn are not always conducive to conducting the learning processes of different learning programs (El Gatit et al., 2008).

Commonly, healthcare sectors in Libya face different obstacles and challenges toward adapting better learning and teaching facilities for learning purposes (El Taguri et al., 2008). Therefore, Libyan large-sized hospitals are reforming or determining the level of readiness to use e-Health services as a tool in nurses' learning in these hospitals. However, constructing a reliable learning

readiness framework in the healthcare sector is a complicated process (Scalise, 2005). This may be due to the current critical status of the Libyan health system, in which stability has been lost among administration, financials, services, and physicians. The implementation of e-Health services has been discussed for a long time; as yet, no serious projects are recognized (Khalil & Al-Bousify, 2008).

Both Khalil and Al-Bousify (2008) claim that the e-Health services are the future of medical practice in Libya, and that implementing them is the next vital step in rebuilding the current health system, and providing a solid base for reliable services in the future. This will increase efficiency and improve outcomes.

Khalil and Al-Bousify (2008) also argue that implementing e-Health services would be ineffective at this point of time. The e-Health system is an accessory add-on that can only be implemented in a financially well-supported health system that was already providing the upper limits of predicted outcomes. They acknowledged that the Libyan health system "is quite far from this level and still needs a lot of basics before the e-Health, like being easily accessed, early intervention, effective, efficient, emergency oriented, equity provision, ethically practiced, evidence-based and educationally competent" (Khalil & Al-Bousify, 2008, p. 3). This suggests that the distribution of resources to the medical sector is not enough; Khalil and Al-Bousify elaborated on this limitation as more useful if used directly in the medical process. In addition, the readiness framework exists as a highly fragmented technology in which the individual operates independently of different learning resources (Byrnes, 2004).

Based on the aforementioned challenges and previously cited research, underlying problems related to the lack of human resources and use policy exist among nurses while performing their usual learning tasks. Such aspects have an important role in ensuring continuity of care across settings (Khalil & Al-Bousify, 2008). In addition, infrastructure problems exist, involving space, hardware and software resources, along with privacy in most Libyan healthcare sectors. Meanwhile, limitations lie in nurses' experience in using and adapting technology to the learning environment.

Thus, by assessing the learning readiness of nurses, their preparedness to engage with e-Health services, while learning in Libyan regional hospitals, will be determined.

1.3 Problem Statement

Nurses need appropriate hardware, software, and other adaptations of technology to process effective learning. Merrow and Corbett (1994) stated that learning is probably the second greatest obstacle in adaptive technology. The greatest obstacle is finding out which devices are available and which ones best fit an individual's need (Tziner, Haccoun, & Kadish, 2011). Thus, the availability of hardware components is crucial, especially when looking at structural readiness, which includes equipment for running e-Health applications.

As cited previously by different researchers worldwide, nursing education has for years failed to adequately prepare nurses to engage with task-based learning using e-Health services, either during basic learning or afterward (Abramczyk,

Lewoc, & Izworski, 2005; Casey, 1995; Chachkes & Christ, 1996; Duffy, 1998; Glanville, 2000; Yeates, 2011). Thus, a learning readiness–assessment framework (LRAF) studying the preparedness of nurses engaging in e-health material is important in this current research. It also provides the ground for establishing strategy for promoting nurse's learning in developing countries. As such, Libyan healthcare sector can identify the preparedness of nurses to adapt technology in their learning. The aim for proposing LRAF is to identify the main areas of lack that lead to such failure.

Wickramasinghe and Schaffer (2009) looked at the critical considerations that facilitate practical decision making regarding any e-Health plan. Their framework promotes the possible barriers of any particular e-Health plan, but lacks the elements that contribute to the readiness of healthcare environments to deploy e-Health services.

In contrast, Khoja et al. (2007) propose another framework, addressing long-term issues regarding lack of access and quality of health care, to learning with the help of e-Health tools. The framework focuses on the effect of information technology (IT), as usually dependent on economic, culture, and mobility aspects. The authors acknowledge that the proposed framework works from the perspectives of both providers and organizational readiness; development was also limited to the electronic health records (EHR) perspective. They encouraged studies from other perspectives. Therefore, they suggested an additional comprehensive framework that incorporates components related to the relation between individual's characteristics and environmental settings to sustain the use of technology.

Another framework was developed by Li, Land, Ray, and Chattopadhyaya (2010) to show the effects of ICT tools on the development of using e-Health systems. Their framework was developed based on the perspectives of realizing a problem, breaching patient privacy, incompleteness and inaccuracy, and poor sharing of records; these are all part of core readiness. Their proposed framework lacks consideration of nurse perspectives regarding e-Health tool use in terms of service related factors, such as learning support, software compatibility, and internet connection.

Campbell, Harris, and Hodge (2001) developed another framework to include the elements of turf, efficacy, context, apprehension, time, and ownership. It is clear that this framework does not consider other perspectives of e-Health use, such as structural, competency, and technology factors; these are believed to have a significant effect on nurses' engagement with e-Health applications in Libyan hospitals.

Based on these frameworks, there are no standard mechanisms to adapt the structural, competency, and technological aspects adopted in developing countries—such as Libya—that lack technology use, competency between individuals, and structural availability. Eadie, Perera, Heaney, and Carlisle (2007) recommend that further research is needed to study new readiness models for the improvement of current learning lacking technology.

Additionally, indicating the readiness level for applying a definite learning technology could help enhance and formulate nurses' responsibilities toward

learning. Hence, this research aims at building a LRAF for promoting nurses' engagement in Libyan regional hospitals, based on the adaptation of e-Health services by integrating the previous frameworks to be considered in the study.

1.4 Research Objectives

Twelve semi-structured telephone interviews to three hospitals (Tripoli Medical Hospital, Heart TAJURA Hospital, and Tripoli Eye Hospital) were conducted to confirm potential factors that contributed to the use of e-Health in these hospitals. The interview questions were designed to determine the main area of failure using different dimensions such as hardware equipment, software services, availability of technical support, adequacy of the services and communication, after that, the researcher grouped the answers and critically analyzed the data in which four themes were emerged and labeled. Four factors were identified: 1) structural readiness, 2) technological readiness, 3) competency readiness, and 4) engagement readiness. In this study, the relations between the potential elements based on their priority in the Libyan healthcare sector were formulated, as recommended by three technicians from each hospital (a total of nine) from the 12 selected. The research objectives were then addressed in terms of:

1. Investigating the key factors of human resources, policy, and hardware availability contributing to the structural readiness of Libyan regional hospitals to use e-Health.
2. Investigating the key factors of software availability, networking, connectivity, and technical support contributing to the technological readiness of Libyan regional hospitals to use e-Health.

3. Investigating the key factors of appreciation, ability, and motivation contributing to the competency readiness of nurses to use e-Health in Libyan regional hospitals.

4. Examining the relationship between structural readiness (in terms of human resources, policy, and hardware availability), technological readiness (in terms of software availability, networking, connectivity, and technical support), and competency readiness (in terms of appreciation, ability, and motivation) with engagement readiness of nurses to use e-Health in Libyan regional hospitals.

5. Investigating the effects of structural readiness (in terms of human resources, policy, and hardware availability), technological readiness (in terms of software availability, networking, connectivity, and technical support), and competency readiness (in terms of appreciation, ability, and motivation) on the engagement readiness of nurses to use e-Health in Libyan regional hospitals.

6. Proposing *a readiness assessment framework* from objectives one, two, and three to illustrate the key factors that influence the adoption of e-Health in Libyan regional hospitals.

1.5 Research Questions

This research was constructed based on the following questions:

1. What are the key factors of human resources, policy, and hardware availability that contribute to the structural readiness of Libyan regional hospitals to use e-Health?

2. What are the key factors of software availability, networking, connectivity, and technical support that contribute to the technological readiness of Libyan regional hospitals to use e-Health?

3. What are the key factors of appreciation, ability, and motivation that contribute to the competency readiness of nurses to use e-Health in Libyan regional hospitals?

4. What is the relationship of structural readiness (in terms of human resources, policy, and hardware availability), technological readiness (in terms of software availability, networking, connectivity, and technical support), and competency readiness (in terms of appreciation, ability, and motivation) with the engagement readiness of nurses to use e-Health in Libyan regional hospitals?

5. Does structural readiness (in terms of human resources, policy, and hardware availability), technological readiness (in terms of software availability, networking, connectivity, and technical support), and competency readiness (in terms of appreciation, ability, and motivation) have an effect on the engagement readiness of nurses to use e-Health in Libyan regional hospitals?

6. What are the key *factors of* re*adiness assessment framework* for the adoption of e-Health in Libyan regional hospitals?

1.6 Research Limitations

This research is limited to investigating and examining the relationships of learning readiness components, such as technological readiness, structural readiness, and competency readiness, on engagement readiness. Technological readiness is

limited to indicate nurses' opinions about software availability, networking, connectivity, and technical support in Libyan hospitals. Structural readiness is limited to indicate nurses' opinions about current human resources, hardware availability, and policy required to use e-Health in Libyan regional hospitals. Another limitation is that competency readiness consists of the influences of e-Health services on nurses' learning in terms of their appreciation, ability, and motivation.

Only three public hospitals in Tripoli—Tripoli Medical Hospital, Heart TAJURA Hospital, and Tripoli Eye Hospital—were chosen for this research. These hospitals were selected for the following reasons:

- they are considered among the largest hospitals in Libya
- the number of nurses in these hospitals is large enough and suitable to conduct the evaluation
- the selected hospitals have a human resource department concerned about research that develops better skills for employees

Regarding this research, the use of e-Health services consist of applying free samples from the online continuing professional development (CPD) resources for nurses, such as online management tools, educational videos, learning power points, healthcare images, and nursing documents (AusmedOnline, 2011). CPD for the nurses is a life-long learning process that maintains, enhances, or increases their knowledge, ensuring their knowledge and ability is relevant.

1.7 Theoretical Framework

This research incorporates three main theories in its framework, namely: social learning theory (Bandura & McClelland, 1977); organizational theory (Hatch, 2012); and self-determination theory (Deci & Ryan, 2008).

The dependency of individuals to process certain learning tasks is mostly associated with environmental settings, where utilization of technology is counted on. Bandura assumed reciprocal determinism, as a world and a person's acts are simulated by each other, while behaviorism explains that one's environment causes one's behavior (Bandura & McClelland, 1977). He explained this view as an effect of behavioral factors, environmental factors, and cognitive factors on the development of human behavior to use or adapt technology, as shown in Figure 1.1. In organizational settings, Black and Boal (1994) supported this observation by justifying how the structural or core elements (in terms of hardware and human resources) plays a key role in determining the behavioral changes of individuals. In addition, researchers in information systems agreed that environmentally associated variables, such as software, communication, and support have a significant effect on the individual in their self-determination to perform effectively (Benbasat & Zmud, 2003; Zowghi & Nurmuliani, 2002). Based on this, the researcher explained the effect of environmental factors in terms of structural and technological readiness on nurses' engagement to use e-Health system.

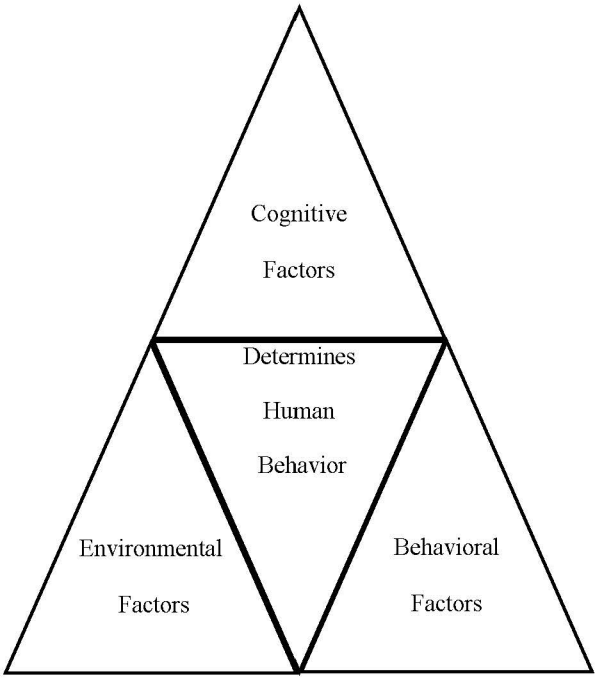

Figure 1.1. Social learning theory (*Bandura & McClelland, 1977*)

The claim made earlier was also supported by organization theory, in which Hatch (2012) believed that the way of distributing information and learning resources through an organization affects the individual's ability to work, and the consequent outcomes. The outcome of a person is identified by environmental settings, such as technology, physical structure, culture, and social technology, as shown in Figure 1.2. Hence, understanding the effect of these aspects within organization theory can explain the current shortage of structure and technology in Libyan hospitals to promote nurses learning.

However, human resource was also addressed by this theory, as specialists engaged in solving technical related issues. In general, organizational development and change are particularly important elements of human resources that demand deep

knowledge of organizations and organizing: organization theory can provide content for executive training programs.

Meanwhile, Hatch (2012) described the effects of communication on organizational perspectives to conduct successful managing or learning tools, to design effective communication systems or to provide suitable mean of network with an organization's needs. Therefore, the researcher relied on these aspects to explain how structural readiness and technological readiness influence nurses in Libyan hospitals to learn using e-Health.

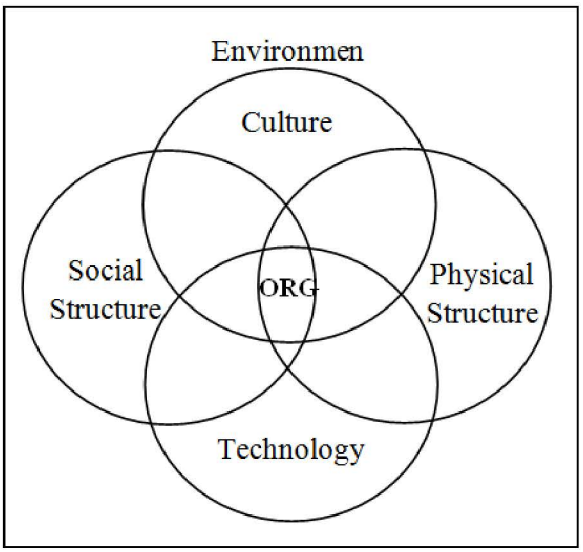

Figure 1.2. Organization theory (*Hatch, 2012*)

In addition, Deci and Ryan (2008) proposed self-determination theory as a way of explaining the motivation that assumes all students—regardless of age, gender, socioeconomic status, nationality, or cultural background—possess inherent growth tendencies that provide a motivational foundation for high-quality classroom engagement and positive school functioning. While other motivation theories explain how students' expectations, beliefs, and goals contribute to their classroom engagement, self-determination theory is unique in that it emphasizes the

instructional task of vitalizing students' inner motivational resources as the key step in facilitating high-quality engagement.

Meyer and Gagne (2008) justified employee engagement from a self-determination theory perspective, where employees were found to process a self-competence toward their job. This was constructed based on the premise of self-determination theory that students sometimes lack self-motivation, display disaffection, and act irresponsibly. Therefore, providing an appropriate learning environment and learning resources can facilitate better engagement. Students are expected to interact with classroom conditions to result in varying levels of student engagement (Deci & Ryan, 2008). This can be controlled by the competence, relatedness, and autonomy of the user toward the learning process, as shown in Figure 1.3.

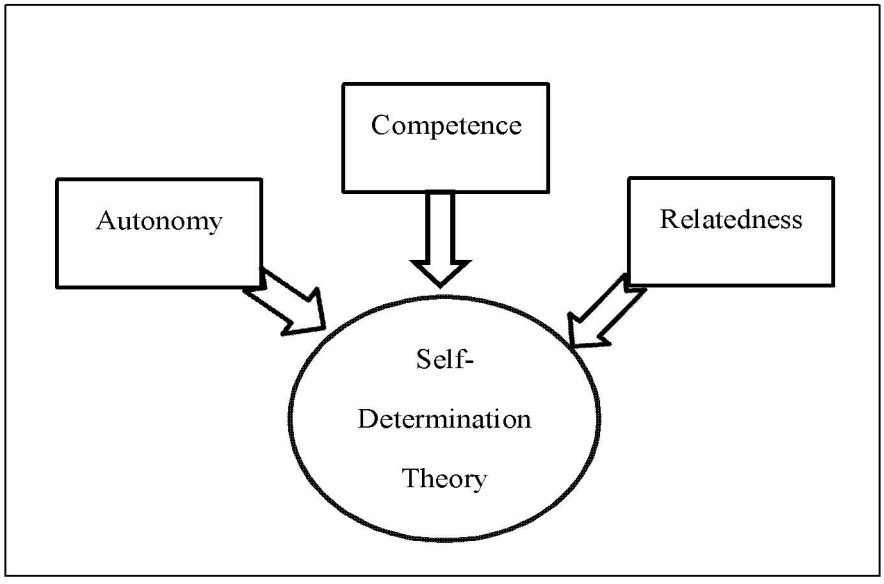

Figure 1.3. Self-determination theory (*Deci & Ryan, 2008*)

Based on the social learning theory by Bandura and other researchers in information systems agreed that environmentally associated variables, such as

software, communication, and support have a significant effect on individual in the self-determination to perform effectively. Based on this, effect of environmental factors was explained based on structural and technological readiness to use e-Health system. The organization theory by Hatch (2012) stated that the way of distributing information and learning resources through an organization affects the individual's ability to work, and the consequent outcomes. The outcome of a person is identified by environmental settings, such as technology, physical structure, culture, and social technology. Meyer and Gagne (2008) justified one's engagement from a self-determination theory perspective, where employees were found to process a self-competence toward their job. After all, the researcher constructed the present hypothesized research framework as shown in Figure 1.4.

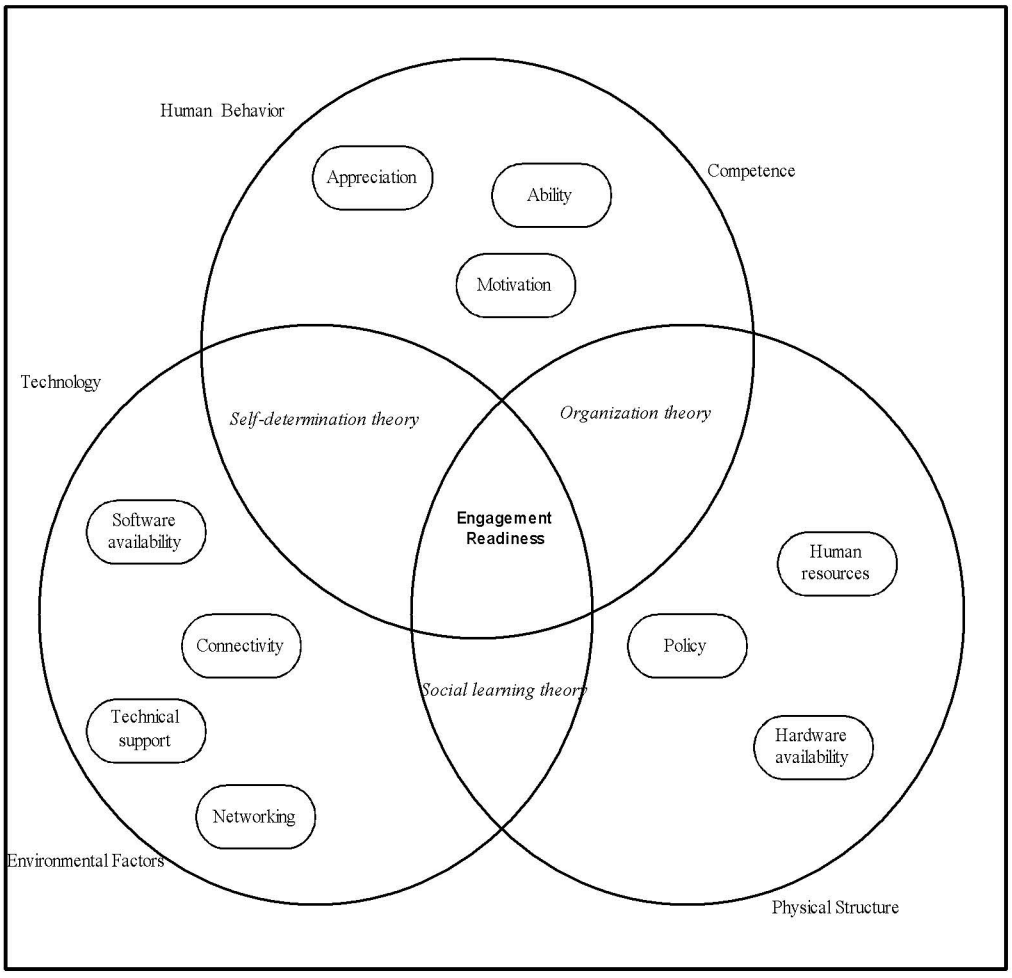

Figure 1.4. Theoretical framework

1.8 Hypothesized Research Framework

E-Health systems include applications of ICT to promote healthcare service support, delivery, and education. To ensure effective capabilities, nurses in the Libyan healthcare sector must engage with learning practices that usually depend on a structural background and available technical resources for e-Health. E-Health in most Libyan regional hospitals is partially used by nurses, due to its unfamiliarity. Some researchers (Win & Croll, 2005; Jha et al., 2009; Li, 2008) in other countries attribute this partial use to the limitations of the structural background required to ensure successful implementation of e-Health, while others (e.g., Caison, Bulman, Pai, & Neville, 2008; Li et al., 2010) have linked it to the low use of technology in developing individual abilities. This suggests that a readiness assessment is required at this stage as an essential requirement for the success of e-Health learning tools among nurses in Libyan regional size hospitals.

By reviewing the current literature on e-Health readiness frameworks, it can be concluded that most researchers consider e-Health to reside in structural readiness, along with technology that organizations usually provide. Different technological elements, such as software availability (Win & Croll, 2005), networking (Blaya, Fraser, & Holt, 2010), connectivity to the internet (Zhou et al., 2009), and technical support (Jha et al., 2009) are identified in this study as the main components affecting technological readiness to use e-Health among nurses in Libyan regional hospitals. In contrast, Javalgi, Martin, and Todd (2004) and Richey and Autry (2009) have acknowledged that technological readiness is considered an essential factor for sustaining the use of electronic services.

E-Health presents a range of services or systems that are at the edge of medicine/healthcare and IT. The implementation of e-Health services in the Libyan healthcare sectors is to take place in the post-implementation phase, which means that the e-Health system is already delivered to the healthcare users. Therefore, identifying other readiness elements, such as economic, culture, and mobility factors, is not essential to this study. The post-implementation evaluation focus on crucial factors for assessing the merit, success, and value of systems, contributing to evidence-based practices, and 'learning from experience' (Alexander, 2003).

According to Li et al., (2010) the effect of hardware resources, policy, and HR are the most critical elements for addressing the structural readiness to use technology.Zakaria and Janom (2011) described the importance of measuring the effect of using electronic tools on an individual's competency level regarding appreciation and motivation, which significantly affects the user's engagement level with online environments.

The present study's framework was constructed based on social learning theory, organization theory, and self-determination theory, while relationships between the variables were also supported by different readiness frameworks (Li et al., 2010; Wickramasinghe et al., 2005). Figure 1.5 presents the hypothesized research framework indicating the readiness for adapting e-Health technology into nurse learning, based on the effects of structural readiness, technological readiness, and competency readiness on engagement readiness in Libyan regional hospitals.

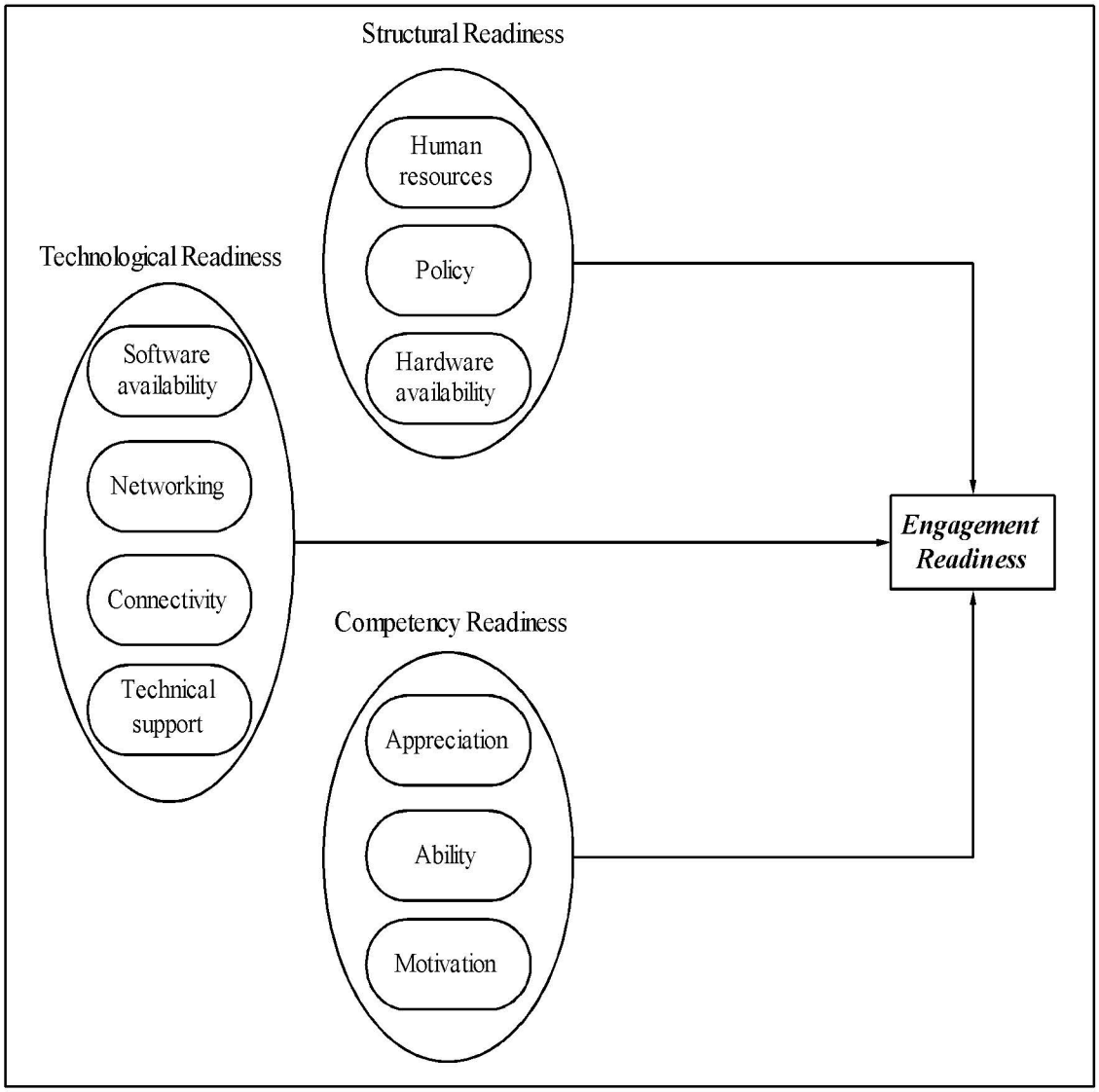

Figure 1.5. Hypothesized research framework

1.9 Research Significance

Based on the current literature, this study is the first of its kind in the Libyan hospital industry, and will provide a significant contribution toward building a LRAF, ensuring nurses' engagement with the e-Health system, while attending the usual learning programs offered by the Ministry of Healthcare in Libya. The expected benefits for Libyan regional hospitals include:

1. Enabling the ministry of healthcare in Libya to identify the current state of nurse's competency level in terms of appreciation, ability, and motivation in using e-Health.

2. Enabling the ministry to identify the current state of their hardware availability, human resources, and policy readiness level to use e-Health services among healthcare nurses.

3. Enabling the ministry to identify the current state of software availability, networking, connectivity, and technical support readiness to use e-Health services among healthcare nurses.

4. Promoting the use of e-Health systems as a tool for engaging nurses while learning.

5. Providing the ministry with a readiness assessment framework to ensure nurses' engagement based on the elements of structural readiness, technological readiness, and competency readiness.

Meanwhile, the use of e-Health services for nurse learning in Libyan hospitals is expected to improve various aspects of quality, efficiency, communication, motivation, and others by:

1. Supporting the delivery of care tailored to individual patients, where e-Health enables more informed decision making, based both on evidence and patient-specific data.

2. Improving transparency and accountability of care processes and facilitating shared care across boundaries.

3. Aiding evidence-based practice and error reduction.

4. Improving diagnostic accuracy and treatment appropriateness.

5. Improving access to effective healthcare by reducing barriers created, for example, by physical location or disability.

6. Facilitating patient empowerment for self-care and health decision making.

7. Improving cost-efficiency by streamlining processes, reducing waiting time and waste.

1.10 Operational Definitions

The operational definitions listed are within the context of this research.

1.10.1 Readiness.

Refers to the required conditions for engaging individuals in treatment (Ward, Day, Howells, & Birgden, 2004). The readiness in this study refers to the individual and environment conditions required to promote engagement while using e-Health system.

1.10.2 e-Health.

Refers to the range of services or systems at the edge of medicine/healthcare and IT, including health knowledge management that involves overviews of the latest medical journals, best practice guidelines or epidemiological tracking; virtual healthcare teams consisting of healthcare professionals who collaborate and share information on patients through digital equipment; and medical research using grids: powerful computing and data management capabilities to handle large amounts of heterogeneous data.

1.10.3 Engagement readiness.

Is defined as the level of one's willingness to actively accomplish organizational goals (Rosenstein & O'Daniel, 2005). Engagement readiness in this study refers to the active participation of nurses in the idea of e-Health. In this process, nurses weigh the level of their engagement to use e-Health systems, based on the levels of structural readiness, technological readiness, and competency readiness in Libyan regional hospitals.

1.10.4 Structural readiness.

Focuses on the establishment of efficient structures as a foundation for successful e-Health projects within an organization, for example, human, technical, learning, policy, and funding (Li et al., 2010). Structural readiness in this study refers to the required current human resources, hardware availability, and policy to promote engagement among nurses in Libyan regional hospitals with e-Health in learning.

1.10.4.1 Human resources.

Human resources is a group of individuals who promote different activities in an organization, business sector or an economy (Gomez-Mejia, Balkin, & Cardy, 2004). Human resources in this study refers to the set of individuals available in Libyan regional hospitals to promote the use of e-Health among nurses for learning purposes.

1.10.4.2 Hardware availability.

Hardware availability refers to devices physically connected to computers, such as monitors, printers, and projectors. Hardware availability in this study refers