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Towards a New Framework for Nursing Education & Training in Developing Countries

A Thesis Submitted for the Degree of Doctor of Philosophy

By

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This Thesis is dedicated to my Father's Soul, my Mother, my Husband, my Kids, my Brothers, my Sisters, my Nephews and my Nieces

ABSTRACT

The advancement in ICT in recent decades has transformed every aspect of life, including medical care. The most sophisticated example of this is electronic health (e-health), which in developed counties has been a major contributor to enhancing the overall quality of healthcare services. However, e-health remains primitive in developing countries, whether they are relatively poor like Jordan or wealthy like Qatar. Barriers to successful e-health adoption in developing countries are attributable either to superimposing the technology itself while ignoring staff preparedness to integrated e-health or financial inhibitions to making such fundamental changes to healthcare delivery. Staff preparedness is related to educating or training healthcare staff, particularly nurses, who have fewer opportunities to attend training, or are sometimes ignored. Hence, the focus of this research is to evaluate the preparedness of nursing community for e-health adaption in the developing countries, taking Qatar and Jordan as case studies, in order to identify existing challenges and the key requirements to establish an educational framework that can be integrated in nursing curricula or professional development to promote e-health adaptation by nurses.

This research critically reviews previous literature related to the research project, identifying the challenges to e-health preparedness, and analyses nursing and midwifery curricula from different countries with regard to e-health and ICT. The findings show that e-health modules are not generally included in any higher education nursing programme, with only a few transcripts showing basic computing or ICT modules.

E-health national strategies for both Jordan and Qatar were analysed to identify whether the inclusion of professional training on e-health has been considered as part of e-heath strategy. In addition, analysis of e-health national strategies for other leading countries in the field of e-heath was conducted, finding that there is a decided gap between developed and developing countries with regard to e-health. The level of readiness in nursing was investigated and to identify the main barriers for using e-health/e-nursing in Jordan and Qatar. The results showed the top challenges facing e-health are educational-related aspects, hence a plan for promoting and providing education on the benefits and use of e-health processes and applications is advised, with prerequisite ICT training, as the results showed that nurses lack sufficient knowledge about e-health processes and applications.

The findings from earlier tasks were used to identify the requirements and then propose the framework to achieve main goal of this research in providing a roadmap. The framework was constructed in accordance to with the Technology Acceptance Model (TAM), followed by evaluation by different expert groups. All the groups voted for the suggested structure of the framework to be taken to the next phase of deployment.

The final task was to evaluate the attitude of the nursing community working towards the possibility of implementing an e-learning system, which has been presented as the main platform in the proposed framework. The findings have demonstrated a very positive attitude from the nursing staff towards the idea of using e-learning. There also does not appear to be any apparent obstacles to deploying the concept of e-health as the audience in question have the necessary computer skills.

In summary, this research project has contributed in presenting framework and some useful findings related to e-health in general and in Qatar and Jordan in particular. The proposed framework can be as a roadmap for future e-heath/e-nursing projects, in addition, it can be utilised with some modifications to foster similar electronic applications.

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
CIDE	College of Internet Distance Education
CME	Continuous Medical Education
CPD	Continuous Professional Development
DHA	Department of Health and Ageing (Australia)
EBP	Evidence-Based Practice
ECG	Electrocardiogram
EDP	Electronic Data Processing
EHR	Electronic Health Record
EMRO	Eastern Mediterranean Regional Office (UN)
ESCWA	Economic and Social Commission for Western Asia (UN)
GDP	Gross Domestic Products
HMN	Health Metrics Network
HR	Human Resources
HSD	Honesty Significant Difference
ICT	Information and Communication Technology
IS	Information Systems
IT	Information Technology
ITU	International Telecommunication Union (UN)
LITIS	Levels of Technological Innovation in Healthcare
LMS	Learning Management Systems
MENA	Middle East and North Africa
NHS	National Health Service (UK)
NI	Nursing Informatics
NP	Nursing Practitioner
PACS	Picture Archiving and Communication System (Estonia)
PANACeA	Pan-Asian Collaboration for e-health Adoption and Application
SAFEM-D	Sistema Aberto de Formação e Ensino Multimédia a Distância
SCH	Supreme Counsel of Health (Qatar)
SCIE	Seven Components of e-Learning
SD	Standard Deviation
SPSS	Statistical Product and Service Solutions
SWOT	Strengths, Weaknesses, Opportunities and Threats Analysis
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
UCEL	Universities' Collaboration in eLearning
UNPAN	United Nations Public Administration Network
WHO	World Health Organization

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DECLARATION

This work was produced by the author unless otherwise stated and duly acknowledged.

Signed: ……………………….

Date: ……………………….

CHAPTER 1: INTRODUCTION

The fast growth of Information and Communication Technologies (ICT) and internet applications since the late 1990s has revolutionised all industries and created a new lifestyle. This has clearly emerged in political, social, and economic forms. Key drivers of the rapid change towards using ICT and internet applications are efficiency, connectivity, accessibility, low cost, revenue, opportunities, and necessity. One very important sector which has been on the top of agenda for integrating ICT is the healthcare sector, and the concept of electronic health (e-health) or Health Information System (HIS) has been the most advanced example of this (Figure 1.1).
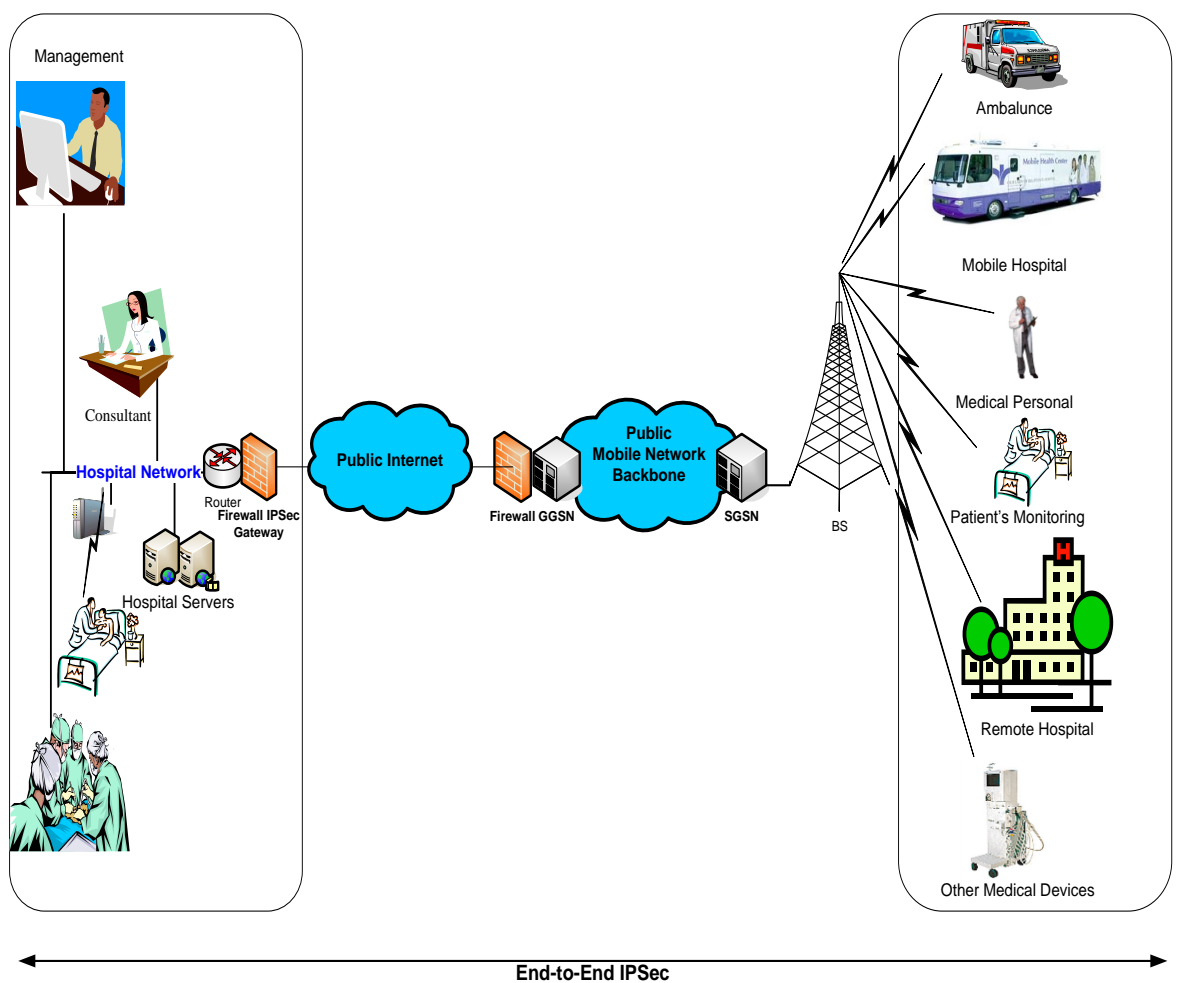
Figure 1.1: Overview of the platform architecture (Hunaiti, 2008: 45)

On the other end the education sector has a new application known as electronic learning (e-learning). E-health is applicable in the healthcare sector in many areas, from basic management functions to advanced ones for life saving along with an integrated system for data gathering and data sources (Figure 1.2). E-learning has helped in providing many

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opportunities for teaching and learning on a wider scale with flexible time. Moreover, in some cases e-health and e-learning have been combined in a platform for training and education in the healthcare sector. Nevertheless, the shift towards ICT has not always progressed smoothly. Common challenges have been witnessed due to the over reliance on technology as a solution for all issues without paying much attention to other aspects like training and educating end users on adopting new practices in their daily work. This has been predominantly been the case in e-health introduction in a number of developing countries, where training opportunities have not been included in the vast majority of healthcare workforces; the nursing community has been seen as secondary in the agenda or excluded from e-health strategy. Moreover, the problem could emerge in some countries depending on recruiting international nursing workforces from different educational backgrounds with less knowledge of e-health, as many higher education institutions contribute little to e-health promotion and training. As a result, this could be a major driving factor for the failure or losing investment in e-health projects, hence there is a vital need to research elements related to e-health, nursing training, and education. There is a need to develop e-learning for e-health education and training, which can be a major contributor to the future success of e-health projects in general and e-health particularly within nursing.
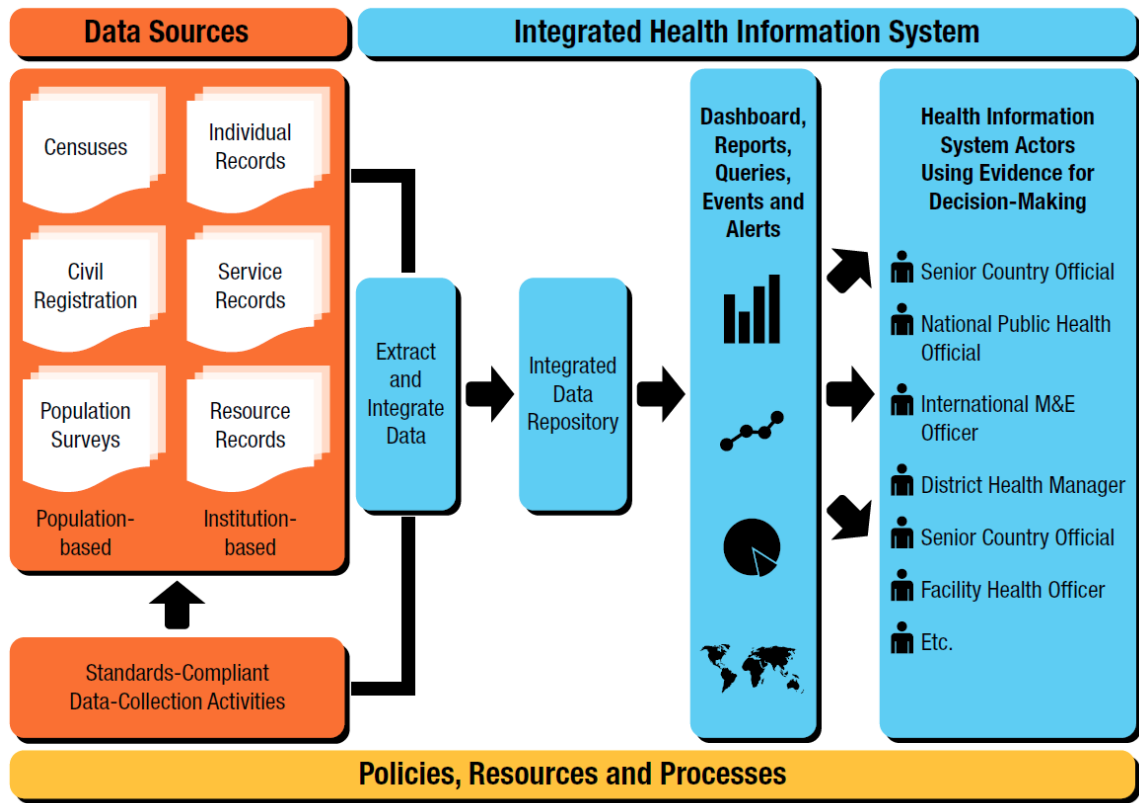
Figure 1.2: Integrated Health Information System (WHO, 2008: 43)

1.1 Motivation and Background

Developing countries share common challenges in healthcare. E-health is a relatively new concept for most of the developing countries. Recent advances in ITC have made e-health affordable and feasible. As a result, they have been recognized as a tool that holds the promise to provide equitable access to timely, efficient, and quality healthcare and health information in developing countries (Mars, 2012: 79; Curtis, 2007: 2). Globally, e-learning has been proved to be an effective mode for learning in medical education in both undergraduate, postgraduate and Continuing Medical Education (CME). It has become a high profile approach for pre-registration of health students and Continuing Professional Development (CPD). The Middle East region is characterised by low adoption of e-learning services and technology. Although there have been attempts by a number of researchers to tackle the e-learning adoption issues, such endeavours have been limited by the size of the project, region and scope of research.

E-health policies in developing countries are encouraged by the World Health Organization (WHO) guidelines on e-health development. Plans at the country level have been made, as major healthcare advisory partners' perspective e-health has become a necessity in the developing countries (Rodrigues, 2003: 78). This has included the healthcare delivery system, governmental initiatives, and professional groups interested in e-health implementation. There is growing support from stakeholders for e-health and telemedicine implementation, and funds are being made available from different institutional and governmental sources. There have been initiatives in e-health projects in Pakistan from the early 2000s, however these were from different platforms, without any multidisciplinary collaborative characteristics of e-health being appropriately realized by the major stakeholders; sporadic initiatives from diverse sources lack coordination and therefore are ineffective (Patoli, 2008: 44). According to the WHO Framework and Standards for Country Health Information Systems/Health Metrics Network (WHO, 2008: 43):

> "*Improvements to health information systems also require attention to be given to the training, deployment, remuneration, and career development of human resources at all levels*".

It must be acknowledged that e-learning is an important methodology for the transfer of knowledge and expertise in medical education (Sandars, 2010: 33; Frehywot, 2013: 39; NHS, 2013: 66). In order to ensure the implementation of an e-learning program it must be designed to correspond to learners' needs and their level of technological proficiency, as

well as the existence of appropriate ICT infrastructure and e-learning readiness (e-readiness)(Schreurs, 2008: 25; Asghari, 2012: 31). This research was initiated to gauge Middle Eastern countries' e-readiness for e-health and to develop an e-learning model for e-health that can be integrated with graduate nursing curricula to be mandated for registration for practice in developing countries.

1.2 Case Studies

1.2.1 Jordan

Jordan (Figure 1.3) is a relatively small country with 6.5 million inhabitants, including large Palestinian, Iraqi and latterly Syrian refugee diaspora populations (UN, 2012: 70). It has limited natural resources and depends to a large extent on US aid (BBC Monitoring, 2013: 67). The healthcare sector in Jordan depends largely on indigenous staff, mainly graduates of Jordanian universities, with a growing number of advanced practice nurses educated in Europe and the US. Despite limited resources, Jordan has one of the most advanced healthcare systems in the Middle East due to skills, and its selection as a case study is useful to provide an insight into how a framework for e-health education can be implemented on a national level in developing countries.

1.2.2 Qatar

Qatar (Figure 1.3) is a small country with approximately two million inhabitants (UN, 2012: 70), and it is one of the richest countries in the Middle East due to its large oil and gas reserves and a small population (BBC Monitoring, 2013: 68). The healthcare sector in Qatar depends on staff recruited from overseas, coming from different educational backgrounds and cultures, and different first languages. In contrast to Jordan, which is richer in human capital (in terms of the general educational standard of its native healthcare professionals), Qatar is totally dependent on expatriate health workers lured by high salaries to a relatively new and improvised healthcare system underpinned by extensive financial resources; it thus provides a useful case of a developing country with extensive means of implementing healthcare initiatives such as a framework for e-health education that can be implemented as a pre-arrival training platform.

Figure 1.3: Middle East Political Map (al-Bab, 1998: 69)

1.3 Aims and Objectives

The aim of this research is to investigate the preparedness of the nursing community for e-health adaption in the developing countries Qatar and Jordan (the case studies), in order to identify existing challenges and key requirements; to establish an educational framework/model that can be integrated into nursing education or professional

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development; and to explore e-health adaptation within nursing as part of the registration process.

The above-mentioned aim will be achieved by the following objectives:

1. Conduct a comprehensive literature review on topics related to the study including e-health, e-nursing, e-learning for healthcare, registration and e-health literacy.
2. Analyse nursing and midwifery curricula from several countries to evaluate their contents of health information courses.
3. Analyse e-health strategic to identify gaps between developed and developing countries.
4. Carry out studies to identify readiness issues and obstacles related to e-health and e-nursing in the case studies.
5. Propose and evaluate an e-learning model for e-health education.
6. Evaluate nursing community perceptions towards e-learning in the proposed model.

1.4 Contribution to Knowledge

This research study provides a number of original contributions to knowledge, specifically the E-Learning Model for E-Health Education, by creating new unified e-learning model for e-health education for the developing countries, which lack serious participation in this field of research. In addition, the following points are presented as contributions to knowledge:

- Results presented from the investigation and analysis of nursing and midwifery curricula, as well as the readiness of e-health in the developing countries, are considered a contribution to identifying the main requirements of this research and filling a gap in the literature that can be used in future by any organization, e-learning companies and health policy makers and registration authorities and future research.
- Methodological approaches in this research and the created model can be used for further research into different regions sharing similar cultural characteristics or in other research disciplines.
- Publications: the outcomes of this research were presented to the public via a number of publications.

1.5 Thesis Layout

In order to accomplish the project aim, each of the above objectives was divided into smaller tasks, each of which is the subject of one chapter in this research study. The following diagram (Figure 1.4) shows the tasks, while the full discussion and methodological approaches are discussed in the following chapters.
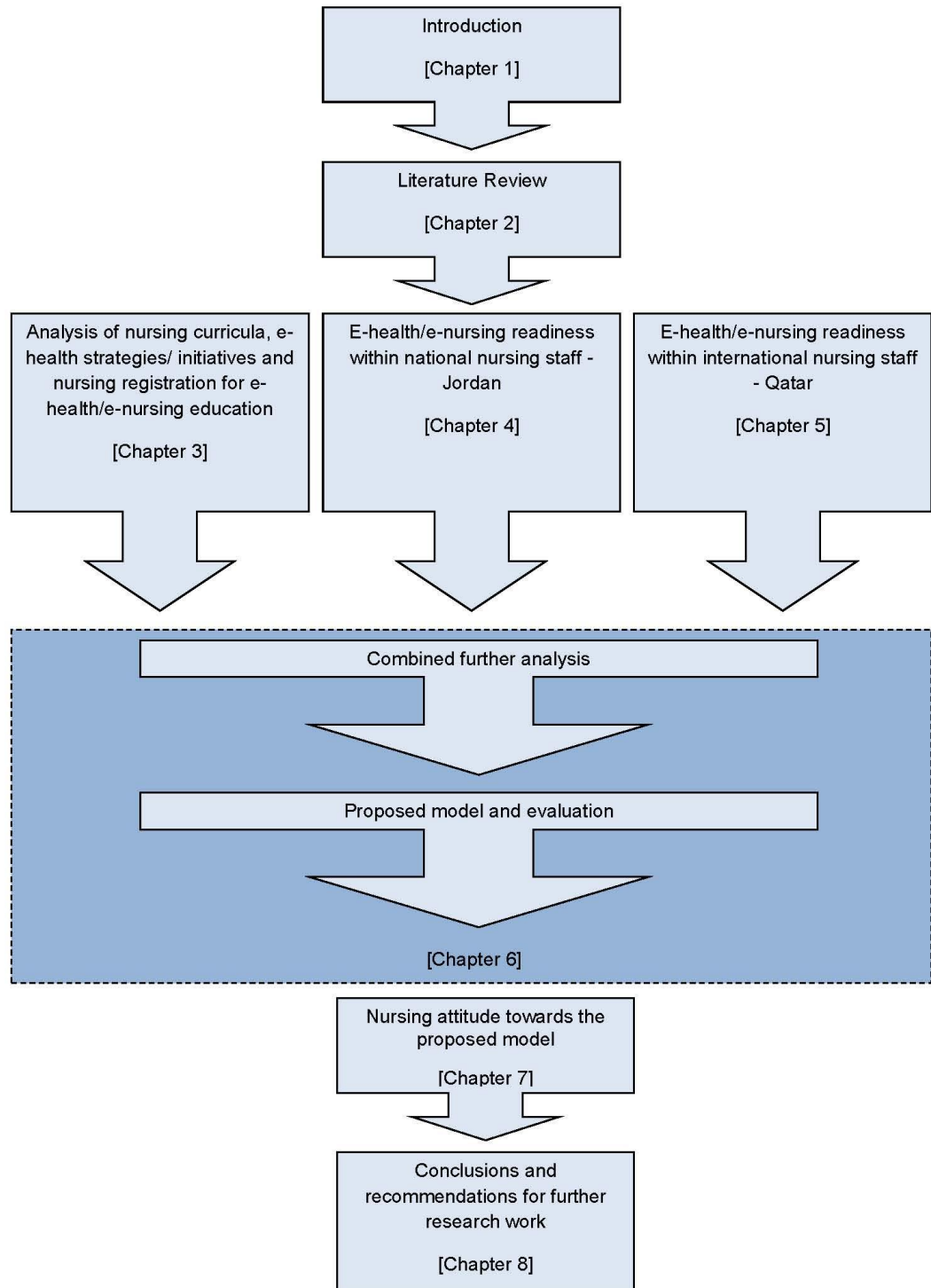
Figure 1.4: PhD Project Flow Diagram & Structure of the Thesis

CHAPTER 2: LITERATURE REVIEW

2.1 E-Health

Although the term 'e-health' started to appear in the literature from the late 1990s (contemporaneous with the rapid proliferation of internet and IT use), the actual history of e-health application goes back to 1917 when the first recorded use of telemedicine occurred in Australia (Tuckett followed instructions that had been telegraphed in Morse Code by a surgeon named J. J. Holland, who was giving instructions as to how surgery should be performed on a stockman who had fallen off a horse). Over the years continued successes in the practical use of communication technology in medicine and the simultaneous development of technology have given rise to numerous uses of e-health applications, including health informatics in laboratories, hospital-based information and administrative systems to facilitate patient scheduling, result reporting, patient billing as well as staff rosters. The development experienced rapid growth with the evolution of personal computers, internet and email, and it is now considered that e-health is about to reach a tipping point and become a fundamental (rather than a marginal) aspect of healthcare worldwide (Curtis, 2007).

Due to the widespread use of ICT applications in healthcare, 'e-health' now boasts over 50 unique definitions. To date there is no single recognised and established definition, but two popular themes have evolved which comprise both health and technology (Booth, 2006; Neuhauser and Kreps, 2010).

Eysenbach (2001) gave the most commonly quoted definition for e-health concentrating on the theme that it is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. Eysenbach's definition implies not only a technical advance, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked and global thinking, to improve healthcare in different settings locally, regionally and globally.

Research articles explicitly referring to e-health began to appear from the early 2000s. Literature shows that definitions of e-health demonstrate variations in the breadth and focus of alternative conceptualizations; most conceptualize e-health as a broad range of medical informatics applications for facilitating, management and delivery of healthcare.

The lack of consensus regarding the meaning of e-health has led to uncertainty among academics, policymakers, providers and consumers (Pagliari et al., 2005).

2.2 Barriers to E-Health

Integration of ICT in healthcare systems has been fairly slow due to many different factors, the most fundamental of which is when the required infrastructure is not sufficiently suitable and the associated ICT costs are prohibitively expensive. There is also a lack of computer literacy and human resources in terms of both capacity and expertise, an absence of policies or a lack of awareness amongst policy makers regarding the benefits attributable to e-health, restrictive statutory telecommunication legislation, and fissiparous coding systems and standards. These shortfalls are exhibited in challenges during computerization and data processing, in addition to poorly designed systems and the lack of systematic education and training in e-health, ultimately comprising a plethora of restrictive factors (Al-Shorbaji, 2006a; Mars, 2012). Such challenges are latent in all pre-existing healthcare organisations, but they are more easily overcome in the context of developed countries due to more resources and greater ability to change. Nevertheless, in the mid-2000s Richard Booth reported that only half of nursing schools in Canada had a planning strategy relevant to e-health (Booth, 2006). This is related to a problem in identifying the required when working in technology, which in turn result in a lack of informatics content within the nursing curricula and poorly prepared nursing facilities. If even developed countries (particularly Canada, which has a relatively advanced healthcare system) struggled to implement e-health in nursing education, it can be inferred that these challenges are exacerbated in most developing countries.

According to (Edirippulige.S et al., 2007), the government plays a crucial role in e-health deployment. A lack of understanding or general awareness regarding its benefits consequently results in the lack of thought, policy, legislation and funding, all of which are required to ensure the vibrancy of the sector. The exclusion of the health sector in national ICT initiatives is also a major cause of the slow progress of e-health in developing countries and delays the introduction of appropriate governance and data management procedures, which is a contributing factor to the general ignorance. Surveys undertaken by the UN Eastern Mediterranean Regional Office (EMRO) have highlighted a number of challenges to implementation of e-health in the region. Some can be categorised as institutional and others are viewed as personal. The lack of regional awareness has meant that ICT has not been given any strategic consideration from a medical context both from an educational and operational perspective; this is largely down to the fact that they have

not grasped its potential. Consequently, numerous healthcare facilities have not received the necessary periodical budget and the required investment is not a financially viable consideration for a significant number of systems (Al-Shorbaji, 2006).

A number of governments around the world are taking part in significant programmes to roll out e-health interventions as quickly as possible throughout the healthcare sector. Due to the speed with which this is being achieved, little time, thought or resources have been dedicated in order to assess the potential risks that could be associated with these e-health interventions. In order to ensure the maximum benefit and reduce the associated risks with implementation, care and attention is required throughout the design, development and deployment stages if the benefits associated with its introduction are to be realised (Catwell and Sheikh, 2009).

An example of the ill effects of steamrolling e-health implantation by policy makers is offered by Australia, where inadequate e-health literacy on the part of healthcare professionals was identified by Rao (2009) as the most significant barrier to the uptake of e-health services in Australia (Eley et al., 2008). The Australian e-health strategy consequently identifies the importance of national strategies to accelerate the adoption of e-health in Australia across the health sector, while also emphasizing the importance of a coordinated program of awareness, training and education, as well as incentives and compliance programs. These programs target consumers, care providers, healthcare managers and vendors, with a particular focus on driving the adoption of e-health solutions across the Australian consumer and care provider communities (Australian Government, Department of Health and Ageing [DHA], 2008).

Cognitive, social, and cultural factors can also hinder the benefits of e-health due to ICT illiteracy, cultural differences, language differences, lack of access to technology, educational deficiencies and lack of access to capital among healthcare providers, complex systems and lack of data standards, privacy concerns and legal concerns/issues (Harrison and Lee, 2006; Anderson, 2007).

Healthcare practitioners have recognised that in order to overcome these barriers there is a need for collaborative working performance incentives from educational institutions, healthcare facilities and the governing authorities. Legal barriers will also need to be removed and there is a need to ensure the integrity of medical data so that both practitioners and patients have confidence in and appreciate the value of e-health applications.

As alluded to previously, latent professional resistance to new technologies is also major barrier to the increased utilization of e-health. The adoption and use of e-health applications by organization is completely dependent on its adoption by professionals ; thus this barrier must be overcome to facilitate the implementation of e-health services in clinical practice, and professionals *must* be included and considered from the design stage onwards (May et al., 2009).

2.3 E-Health Literacy

In the 1990s the term 'digital divide' emerged to refer to the growing gap between those who have limited access to ICT and those use it extensively for numerous purposes (Thinyane et al., 2006). While the geographical focus of the digital divide of the 1990s has abated with the increase in internet access in the developing world, generational differences still exist and the varying affinity people feel with using ICT, with some describing 'digital natives' and 'digital immigrants' (Prensky, 2001). Within the healthcare context, professionals from developing countries can be expected to have less readiness to use new ICT means of healthcare provision, and most people who enter healthcare do so for personal aspirational goals and to help people in a field-based format; theoretical education in healthcare alongside practical experience and training have formed the mainstay of the education of healthcare professionals for centuries, and albeit ICT has widely deployed in technical formats in healthcare for decades, existing healthcare professionals cannot be assumed to be predisposed, able or even willing to adopt e-health initiatives at the outset (although they have been assumed to be so by ineffective implementations, as mentioned previously). Thus e-health illiteracy has been identified as a major barrier for e-health deployment, and e-health literacy can be categorised as one of the public health goals of the 21st century and a significant challenge that is facing healthcare globally. Norman and Skinner (2006a) defined e-health literacy as the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem.

E-health literacy is not static; rather, it is a process-oriented skill that evolves over time as new technologies are introduced and the personal, social, and environmental contexts change. It is influenced by presenting health issues, educational background, health status at the time of the e-health encounter, motivation for seeking the information and the technologies used. Improving literacy is a process that requires coordinated remediation and education, involving partnerships among patient-clients, practitioners, educators, and

the community health organizations; this is a process which requires time to evolve properly.

The E-Health Literacy Scale is an eight-item list developed by Norman and Skinner (2006a) to measure e-health literacy. It measures users' perceived skills and comfort with e-health and includes six types of literacy: traditional literacy and numeracy, computer literacy, media literacy, science literacy, information literacy, and health literacy.

2.3.1 E-Health Literacy Model

The E-health Literacy Model ('Lily Model') was introduced in 2006 by Norman and Skinner (2006a) to assay e-health literacy and is comprised of a number of different literacy types that include a set of fundamental skills required by users in order to directly benefit from e-health. These individual skills form a relationship with one another as shown in Figure 2.1.The lily's petals are used to represent the component literacies, which feed the pistil, representing e-health literacy. The model also shows that the pistil overlaps the petals, signifying the connecting role it plays. Each of the six literacies that comprise the Lily Model are organized into two central types: the analytical and the specific. The analytical type consists of traditional media and information and involves skills that are applicable to a wide range of information sources, irrespective of the topic. The specific type consists of computer, scientific and health skills and relies more on the situation-specific competencies. The six types all merge together to form the foundation skills that are required to get the most out of consumers' experiences with e-health.

The development of information literacy not only facilitates the process of effective decision making but helps with research and problem solving. It also enables nurses to take responsibility when it comes to the continued learning in areas of professional or personal interest.
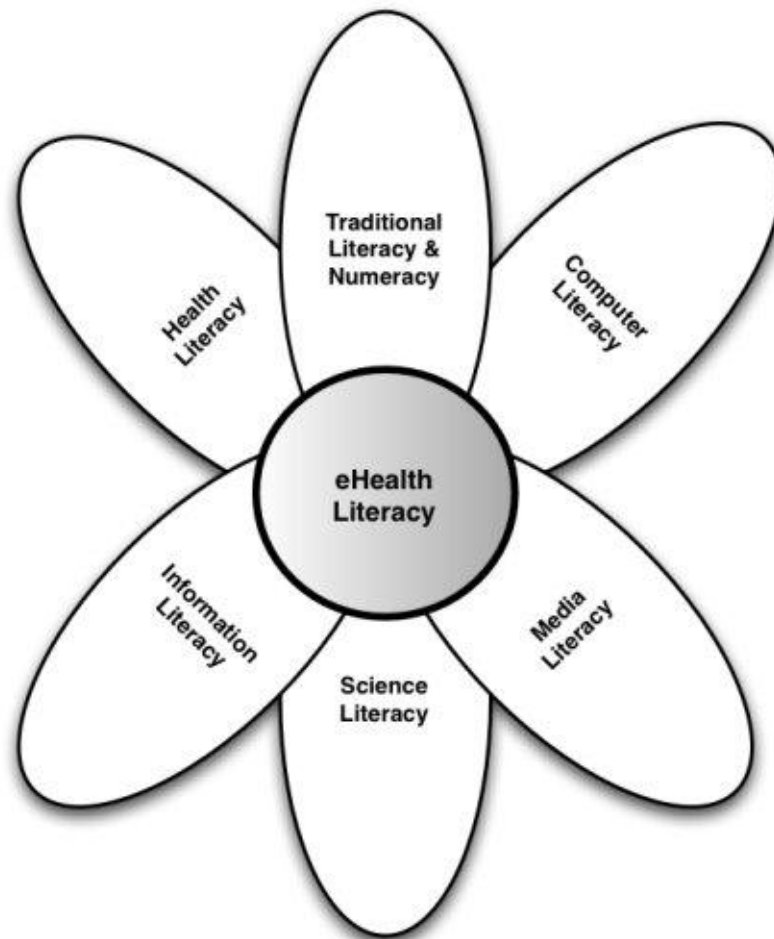
Figure 2.1: E-health literacy (Lily) model (Norman and Skinner, 2006a)

2.3.2 E-Health in Education/Nursing Curricula

E-health is still relatively new in nursing education literature. There are arguments that the nursing curriculum can be a key channel for encouraging change as well as increasing the focus on innovations involved within healthcare. Whilst there is a slow flow of content in nursing education, health innovations can provide a platform that will enable healthcare professionals to be educated and informed; this in turn will enable the motivation of such innovations as well as improving the healthcare system in general. Without skilled health practitioners who are able to apply the new patient care methodology, technology is useless. There remains a significant amount of work to prepare and educate health professionals who will work within e-health. To guarantee that nurses in the future are prepared to practice in a technology-driven health system sufficient education in e-health is needed, with the strong integration of e-health concepts and practices in nursing education.

Nurses need to keep abreast of developments or there is a risk of their finding themselves being left   behind and removed from current working practice. Traditional teaching methods need to be reviewed and steps taken to align them with modern thinking; this means including Evidence-Based Practice (EBP) and acknowledging the benefits of interdisciplinary working. The teaching criteria need to include topics such as patient confidentiality, e-health quality assurance and quality improvement approaches as well as being flexible to react to changes that are bound to occur within technology and the relationships of these topics towards patient care and the nursing practice (Booth, 2006).

Prior to the late 2000s there were very few e-health subjects incorporated into the undergraduate health programmes, thus negating any possibility of preparation for e-health and demonstration of its practical applications and benefits for nursing education, administration and clinical application. The main barrier to the acceptance of e-health in nursing practice is the lack of organisation in the education and the training of e-health, which results in lack of awareness and knowledge with regards to e-health among the nursing community. Nurses, who represent the largest group in the health workforce, need to be provided with the skills and knowledge that are needed in e-health through professional courses if e-health is to become a vital part of mainstream healthcare then it will be important to integrate e-health with undergraduate nursing curriculum (Edirippulige et al., 2007).

Nursing education literature has dedicated little devotion to the incorporation of integrated information literacy into curricula beyond working with librarians. There has been minimal discussion of education principles involved with implementing an integrated information literacy program despite the fact that attempts have been made to integrate this into the nursing education programmes described in the literature. Incorporating these information literacy skills into curricula requires coordinated efforts by academics, administrators, librarians and institutions. The information literacy approach to the curriculum is where the development of the appropriate skills and knowledge is integrated with teaching, as well as in the learning and the assessment of the objectives and content of the curriculum. It is often argued that understanding the cluster of abilities is important to the curriculum; this, merged with the sequence, structure and content of the curriculum, is required to achieve competency in information literacy (Barnard, Nash and O'Brien, 2005).

Nursing leaders are in a unique position within the healthcare industry to lead on leveraging health information technology to enhance the quality of patient care in a rapidly changing information technology landscape, especially when health information courses

are not routinely included nursing curricula (Harrison and Lee, 2006). Jehoda (2009) reviewed published literature relating to nursing informatics between 1991 and 2008 to understand the current state of integration between informatics and basic nursing curricula. Results revealed that nursing informatics is a continually developing discipline, and that this development is closely related to the current state of ICT and the infusion of ICT tools, as well as both information and computer literacy, which are crucial to modern nursing. Accordingly, nursing science programmes must integrate the contents of both competencies and complex informatics in their curricula to meet the changing demands of the healthcare environment for cost effectiveness, quality and safety in a technology-driven environment.

The establishment of the EMRO Virtual Health Sciences Library and Health Academy are examples of WHO efforts to allow for a substantial increase in knowledge management activities and information-sharing among member states and the validation of health information (Al-Shorbaji, 2006b). Despite the information technology revolution in healthcare resulting in the incessant need for nurses with sound knowledge of Nursing Informatics (NI), many undergraduate nursing schools still do not offer sufficient informatics education; this creates an NI knowledge gap between formal nursing education and the needs of the healthcare system which can be attributed to the fact that nursing faculty members have limited NI knowledge. The integration of NI into undergraduate nursing programs could bridge the NI knowledge gap between formal nursing education and the needs of the healthcare system, improve expert decision making, clinical reasoning of new nursing graduates, and improve work efficiency and collaboration with other healthcare professionals, thus reducing clinical errors, and improving the quality of patient care (Link and Marz, 2006).

2.3.3 E-Health in Developing Countries

The revolution in IT and telecommunications holds promise in addressing common health challenges within developing countries around the world, as they have made e-health both affordable and feasible. They have been recognized as a tool to provide equitable access to timely, efficient, and quality healthcare and health information. E-health has been found to solve many management and operational issues, including addressing some problems caused by the massive shortage of medical staff worldwide (Rodrigues, 2003; Khan, Qurashi and Hayee, 2007; Khan, 2008).

WHO and EMRO have considered the role of ICT as part of their strategic planning and the latter has introduced a number of initiatives and implemented a number of activities in support of e-health, including: policy-setting; capacity building; planning, monitoring and evaluation; networking and communication; infrastructure development; consulting services; electronic publishing; systems development; e-learning; telemedicine; and regional-level collaboration.

Mars (2012) described 11 years of experience in different approaches of e-learning to build e-health capacity in Africa, including: videoconferencing teaching, recordings of videoconferencing and other teaching formats and e-health training model for Shared Teaching and Building Capacity in Africa. E-learning opportunities were well received by students and practitioners and the model of collaborative teaching offers a means of quickly developing capacity in e-health, however the integration of ICT in healthcare in Africa was challenged by lack of infrastructure, prohibitive expense, computer illiteracy, restrictive telecommunication legislation, and lack of human capacity in the field of e-health (cultural barrier).

Developing countries recognize the challenges for e-health deployment and have started to establish collaboration with developed countries (e.g. Pakistan with the US; the Pakistan-US Science and Technology Cooperation Program created in 2003 is an example of this collaboration)(Khoja, Scott and Gilani, 2008). The PAN Asian Collaboration for e-Health Adoption and Application (PANACeA) is another example; this is an initiative to generate evidence in the field of e-health within the Asian context, by forming a network of researchers from developing Asian countries. This project is aims to generate evidence for developing e-health programmes in the developing countries of Asia (Pappas and Khoja, 2008).

WHO encouragement of e-health has made the latter an important component of Pakistan's healthcare delivery system. There has been governmental and professional interest in e-health implementation in Pakistan and support has been received from the stakeholders for its implementation, and availability of funds, and initiatives from different disciplines in e-health projects since 2000. However, the outcome of these initiatives has been inefficient due to lack of collaboration between the major stakeholders and the diverse sources of impetus (Patoli, 2008).

When planning for e-health in developing countries the emphasis should be on solutions rather than on high-end technology; evaluation is also essential to ensure that e-health

solutions really work (Pappas and Khoja, 2008). Qurban and Austria (2008) conducted an explanatory analysis of secondary data obtained from the World Bank, WHO, ITU, UN-ESCWA. EMRO and UNPAN of four middle east countries, comprising three GCC countries (Oman, KSA and UAE) and Jordan to assess their capacity to embrace e-health opportunities, challenges, and innovations by assessing the national performance indicators of ICT and healthcare sectors using SWOT analysis. The results showed that GCC countries are readily prepared to adopt e-health opportunities due to sufficient fiscal capacity and government support. Weaknesses/barriers for e-health adoption differ among the three GCC countries, including the lack of a comprehensive national ICT plan in the UAE (there was varying performance among emirates); low of connectivity and high internet and telecommunications cost, low national knowledge transfer and dependency on skilled expatriates in Oman; and lack of public access to the internet and telecommunications, low connectivity among e-health stakeholders and insufficient manpower for e-health implementation in KSA. Despite Jordan's low Gross Domestic Products GDP (to be added to abbreviation list)when compared with the other countries studied, the vigour with which it attempts to improve ICT infrastructure and applications (including e-government) and summits allocated for training and developing human resources in this regard is promising. The authors concluded that these countries will be able to easily incorporate e-health policies within their e-government infrastructure.

Government policies have a significant impact on governing, financing, and regulating the health sector. This is of significance in developing countries where the public health system is the major provider of services; hence, the exclusion of the health sector in national ICT initiatives is a barrier to the deployment of e-health factors. This situation is exacerbated by lack of awareness of the benefits of e-health among policy makers, lack of evidence for the benefits, limited financial resources, prejudice, lack of expertise, health system inertia, and resistance to change related to sensitivity (as health is closely linked with confidentiality and security issues, which makes, the introduction of ICT into healthcare institutions more problematic than in other sectors)(Edirippulige et al., 2007)

2.4 WHO Global Strategy for E-health

WHO has proposed a global strategy to design and reconfigure healthcare, which could serve as a model for delivering comprehensive e-health services. The Health Metrics Network (HMN), launched in 2005, is the first global health partnership that focuses on core requirements of strengthening the health system to improve global health. It identifies the importance of strengthening the systems that generate health-related information for

evidence-based decision making in low- and low-middle income countries. According to HMN, improvements to health information systems require attention to the training, deployment, remuneration and career development of human resources at all levels. This entails capacity development, training and educational schemes to address human resource development in areas such as health information management and use, design and application, and epidemiology. Such training should be for all levels of competency, ranging from the pre-service training of health staff and continuous education to public health postgraduate education. It is essential that any the national action plan includes the training of existing and new human resources as well; the model proposed in this study is in alignment with the WHO global strategy for e-health (WHO, 2006).

Although e-health has emerged as a fast-growing, transformational technology worldwide, there no academic discipline currently offers a comprehensive curriculum that integrates fields underlying e-health. Because use of e-health approaches and systems in the healthcare sector is becoming a daily practice, practitioners tend to build applications from the perspective of their personal expertise; lack of formal health informatics training in core curricula in medical schools creates artificial barriers in medical education and slows down information transfer which could limit the success of e-health. Thus, incorporating e-health into the IS curricula can make good use of slack resources and also reinforce the image of IS as a forward-thinking and growth-oriented discipline (Wilson, 2006; Bari, Forczek and Hantos, 2011).

2.5 E-Health in Developed Countries

In the developed world, the vast majority of people under 30 years old prefer to use the Internet to communicate with health professionals, to investigate their health options, put forth their ideas and connect with others about health issues using e-health strategies (Doupi et al., 2010). Following the Communication of the European Commission (EC) on "e-Health – Making Healthcare Better for European Citizens: An action plan for a European e-health Area", Member States of the European Union (EU) committed themselves to develop and issue national roadmaps – national strategies and plans for the deployment of e-health applications addressing policy actions identified in the European e-health Action Plan With EU and WHO support and own funding initiatives. Estonia established the Estonian e-health foundation, a supportive legislative environment for ICT and the use of existing structures for a health information system. Estonia has put in place relatively an advanced e-health services; 100% of the Estonian GPs use a computer. 98% of GPs in Estonia store administrative patient data and 94% use a computer in consultation

with the patients. Radiological studies are stored in the national Picture Archiving and Communication System (PACS). This portal gives the GP access to the images, reports, and ECGs of particular patients. Whilst Estonia has put in place comparatively advanced e-health services, more than a few challenges to e-health services development remain, such as the lack of a comprehensive e-health strategy for the country, interoperability, an inappropriate legal framework and threat of governmental standstill due to non-existing public debate on privacy concerns, and insufficient funds for the development due to rising IT development costs (mainly human resource issues) (Doupi et al., 2010).

Establishment of e-health foundations in developed countries such as New Zealand, the UK, Denmark and Canada is strong international evidence on e-health progress at a national level (DHA, 2008).

Pillon and Todini (2004) traced Italian experience of e-health application to 1987-1988, with the first medical digital transmission from Terra Nova Bay and transmitted Doppler waveforms from the expedition support ship to Italy, which was followed by consecutive successes when Italy arrived at the stage where they had a full telemedicine/e-health system adapted to remote healthcare, and Italy became a trailblazer of medical practice using different digital applications.

European strategies and best practices have influenced the development of European Union EU10 policies; Denmark, the UK, Greece, Switzerland, Italy and Sweden are examples of useful models for e-health strategy development in developed countries. They have established organizations focusing directly on e-health development and preparation of e-health strategies. By 2007, Poland, the Czech Republic, Malta and Estonia were the only EU countries that had not yet officially adopted e-health strategies. Despite the progress in e-health deployment in European countries, challenging issues remain concerning legislation for e-health development, such as lack of compulsory legislation on the application of e-services, difficulties with current legislation on patient databases, reimbursement laws, and standards. Only Estonia and Poland report a favourable and supportive legislative environment for ICTs and legal frameworks for e-health, while the EU10 countries have incomplete, inefficiently implemented e-health strategies, representing barriers to e-health development and implementation (Christodoulou, 2008).

The National E-Health Strategy in Australia (DHA, 2008) identifies both current and potential future e-health applications and awareness programs, education and training, professional accreditation, professional development programs, changing and enhancing

education and training programs as essential components of change and adoption of e-health. Rural and remote communities in Australia stand to gain the most from e-health applications given the challenges of distance, limited human and technical resources, and support services; the same conditions motivated the pioneering case of telemedicine in 1917 referred to in Section 2.1.Inadequate e-health literacy is likely to be the most significant barrier to the uptake of e-health services in Australia (Rao, 2009).

According to Rodrigues (2003), most public health organizations in the developing world do not take advantage of existing ICT opportunities and most existing information systems are insufficient for the requirements of new models of healthcare being deployed in the context of health reform initiatives. For example, challenges to the deployment of e-health in Latin America and the Caribbean include socioeconomic and development constraints, market characteristics, cross-border issues, technology infrastructure and operational issues, lack of skilled and committed human resources, lack of standards, security and privacy concerns related to quality of publicly available information. In Spain, lag in Internet penetration and poor quality of Internet content, issues related data security and confidentiality, legal and administrative framework, funding, sustainable business mode and technological aspects. All of these factors resulted in the low level of development of ICT in health and consequently delays in e-health development in Spain in comparison with other European countries (González et al., 2006).

González et al. (2006) emphasized that two main features of the health sector should be kept in mind when drawing up strategies to promote and foster the introduction of these new technologies: firstly, health is one of the most information-intensive sectors, and could be singled out as the prototype of a knowledge-based society; and secondly, the health sector is subject to a higher degree of regulation and has a management structure that is essentially public in nature.

2.6 E-Learning Concept & Historical Background

E-learning, online learning or computer-based learning are essentially novel versions of distance learning, which has its roots the correspondence schools and courses of the early 20th century. It is applied via the Internet technologies and involves educational activities that do not require the physical presence of the teacher and learner in the same time and place. It has many applications such as e-examinations, e-drills, e-book and e-television, e-counselling, e-sound book and effective e-learning system (Srichanyachon, 2010).

Historically, there have been two common e-learning modes: distance learning applied for learners who are at remote locations from a central site, and computer-assisted instruction using information mainly from computers to deliver instructions and to help in the delivery of stand-alone multimedia packages. With the propagation of web-based learning, the latter has increasingly been used to refer to the use of the technologies provided by the internet to deliver a broad array of solutions to enhance the performance and knowledge of web-based learning. This is built on adult learning theories, which state that an adult learns by relating their new learning to a past experience by linking a specific need to their learning (Ruiz, Mintzer and Leipzig, 2006).

The computer literate generation (i.e. digital natives) increasingly prefer e-learning to traditional formats. According to Koohang et al. (2009), 20% of all US higher education students were taking at least one online course in autumn 2006, whereby the delivery of all activities relevant to the instruction as well as the teaching and learning were effected through various electronic media.

The UK-based National Services University and the National Learning Strategy ('Working Together – Learning Together") identified e-learning as a central strategic delivery mechanism and aimed to ensure training relevant to this purpose. Many universities in the UK are investing in e-learning for all student categories, including healthcare students, (Childs et al., 2005).

With the proliferation of the internet and due to changes in healthcare delivery, e-learning is gaining popularity in medical education. It is growing rapidly at different levels of medical education; plenty of e-learning resources are available that offer a vision of expanded access to large numbers of high-quality sharable e-learning material. In 2006 the School of eLearning Science of the College of Internet Distance Education (CIDE) at Assumption University (Thailand) offered the first Ph. D. in eLearning Methodology in the world, reflecting the rapid maturity of the concept of e-learning; however, practical application generally remains fragmentary (Ruiz, Mintzer and Leipzig, 2006; Charmonman, 2008).

2.6.1 Components of E-Learning

According to Ruiz, Mintzer and Leipzig (2006), the creation of e-learning materials involves four main components with regard to content: development, delivery, management and standardisation. Each component plays an important role when it comes to designing an online course. The audience itself (i.e. learners) can be considered as a fifth

component. A well designed e-learning course can motivate learners to become more engaged with the content and it should demonstrate increased retention rate integrated with better utilization of content. This results in better achievement in attitudes, skills and knowledge of the course. The diagram below illustrates how these components are connected and related to successful e-learning:

Figure 2.2: Components of E-Learning

2.6.2 Advantages of E-Learning

There is consensus among learners and faculty administrators that e-learning enhances both learning and teaching and can save 50% of resources spent on conventional learning (Ruiz, Mintzer and Leipzig, 2006). It is considered as a golden opportunity for organizations that deal with fast changing knowledge. According to Weber (2010), e-learning would solve many different issues including easing poverty, illiteracy as well as working through e-government to create an advanced knowledge-based society and better citizens. This will present a perfect opportunity to study the cultural differences in classroom behaviours, learning styles, the cross-cultural impact of learning objects and the instructional approaches in communities that are culturally diverse.

The key positive features of e-learning are that it allows learners to access the material at their own place, speed and time. It also allows learners to customise the selection of learning objectives in order to meet their own individual learning needs and styles (Tsai, 2012). Another advantage of e-learning is that the pre-packaged learning module can be spread over computer networks at a low cost to a large number of learners. This makes e-

learning suitable for employee training for the continued professional development as well as disabled learners who face barriers to education in traditional formats (Weber, 2010).

It also offers new ways of collaborative learning that may enhance the performance of students as well as offering new ways of collaborative learning which stems from the social interaction amongst students and their mutual support, which generally increases retention (Gokhale, 1995; Gafni and Geri, 2010).

E-learning has proven effectiveness comparable to face-to-face traditional teaching, which makes it a valuable and legitimate learning technique in the education of healthcare professionals in healthcare settings and academic institutions. Reasons for adopting e-learning in medical education and continuing professional development include the promotion of lifelong learning, fulfilling personal interests, time-saving, fully customizing content to meet the job needs, information diversity, flexibility in time and space, less impact on family and other life responsibilities, flexibility for adult learners, the capacity to provide a well-organized and large amount of information quickly and without errors, cost-effectiveness by offering systematic information to a large number of learners, greater accessibility of information, ease in updating contents, personalization of instruction, standardization and distribution of contents (Zaben et al., 2000; Niculescu-Aron, 2007; Hugenholtz et al., 2008; Schreurs and Moreau, 2008; Sandars, 2010; Asghari et al., 2012).

Duffy et al. (2002) compared the outcome of course delivery for health professionals, including post-registration nurses in conventional classroom-based distance learning, with face-to-face tutorials, and completely online with no face-to-face contact. The results showed that overall module results were significantly higher for the students who studied completely online.

A further advantage of e-learning is the indirect cost savings that can be achieved by retaining the service of trained staff in the health sector or sponsoring their studies, which promotes staff retention and decreases turnover rate, which consequently positively reflects on the quality of healthcare services, and facilitates the integration of new conceptual knowledge with practice through the application of learning to the real situations in assignments and projects (Alexander, Igumbor and Sanders, 2009).

2.6.3 E-Learning Readiness

E-learning readiness should be determined before organisations introduce e-learning; not only does this require readiness from the learner, but also from the trainer as well as the

organisation. Schreurs and Moreau (2008) defined e-readiness in terms of the extent to which an organisation ready with regard to social context, technology access and content delivery.

Several models to assess e-readiness are suggested. Jeanne Schreurs and Rachel Moreau (2006) used e-readiness models to develop an e-learning readiness measurement instrument and questionnaire to assess Flemish hospitals' e-readiness for e-learning. The authors proposed a model of the Seven Components of Good E-Learning (SCIE), which concluded seven components of good e-learning delivery: Situational, Content suitability, Technological, Learning style, Instructional and Network, Organizational and Personal. The authors argued that without these components being put in place by organizations, e-learning will not achieve its intended objectives. Despite the fact that e-learning offers a lot of advantages, there is still a lot of reservation towards e-learning due the reason is that organizations are not e-learning ready. As stated previously, e-learning readiness requires collaborative efforts between suppliers, trainers and learners. Training and infrastructure can facilitate readiness as well as ease the operation of services such as e-health, e-government, e-commerce and e-learning (Thinyane et al., 2006).

Brown et al. (2010) investigated Australian health sciences students' attitudes towards e-learning and computer-assisted instruction. The findings indicated that significant predictors of health science students' attitudes towards computers in education depended on their age, sense of autonomy and perception of equitable treatment by teachers as well as the extent in which they were satisfied with their e-learning environment itself. The use of e-learning is in nursing viewed as an effective means in providing professional education that aims to produce graduates with on-going relevance, innovation, creativity, cost-effectiveness, and enhanced quality of services in the healthcare industry.

2.7 Barriers to E-Learning

Known barriers to e-learning that challenge both learners and educators include lack of suitable courses, poorly designed packages, high cost, lack of provision by employers, lack of managerial support, heavy workload and lack of protected time for learning in addition to technical barriers. The latter include the unsuitability of available computer technology, poor infrastructure, lack of internet access and personal computers, lack of skills in using e-learning methods, computer anxiety and ICT illiteracy, lack of access to eLearning materials, lack of confidence with e-learning a lack of time to prepare the materials and a lack of support and guidance for development and use of these methods, in addition to

problems with the network or facilities in the rooms, limited student IT skills and negative attitudes towards e-learning, lack of motivation and low self-control, absence of social characteristics compared to direct communication and interaction with instructors and colleagues that could result in poor quality of preparation due to lack of teacher/tutor guidance and explanation. The risk of studies not being recognized (i.e. accredited) due to the novelty of e-learning is an additional limitation that that cannot be ignored (Childs et al., 2005; Niculescu-Aron et al., 2007; Blake, 2009; Zaben et al., 2010).

Childs et al. (2005) conducted a systematic review on literature on barriers to and solutions for e-learning in the health field. They identified barriers including cost, requirement for change, poorly designed packages, inadequate technology, lack of skills, need for component of face-to-face teaching and computer anxiety. A range of solutions can solve these barriers, including standardization strategies, integration of e-learning into curricula, blended teaching, user-friendly packages, access to technology, skill training, management/employer support and dedicated work time for e-learning.

Success of an online course development is dependent upon the commitment, enthusiasm, interest and skills of dedicated instructors. Delivering quality online courses is a challenging task for instructors compared to traditional courses, hence they must be provided with on-going training and support in order to become technologically proficient (Fish and Wickersham, 2009). ICT training is needed to overcome computer anxiety. Link and Marz (2006) considered attitudes towards e-learning as an umbrella for learning methods supported by ICT. The authors argued that students would benefit from formal ICT training for a wide range of computer skills among students, while a single computer course for all students would not be useful, as students' ICT proficiency varies.

2.8 E-Learning in Developing Countries

Developing countries still lag far behind in the deployment of an effective e-learning in medical education, which necessitates primary focus on the integration of efforts and organization of activities (Karimzadegan, 2007). According to Weber (2010), the barriers to e-learning adoption and development in developing countries include the lack of competitive telecommunications markets due to monopolies, which results in substantial internet usage fees, comprising a major barrier that limits access to online learning resources; inadequate training of teachers to use emerging digital technologies; and the lack of native language (e.g. Arabic) learning objects and materials. Other barriers include

the lack of e-learning quality standards as well as cyber safety, however this is an international concern not related to development status.

Weber (2010) surveyed the historical development and current status of e-learning in Gulf Cooperation Countries (GCC) states, including the educational, political, social, and financial factors that led to the adoption and development of current e-learning systems and initiatives, E-learning technology and programs are relatively new throughout the Gulf region, and all Gulf countries face the very serious problem of the lack of educational quality assurance in the e-learning arena. Within the GCC there is also a lack of inter-ministerial cooperation, latent technophobia and lack of collaboration. However, in recent years interest in e-learning has grown almost exponentially in the GCC countries, facilitated by large investments in e-learning resources during the past five years in support of the development of e-government. Qatar has rapidly moved to the forefront of e-learning among the GCC countries and it has a concrete national strategy to develop a knowledge society, with comprehensive development of ICT, including e-learning.

Gunawardana (2005) investigated the potential challenges and benefits of implementing eLearning in Sri Lanka by reviewing the awareness and readiness of the selected higher educational institutes with the aim of identifying the enabling factors, bottlenecks and forecasts of the future growth of e-learning in Sri Lanka as a host in Asia. Awareness of e-learning was found to be high, despite poor investment in developing e-learning applications. Most institutions investigated/surveyed the use of internet-related e-learning sites just for the sake of it, and not to enable real online learning. Institutes have also been using e-mail and internet in addition to developing web pages for transaction of students rather than for learning purposes; it was promising that they planned future investment in the selected areas of e-applications. The author argued that the existence of infrastructure, along with some degree of connectivity, is essential for e-learning to succeed in the developing world.

Zaben et al. (2010) investigated perceptions of a group of professionals from different health specialties in Palestine of e-learning as a mode of educational delivery and to address health professionals' needs in terms of continuing health education and telemedicine. E-learning was indicated as an important modality in enhancing knowledge from lecture-based learning, while time limitations, internet access and computer use issues were considered to be the main obstacles facing health professionals in using e-learning methods. The most major limitation was the time factor; the authors emphasized the need for e-learning programs of continuing health education tailored to enable health

professionals to pursue their postgraduate studies and CME while encouraging a culture of lifelong learning.

Frehywot et al. (2013) reviewed literature of e-learning in medical education in low income and limited resource countries, finding that e-learning is an effective and efficient means for medical education and capacity building in such countries. It offers great educational opportunities for students and enhancing faculty effectiveness. A variety of e-learning resources are already being used, and a certain level of institutional readiness exists in terms of infrastructure and human resources. To nurture this is however a challenge for most developing countries, due to policy-related issues and network security, bandwidth and storage solutions, content and knowledge management of e-learning, copyright, intellectual property and accessibility.

2.9 E-Learning in Medical Education

With the birth of internet and due to changes in healthcare delivery, e-learning became a pressing issue in medical education at different levels, The integration of e-learning into existing medical education is an effective solution for effective e-learning for health professionals but it should be the result of a well-designed plan that begins with a need assessment and concludes with the decision to use e-learning (Childs et al., 2005; Ruiz, Mintzer and Leipzig, 2006).

Anderson et al. (2009) investigated the potential merits of e portfolios in nurse practitioner education for competence and capability development. E-portfolios were found to be effective tools to facilitate continuous assessable learning in response to changes and complexities in nursing practice and to foster personal qualities such as critical thinking and individual assessment and accountability. The authors argued that e-portfolios could be integrated into an NP curriculum model alongside action learning and clinical practice.

Hugenholtz et al. (2008) investigated effect of e-learning on knowledge on mental health issues compared to lecture-based learning in a CME program for occupational health physicians. The results showed that the effect of e-learning is comparable to the lecture-based approach, based on which findings the authors argued that e-learning may play an even more important role in the future CME of healthcare professionals.

Several registration authorities mandate that health practitioners demonstrate CME credits to ensure regularly updated medical knowledge and skills. Companies such as CME.web.com and GE Health Care offer online CME credits through web-based tutorials

and other electronic means. In light of increasing requirements for CME, e-learning has become an attractive option and a valuable flexible and time-saving learning method for continuing education for busy health professional, enabling them to update their medical knowledge and skills and fulfilling CME requirements with minimal negative impacts on other life areas (including personal and professional life) at low cost compared to traditional educational formats. As the health system advances, medical professionals are increasingly required to be connected to the most recent information on biomedical advances in the more technologically developed countries (Schreurs and Moreau, 2008; Weber, 2010).

Lockyer, Moule and McGuigan (2007) explored nurses' perceptions of the impact of an online education package on patient care in two hospitals in the UK. The results revealed that nurses who used the e-learning package were more confident to care for their patients and to transfer their learning to their clinical practice; this supports the utilization of e-learning in CME and professional development. With the digital age e-learning has become a high profile approach for pre-registration health students and for continuing professional development; most UK universities are investing in e-learning (Childs et al., 2005).

Alexander, Igumbor and Sanders (2009) identified that a further advantage of e-learning is cost-saving achieved by retaining the service of trained staff in the health sector while they study, including by sponsoring staff to study; this results in increasing staff retention and decreasing the turnover rate, which positively reflects on the quality of health and facilitates the integration of new conceptual knowledge with practice through the application of learning to the real situations in assignments and projects.

There is increased focus on innovative educational delivery methods to encourage continued education in healthcare, particularly for those accessing courses from the practice setting, due to on-going need for healthcare professionals to update their knowledge and skills and enhance their clinical practice. E-health applications are increasingly used to deliver health services, and healthcare providers, healthcare students and teaching staff required to be familiar and competent with such applications in order to meet their patients' needs and to keep up with the rapid changes in their practice areas. In this context, e-learning will play an increasingly vital role in enabling healthcare professionals to maintain competency in a technology-driven and rapidly changing healthcare environment (Blake, 2009).

In a study aiming to determine the need for introductory ICT training among medical students and to identify difficulties that may be encountered in implementing a university-wide LMS due to students' lack of computer literacy or low acceptance of e-learning, Link and Marz (2006) considered attitudes towards e-learning as an umbrella concept for learning methods supported by ICT. The authors argued that students would benefit from formal ICT training for a wide range of computer skills among students, while a single computer course for all students would not be useful as students' ICT skills vary. Special consideration should be taken to prevent students who lack computer skills from being disadvantaged or from developing computer-hostile attitudes which will lead to frustration and negative attitudes towards e-learning; there is no one-size-fits all course design available or indeed possible.

Delivering quality online courses is a challenging task for instructors compared to traditional courses. Successful online courses are highly dependent upon the commitment, enthusiasm, interest, skills and dedication of instructors, hence instructors must be provided with on-going training and support in order to become technologically proficient, which makes them competent and confident to deliver online training (Fish and Wickersham, 2009).

Although a wide range of technologies can be employed to support nursing and healthcare education, there is still limited appreciation of student experience and use of e-learning. Student engagement with e-learning is mainly at an information retrieval and inter-activate level; there is scope to broaden the use of e-learning that would engage students in the social construction of knowledge (Moule, 2006; Lockyer, Moule and McGuigan, 2007).

Frehywot et al. (2013) reviewed literature of e-learning in medical education in low-income and limited-resource countries. They found that e-learning is an effective and efficient means for medical education and capacity building in developing countries resulting in improved educational opportunities for students and enhancing faculty effectiveness. A variety of e-learning resources are currently being used, and a certain level of institutional readiness exists in terms of infrastructure and human resources but this needs to be ensured; this a great challenge for most developing countries, and policy-related issues must also be taken into consideration such as network security, bandwidth and storage solutions, content and knowledge management of e-learning, copyright, intellectual property and accessibility.

2.9.1 Integrating E-Learning into Nursing Curricula

Anderson et al. (2009) investigated the potential merits of e-portfolios in nurse practitioner education for competence and capability development. E-portfolios were found to be effective tools to facilitate continuous assessable learning in response to changes and complexities in nursing practice and to foster personal qualities such as critical thinking and individual assessment and accountability. The authors argued that e-portfolios could be integrated into a NP curriculum model alongside action learning and clinical practice.

Childs et al. (2005) conducted a systematic review on literature on barriers to and solutions for e-learning in the health field. Barriers identified included cost, requirement for change, poorly designed packaged, inadequate technology, lack of skills, need for component of face-to-face teaching and computer anxiety. A range of solutions may overcome these barriers, including standardization strategies, integration of e-learning into curricula, blended teaching, user friendly packages, access to technology, skill training, management/employers support and dedicated work time for e-learning. The integration of e-learning into educational curricula is considered as an effective solution for effective e-learning for health professionals. Blake (2009) identified similar barriers: lack of confidence with e-learning, lack of time to prepare materials, lack of support and guidance for development, problems with the network or facilities in the rooms, limited student IT skills and negative attitudes towards e-learning (Blake, 2009).

2.9.2 Integrating E-Learning into Medical Education

The integration of e-learning into existing medical education should be the result of a well-designed plan that begins with a need assessment and concludes with the decision to use e-learning (Ruiz, Mintzer and Leipzig, 2006). E-Health literacy is a dynamic, process-oriented skill that evolves over time as new technologies are introduced and the personal, social, and environmental contexts change; it is influenced by presenting health issues, educational background, health status, motivation for seeking information and the technologies used. Improving literacy requires coordination remediation and education, involving partnerships among patient-clients, practitioners, educators, and community health organizations.

Norman and Skinner (2006a) developed a scale of eight items (e-Health Literacy Scale) to measure e-health literacy in terms of consumers' perceived skills and comfort with e-health, listing six types of literacy. The digital divide concept mentioned previously is a major factor worldwide, particularly in developing countries, but it is anticipated that this

issue will diminish as populations generally become more acculturated and conditioned to use the internet and ICT; nevertheless, as long as a digital divide remains, widely varying ICT skills must be taken into account when designing e-learning programs and curricula (Thinyane et al., 2006).

2.10 E-Learning Models for Health Professional Education and E-Health

The increased application and utilization of ICT in healthcare has elevated the importance of theories and conceptual frameworks that predict and explain health ICT acceptance and usage, including those explored below. Within healthcare context most studies have focused on e-health record EHR adoption; little attention has been paid to the capabilities of those systems and the degree to which healthcare professionals actually use them as an end users.

2.10.1 Technology Acceptance Model (TAM)

Of several theoretical models employed to study user acceptance and usage behaviour of emerging information technologies, the most widely applied is the Technology Acceptance Model (TAM) developed during the 1980s (Davis, Bagozzi and Warshaw, 1989), based on the principles of the Theory of Reasoned Action (TRA). It suggests that two specific beliefs, perceived ease of use and perceived usefulness, determine one's behavioural intention to use a technology, which will be linked to subsequent behaviour. The model is illustrated in the figure below.
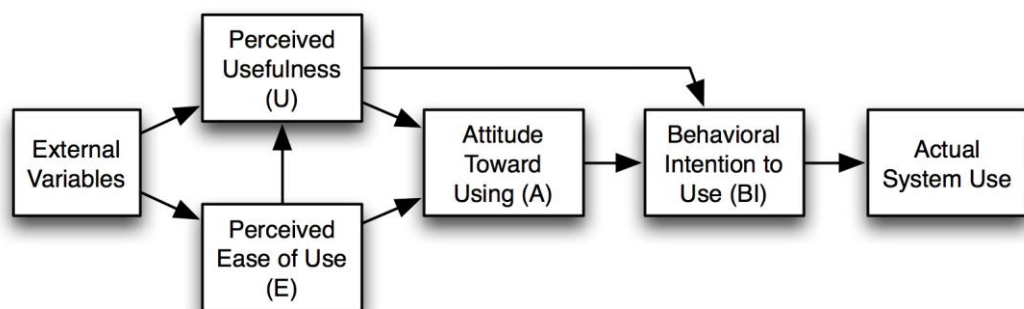
Figure 2.3: Technology Acceptance Model (Davis, Bagozzi and Warshaw, 1989)

Efforts to apply TAM to health IT date back to the late 1990s. Studies of TAM in healthcare have been conducted in a wide variety of countries across the world, with

variations in the focus of the study, definition and measurement of key constructs, population studied and settings. Findings show that despite TAM not being developed specifically for the healthcare context, there is ample opportunity for its success as it has a strong track record in numerous industries, which can be considered as leverage for its acceptance and utilization in healthcare. However, if TAM is used in its generic form, it may not capture some of the unique contextual features of computerized healthcare delivery, although it is considered a gold standard outside healthcare (Holden and Karsh, 2010).

Venkatesh et al. (2003) proposed a model that integrates control as conceptualized as computer self-efficacy and facilitating conditions, intrinsic motivation (conceptualized as computer playfulness), and emotion (conceptualized as computer anxiety) into TAM as anchors that determine early perceptions about the ease of use of a new system. Determinants of perceived ease of use, a key driver of technology acceptance, adoption, and usage behaviour, were strongly supported by the proposed model at all points of measurement, as shown in the figure below.
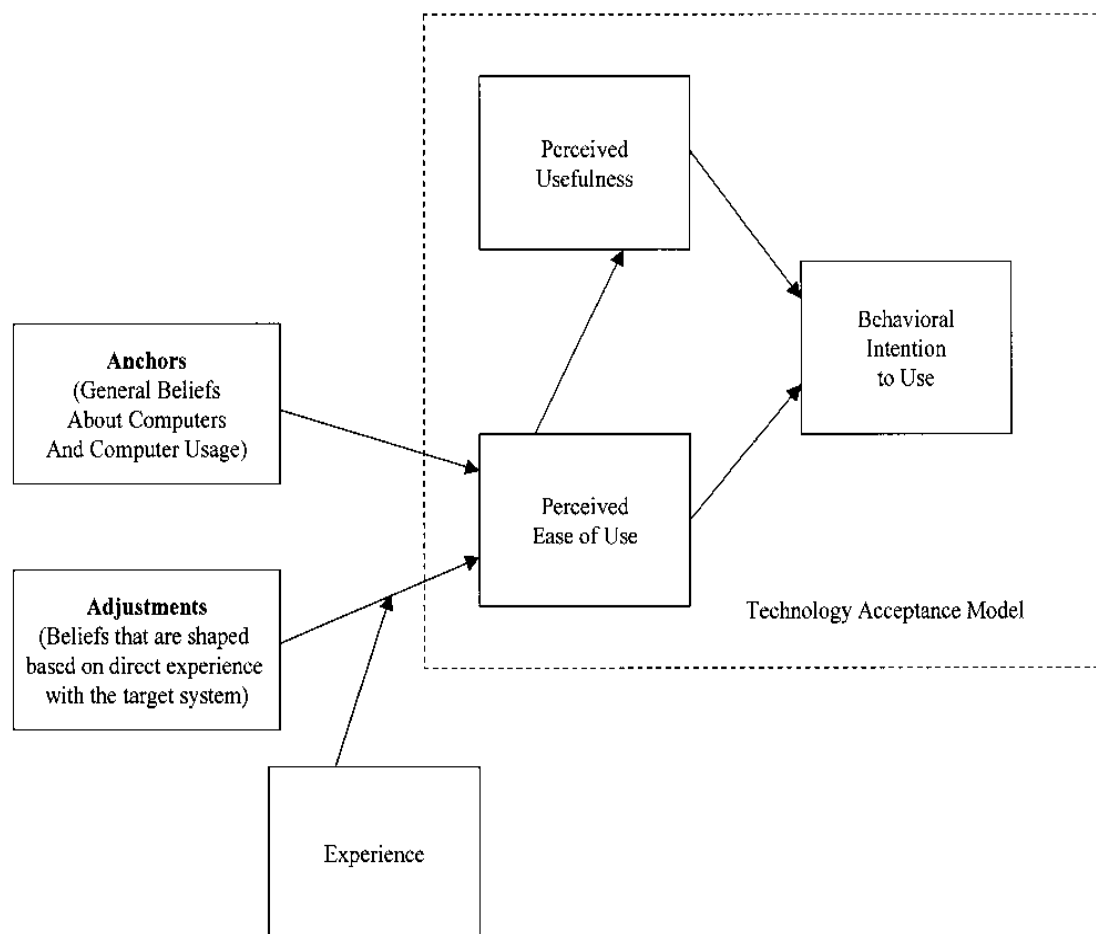
Figure 2.4: Theoretical Framework for Determinants of Perceived Ease of Use (Venkatesh et al., 2003)

Chambers et al. (2008) designed and evaluated an online eight-module learning resource "Working Together" to improve collaborative practice ("team work"). It covers the basic principles and rationale for collaborative practice, the development of collaborative skills, the application of these skills to the delivery of care and the evaluation of the current level and effectiveness of collaboration in the learners' work environment. The model was implemented on different categories of health practitioners and e-learning was found to be a practical means to deliver accessible and convenient education, addressing many of the constraints of busy clinical healthcare practitioners. Asynchronous interaction allowed learners to interact at their convenience, using the "Working Together resource" for online delivery of training content, along with curricula that recognize the factors that impact work-based change. There were indicators that the resource can improve resident quality of care and quality of life, and the authors argued that changing the way health providers are educated is key to achieving system change.

2.10.2 SAFEM-D model

López and Fernandes (2009) presented an e-learning experiment made in the health field in Portugal using a Learning Management System model built on the cognitive education theory that students gain autonomy, responsibility, self-control and self-motivation through their own process of learning. SAFEM-D model integrates virtual classes, theoretical background and a library/Online Media Center (distributive technologies), virtual practice classes (interactive technologies) and a parallel system of training (collaborative technology) in all systems of study. In virtual practice classes, the four styles of learning are taken into account and any technique can be generated within the course progress. Key elements of development of the model are authorship, technology, pedagogy and tutoring. When developing the course contents, the learning styles of the class and grouping students with the same learning style of learning were placed at the top of the pyramid. The development of the service is supported by the technological tools of the E-Learning Platform. A team of pedagogues (specialists in training and e-learning) were assigned to plan and develop actions based on the Model SAFEM-D. Synchronous (chat) and asynchronous (forums, email) tutoring telematics were used to permit users to communicate with their tutors and solve any queries with little effort and great agility. Learning Management Systems (LMS) were to conduct training. The most important aspects of the platform are its friendly interface, help desk, statistical tools that allow full control of training sessions, work teams, communication tools and support for training (forums, chats, e-mail messages, download areas, direct access to tutors, on-line libraries)

and IT autonomy, whereby the training project in e-learning does not require computer technicians or network managers (Application Service Providers).

The e-learning training, the platform and the course were evaluated using feedback from students. It was found to positively note the key features of e-Learning (flexibility, on-going evaluation and training, length of the learning process); based on these findings, it was concluded that the SAFEM-D model used for training in health led to successful learning and high levels of motivation through mentoring/tutoring, presenting some interactive contents and extremely positive assessment.

2.10.3 E-Health: A Model for Developing Countries, 5 Cs Model

Drury (2005) proposed a model consisting of five components (5Cs): context, content, connectivity, capacity and community. It may serve as a useful framework for analysis, to inform the development of e-health in developing countries' context of poverty (given that the more established models for e-health were developed in and for a context of wealth and well developed national and local ICT infrastructures that are inappropriate and unaffordable for most developing countries.

Regarding the contents component, developing countries can ill afford an e-health infrastructure to meet the reporting requirements of international health regulations; health workers therefore need to be provided with access to reliable health digital health information connectivity. Most hospitals in developing countries do not have computer networks or wired networks within and between health facilities, to support the transmission of health information and to build the workforce capacity while supporting community development to make decisions related to health and other development issues.

2.10.4 LITIS Logical Model: Levels of Technological Innovation in Healthcare in Italy

Tamburis et al. (2012) developed LITIS (Levels of Technological Innovation in Healthcare) as a logical model that aims to produce metrics to measure the level of accomplishment of e-health dynamics of the Italian public community and hospital from two complementary perspectives: the Functions (F), which means the services of which different kinds of actors (citizens, social/healthcare operators, managers, administrative staff) can take advantage; and the Enabling Components (C), which are not providing direct services to the different actors, but stand as the qualifying prerequisites to deploy the functions, and handle the change the scope of the LITIS model, involving the whole range of potential e-health functions (i.e. not only the ones related to EHR systems).

LITIS emphasizes the engagement of citizens in primary care, especially for integrated management of chronic diseases. The authors advocate that achieving an effective alignment of the strategies, on a national and regional level, is strictly linked to the critical dynamics of interrelation existing between the main drivers of ICT penetration in the healthcare sector, namely the e–government plans, the drift velocity within spontaneous markets, and the constraints introduced by planning in healthcare (also tourism and banking)(Tamburis et al., 2012).

2.10.5 Universities' Collaboration in eLearning (UCEL) in Health Education

Universities' Collaboration in eLearning (UCEL) is a state-of-the-art e-learning project initiated in March 2002.It is a collaboration and partnership project between a number of UK higher education faculties for ground-breaking new methods of collaborative and interactive e-learning content creation by actively exploring ways in which high quality content can be unlocked and made reusable across many disciplines comprising the wide field of health professional education (Leeder, Rodrigues and Wharrad, 2004).

It offers a model of how large and diverse organizations can collaborate to assimilate e-learning into their current working practice and shows how it can be deployed in a unifying manner. It sees e-learning is seen not as a replacement of traditional face-to-face learning, but more as a powerful ally; the model can readily be generalized to support a wide range of educational needs. A number of subject areas have been identified as broadly generalizable, therefore the UCEL is potentially the most promising model for generating reusable content across all health professional disciplines.

2.10.6 WHO Global Strategy for E-Health

WHO (2008) has proposed a global strategy to design and reconfigure healthcare. The WHO strategy could serve as a model for delivering comprehensive e-health services. The HMN, launched in 2005, is the first global health partnership that focuses on requirements in order to improve global health by strengthening health systems that generate health-related information for evidence-based decision-making in low and low-middle income countries. According to the WHO HMN, improvements to health information systems require attention to the training, deployment, remuneration and career development of human resources at all levels. Therefore, capacity development is needed, and training and educational schemes should be used to address human resource development in areas such as health information management and use, design and application, and epidemiology. Such training should be for all levels of competency, ranging from the pre-service training

of health staff and continuous education, to public health postgraduate education. It is essential that any national action plan includes the training of existing and new human resources as well. The proposed model is in alignment with the WHO global strategy for e-health deployment.

Although e-health has emerged as a fast-growing, transformational technology worldwide, no academic discipline currently offers a comprehensive curriculum that integrates fields underlying e-health. Because use of e-health approaches and systems in the healthcare sector is becoming a daily practice, practitioners tend to build applications from the perspective of their personal expertise, and the lack of formal health informatics training in core curriculum in medical schools creates artificial barriers in medical education and slows down information transfer, which could limit the success of e-health. Incorporating e-health into the IS curriculum can make good use of slack resources and also reinforce the image of IS as a forward-thinking and growth oriented discipline (Wilson, 2006; Bari, Forczek and Hantos, 2011).

2.11 Summary

This chapter has covered the background and reviewed the literature related to the research project. Despite the significant amount of research undertaken, it has been seen that work conducted during recent years on the journey of adapting and deploying e-health systems, which has led to the development of sophisticated models, and the consensus on the importance of training healthcare staff in general and nursing staff in particular in e-health use, there is no clear model or framework to inculcate any training related to e-health in the nursing community, particularly in developing countries. In addition, the outcomes of previous research remain limited and did not tackle issues linked with the training of international nursing workforces using e-learning or the integration of training in e-health as a part of nursing registration schema. Hence, the following chapters look in more detail at aspects of nursing education, e-health strategies, and nursing readiness for e-health systems in order to enable the provision of practical solutions.

CHAPTER 3: ANALYSIS OF NURSING EDUCATION & E-HEALTH STRATEGIES FOR E-HEALTH/E-NURSING EDUCATION

3.1 Introduction

In order to support the findings from the literature review and to gather sufficient information related to e-health education in higher education curricula and e-health education/training as staff development under national e-health strategies, this chapter presents the findings from two studies: the analysis of nursing curricula and analysis of e-health strategies.

3.2 Objectives and Significance

The first goal of this study is to investigate nursing and midwifery curricula for the concept of e-health in order to establish the need for integrating an e-leaning for e-health platform into nursing curricula. In addition, this study facilitates comparison between different nursing and midwifery curricula in different countries. Furthermore, the study helps in assessing the quality of these programmes and highlights the need for the introduction of e-health and e-nursing in these programmes to keep nurses, who constitute the largest part of healthcare system in terms of numbers and the services they provide, on track with the internationalization and advancement in healthcare information technology. The second goal of the study is to analyse e-health national strategies for both Jordan and Qatar to identify if the inclusion of professional training on e-health has been considered as part of e-heath strategy. In addition, the analysis of e-health national strategies for other leading countries has been conducted in order to draw comparison and define any gaps.

3.3 Research Design and Methodology

The curricula of undergraduate programs in Nursing, General Nursing and Midwifery for graduates between 2005 and 2009 were considered. More recent graduates are not included due to licensing/registration requirements, which require a minimum of two years' work experience. For the second part, analysis of e-health strategies in selected developing and developed countries for the concept of e-health education, strategies for two developed countries that made significant progress in e-health at national and international levels (Australia and the UK) and two developing countries (Qatar and Jordan) were analysed. A systematic review methodology proposed by Hones, Myfanwy and Lloyd (2004: 49) was used, which focuses on and provides answers relevant to research questions. To provide a

better understanding of the main procedures of this study, the flowchart in the figure below illustrates the research process.
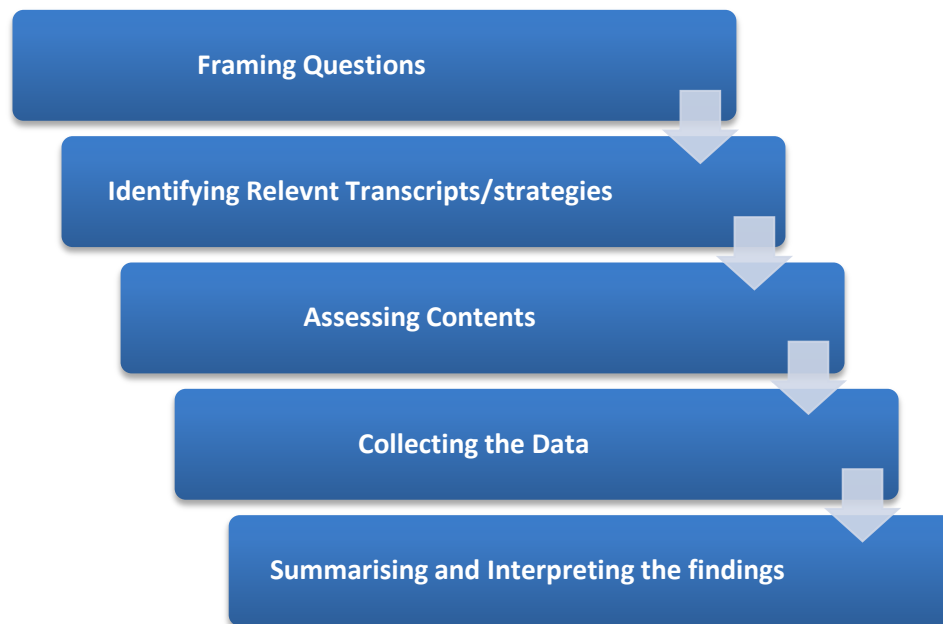
Figure 3.1: Systematic Analysis Flowchart

Before carrying out the research, the researchers acted as a committee to identify the main questions related to this study.

3.4 Research Questions

The main stage was to frame the research questions, which are summarised as follows:

1. Are any ICT related courses listed in the transcript?
2. Are any e-health/e-nursing related courses listed in the transcript?
3. Is there any inclusion of e-health training in e-health strategies?
4. Are there any policy gaps between developed and developing countries related to e-health strategies?

Following that, 24 transcripts and four e-health strategies were selected for this study. Transcript records from different schools of nursing were obtained, mainly from both India and the Philippines, where the vast majority of nurses in Qatar studied and were recruited, and from Jordan. Transcripts from other countries such as Pakistan, Indonesia, Qatar, Lebanon and Syria were also analysed. The motive of the investigation is to benchmark these curricula against what has been recommended in the literature of e-health and e-nursing.

3.5 Analysis and Data Collection Protocol

In assessing the quality and collecting the data, content analysis method was used (Neuendorf, 2002: 48). This type of method requires pre-identification of certain criteria to be accomplishing through an in-depth investigation of the available recourses (i.e. contents). This can be related to the research subject. The following figure explains the mechanism of the contents analysis within this study, as presented in the subsequent sections.
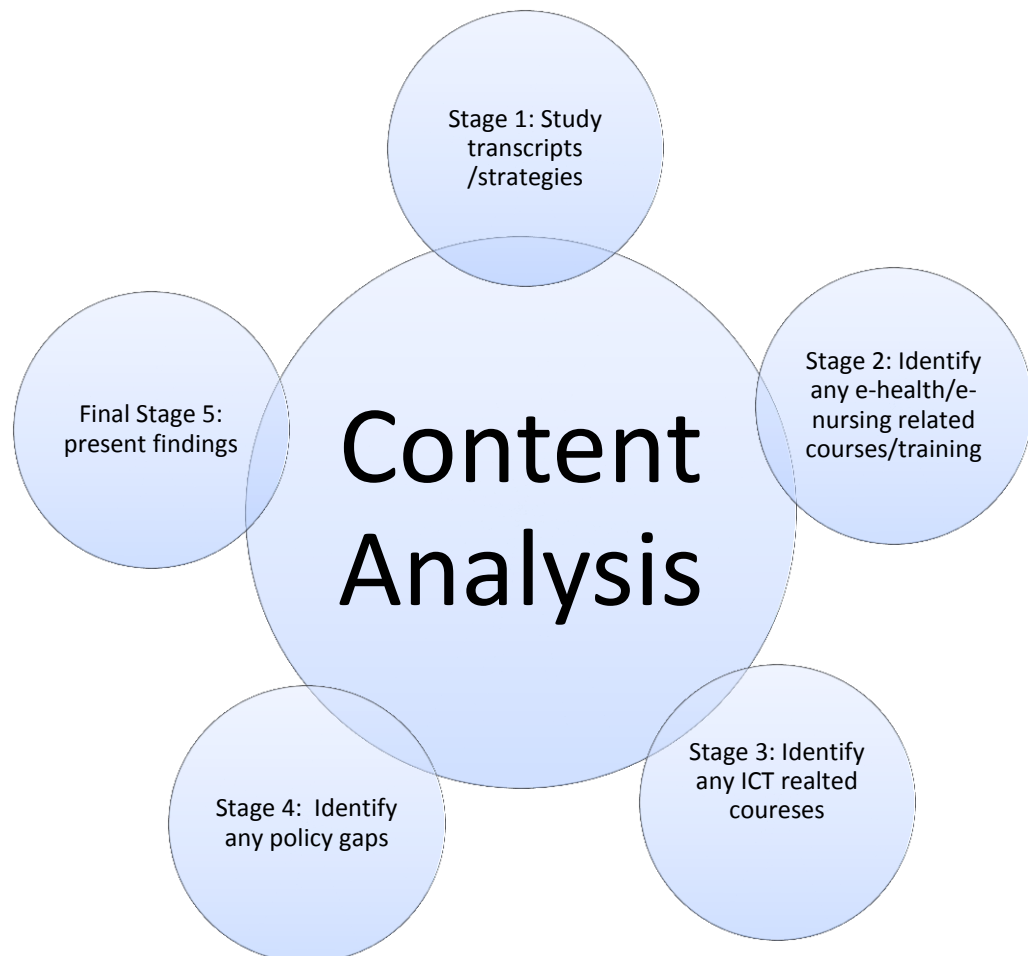
Figure 3.2: Data Collection and Analysis Protocol

3.6 Findings Part 1: Curriculum Analysis

A total of 24 transcripts from several schools of nursing were analysed for different years of graduation. The transcripts all belong to nurses currently working in Qatar. The descriptive details are shown in Table 3.1.

Table 3.1: Content Analysis of Nursing Program Curricula of Study

No.	Country & year of graduation	Length of program [years]	E-health/ E-nursing modules [yes/no] Description	ICT/computer-related modules [yes/no] Description
1	Philippines, 2007	4	No	Yes Computer concepts/computer society
2	Philippines, 2008	4	No	Yes IT fundamentals
3	Philippines, 2007	4	No	Yes Computer I & Computer II
4	Philippines, 2008	4	No	Yes Computer concepts /computer society
5	Philippines, 2008	4	No	Yes Information technology
6	Philippines, 2007	4	No	Yes Computer concepts and fundamentals IT presentation
7	Philippines, 2007	4	No	No
8	Philippines, 2007	4	No	Yes Basic computer programming
9	Philippines, 2006	4	No	Yes Introduction to EDP concepts
10	Philippines, 2007	4	No	Yes Info, tech word processing spread sheets & other applications. Basic concepts of computer. Multimedia presentation with internet Navigation & power point presentation
11	India, 2007	4	No	Yes Basic computer education
12	India, 2007	3	No	No
13	India, 2005	3	No	No
14	India, 2006	4	No	Yes Basic computer education
15	India, 2009	3	No	Yes Computer education
16	India, 2009	3	No	None
17	India, 2005	3	No	None
18	India, 2008	4	No	Yes Computer (Elective).
19	Indonesia, 2006	4	No	Yes Basic knowledge of information & computer
20	Qatar, 2007	4	No	Yes Introduction to computer

No.	Country & year of graduation	Length of program [years]	E-health/ E-nursing modules [yes/no] Description	ICT/computer-related modules [yes/no] Description
21	Pakistan, 2008	4	No	Yes Computer Skills
22	Syria, 2008	4	No	Yes Computer and its applications in health field
23	Lebanon, 2008	3years	No	Yes Informatics
24	Jordan, 2008	4	No	Yes Computer skills 1 & computer skills 2

3.6.1 Country of Graduation

Using data from the above table, the percentages of countries of graduation are illustrated in Figure 3.3.The Philippines constituted the highest percentage (44%) of graduates, followed by India (31%); these two countries thus represented the great majority of the sample.
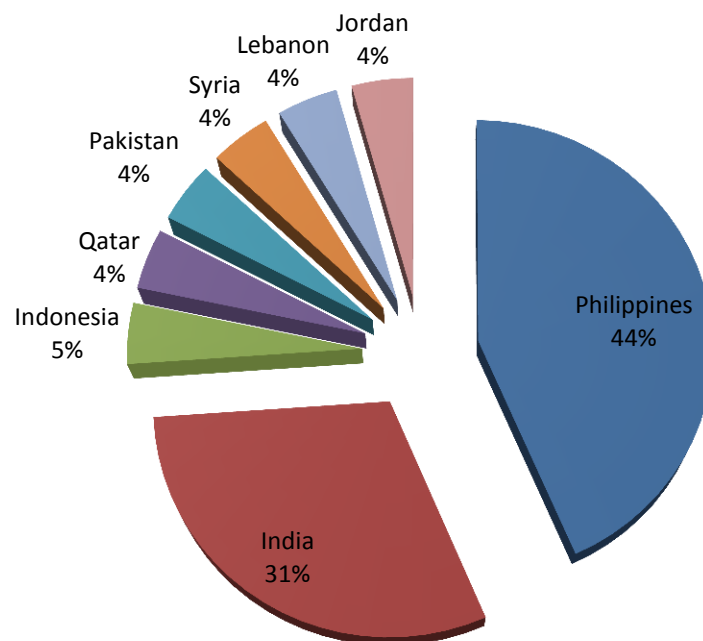
Figure 3.3: Countries of Graduation

3.6.2 Length of the Programme

The following figure shows the length of the programme. It can be seen that 75% of the programmes are four years' long. Only India and Lebanon have shorter programmes of 3 years; nevertheless, this is significant as India is the source of education for 31% of the nurses, as mentioned above.
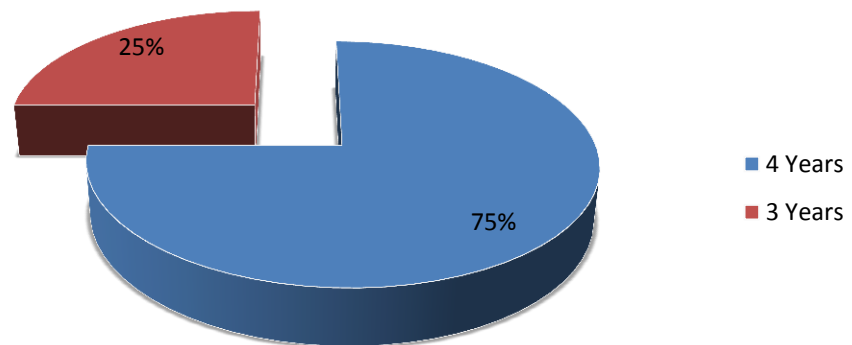
Figure 3.4: Length of Programmes

3.6.3 ICT/Computer-Related Modules

The analysis of the transcripts revealed that the vast majority (87%) of programmes had some kind of ICT or computer-related modules; the results are depicted in the following figure.
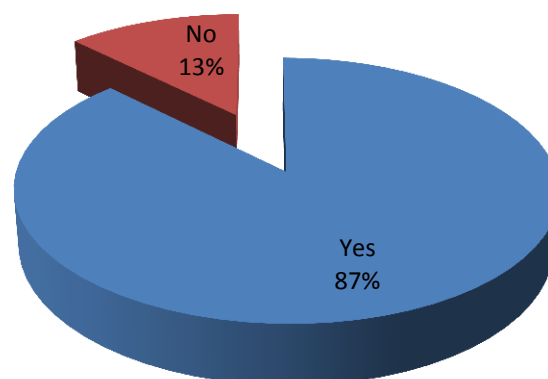
Figure 3.5: Computer-Related Modules

3.6.4 E-Health/E-Nursing Modules

The analysis of the transcripts revealed that there is no module related to e-health/e-nursing in any of the curricula studied, as shown in the following figure.
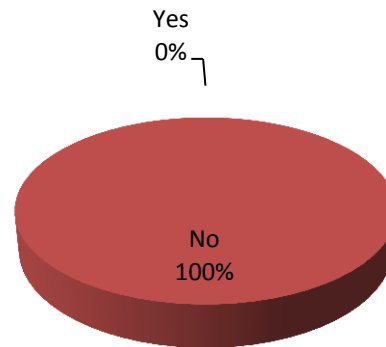
Figure 3.6: E-Health/E-Nursing Elements

3.6.5 Part 1 Summary

This study showed that there is no evidence of the introduction of the concept of e-health/e-nursing in any of the curricula studied, only basic computer and fundamental courses were included. The lack of a systematic education in e-health and e-nursing makes it extremely challenging (if not impossible) for nurses to support professional practice with ICT in a formal, structured manner. Since the healthcare information technology landscape is changing rapidly, and health information courses are not routinely included in nursing curriculum, it is incumbent on nursing leaders to foster an environment among clinical staff to support new and innovative uses of information technology. Nursing curricula must be infused with meaningful e-health contents to ensure that future nurses are well prepared to work in a technologically driven healthcare system and to become a part of the clinical mass of health providers and to act as a change agents in e-health initiatives. More importantly, nursing leadership is in a unique position within the healthcare industry to take the lead in leveraging health information technology to enhance the quality of patient care. The findings support the introduction of an online e-health/e-nursing learning model that should be integrated in nursing curricula for national nursing institutions, which should also be a prerequisite for registration of general scope nurses.

3.7 Findings Part 2: E-Health Strategies Analysis

3.7.1 Australia

In 2008, Australia developed a robust strategic framework for e-health (DHA, 2008: 105). That was based on consultation with the Commonwealth, tertiary governments, healthcare practitioners, academics, and healthcare personnel. Nurses (particularly community nurses) were considered key stakeholders and were involved/consulted in developing Australian e-health strategy to face increasing consumer demands for complex and technologically advanced procedures and to provide insight on the ways information is stored, shared and used across the Australian healthcare system to enable healthcare practitioners to electronically communicate to exchange information. The intended outcome (goal) or e-health strategy in Australia is to provide better coordinated healthcare and to improve the quality, safety and efficiency of clinical practice. Hence, strategic aims have been achieved by giving health providers better access to integrated and complete consumers' health information, clinical evidence and clinical decision support tools for over 10 years, enabling over 90% of care providers to utilize clinical and practice management systems that support e-health priority solutions. The majority of healthcare managers in Australia utilize sophisticated data reporting and analysis tools. Infrastructure healthcare stakeholders' engagement and healthcare providers' capacity-building were important principles that underpin and inform e-health strategy. Potential health solutions from e-health are considered futile unless healthcare providers and healthcare managers are motivated to use it. Lack of ICT skills and infrastructure, including PCs, network connectivity and core patient clinical and practice management systems are considered as key barriers for e-health implementation (Bartlett, 2008: 95). Hence, investment in ICT literacy/training and infrastructure were key activities to establish foundation e-health deployment, besides providing healthcare consumers with health knowledge portals to access nationally coordinated and validated health knowledge sources. Australian e-health strategy identified training as a driving force and key means for the adoption of e-health solutions in daily practice. Therefore, it tackles the importance of national coordination between vocational and tertiary training programs to prepare e-health skill capacity and capability, and it also calls for nationally recognized tertiary qualifications in health informatics.

The Australian e-health strategy is distinguished by the emphasis it places on the importance of training and infrastructure in the roadmap for e-health implementation. This supports the argument of this research, which is that training and infrastructure should be

integrated into the framework for e-health education in developing countries. Therefore, Australian e-health strategy has been used in this research as a very useful guide to establishing the framework (More, 2002: 16).

3.7.2 United Kingdom

The UK has made significant progress in e-health at a national level. England has a long history with e-health and health information technologies; general practitioners in England have used computers for patient records since the mid-1980s, while the introduction of the first e-health policy document goes back to 1998, when the internet was first becoming popularized. A government White Paper focusing on technology in healthcare led to the introduction of a large number of different health information reforms that have impacted on e-health strategies in the UK aimed at utilizing information to ensure best possible patient care and enabling NHS professionals to have the information they need to provide care and improve public health. Therefore, it has been seen as strategic target that healthcare staff are confident in technology so they will adopt it and implement it in their daily practice; this makes training and education in ICT for the acquisition of e-health skills by healthcare professionals, healthcare administrators and support staff prior during and after implementation of any e-health initiative as an outcome to be achieved prior to specific health ICT training curricula being made available at both the professional body level and the level of academic institutions; extensive training for e-health was thus undertaken in the UK prior to e-health application. These efforts have been presented as a full e-learning platform known as e-learning for healthcare (NHS, 2013: 66). E-LfH, a Department of Health Programme in partnership with the NHS and Professional Bodies, provides high quality e-health materials free of charge for the training of the NHS workforce across the UK.

Contributing to the revolution in healthcare training in the UK, e-LfH's e-learning projects enhance traditional learning, support existing teaching methods and provide a valuable reference point which can be accessed anytime, anywhere. UK e-health strategies considered ICT infrastructure and telecommunications as the backbone of e-health deployment/implementation. E-health initiatives and strategies in the UK have clearly tackled the legal and regulatory framework for e-health, e-health applications and risk management and patient safety issues. The Scottish Government has launched the second NHS Scotland e-Health Strategy 2011-2017 after the outcomes related to improving capacity and capability that been considered as building blocks for IT-enabled progression and e-health implementation achieved during the first strategy (2008-2011).

3.7.3 Qatar

The implementation of e-health in Qatar has been negatively affected due to the change in ownership of the national e-health plan from ICT Qatar to the Supreme Council of Health (SCH), and limited coordination between key stakeholders regarding e-health implementation. There is no officially launched e-health strategy in Qatar, however the Qatar National Health Strategy 2011-2016 recognized the importance of e-health deployment and the strategy contains a major strategic project for e-health establishment in Qatar that aims to create an effective, integrated national e-health system that enables participation of all healthcare providers in Qatar and ensures national alignment for implementation. Education and training programmes are an output of this project, but it is still in the initiation phase (Qatar National Vision, 2013: 104).

3.7.4 Jordan

Jordan is a developing country that has started many IT initiatives including e-learning and e-health in the hope of decreasing the technological gap between them and the developed world and to achieve various developmental (Mofleh, 2008: 103). The Jordanian Government sees ICT as an exceptional opportunity for the country to be competitive in this area, and since 1999 Jordan commenced major ICT programmes and took strident measures to implement ICT initiatives to be e-Jordan with a view to becoming an ICT exporter in the Middle East and North Africa (MENA). Among these initiatives was an e-learning project comprising the biggest ICT scheme in Jordan, launched in 2001, and an e-health initiative launched in 2000 with the aim to connect Al Basheer Hospital, the biggest public hospital in Jordan, with all other public hospitals in the country within three years. However, despite the that fact that Jordan was very sincere in deploying ICT-based initiatives and has devoted extensive recourses to these initiatives, the major intended goals have not been achieved/delivered, and progress has been limited (Jordanian MOH, 2006: 105). Key strategic issues that lead to slow ICT transformation in Jordan include lack of ICT master plan, short-term planning for large outputs, inadequate strategies to match Jordanians' needs, level of expertise and adoption of strategies driven by successes in the developed world. The lack of focus and launching several initiatives simultaneously leads to system heterogeneity, which obstructs integration and reflects a lack of understanding of the needs of people and business, in addition to limited funds and ICT skills. Jordan has learned a lot from these near-abortive initiatives and there is a great deal of knowledge and enthusiasm about e-health in Jordan. However, much hard work is

still needed to reduce the technological gap between Jordan and developed countries (Mofleh, 2008: 103).

3.7.5 Part 2 Summary

The key aspect of Australian e-health strategy recommended involving nurses in building the e-health strategy, and the UK health strategy resulted in the implementation of e-learning solutions for medical education and involved health professionals in building the formwork. The WHO e-health directions argue that states should establish e-health strategies and adopt guidelines to enhance the quality and reliability of e-health content, and utilize e-learning as framework for training and education for health professionals and to integrate e-learning methods into student education where appropriate.

The case studies present contrasting images. Qatar has devoted extensive resources to e-health development, but organisation flux and confused ownership have hampered any effective deployment or development so far. Jordan made substantial investment and effort it could ill afford and had very limited success due to lack of consultation and involvement of stakeholders, particularly healthcare professionals. The challenges to e-health deployment encountered by Jordan lay in the construction of the model in terms of the integration of skills assessment on-going support and gradual introduction or phasing of e-health training. Although there have been efforts towards e-health in developing countries, including the case studies, it is fair to conclude that no substantial progress has been made and the large gap in this regard between developing and developed countries remains.

CHAPTER 4: E-NURSING READINESS IN JORDAN

4.1 Introduction

This chapter presents a study conducted with the objective of evaluating e-nursing readiness within the Jordanian healthcare sector from the perspective of the nursing community. The study measurements include knowledge of e-health, status of e-health practice, nursing opinion on e-health relevant applications, attitude towards using e-health in nursing profession and barriers to acquiring knowledge and skills in e-health, the current utilised telemedicine/e-health applications, opinions about e-health education as well as preferred mode of learning. The results showed that the attitudes towards implementing e-health are positive and encouraging among nurses working in the public and private sectors. The results also showed that the nursing community is keen on using and implementing the e-health services, but several challenges and barriers facing e-health were identified.

4.2 Methodology

4.2.1 The Study

Since the objective of this study is to investigate the level of readiness of the e-nursing sector in Jordan from the perspective of the nursing community, the approach was based on previous studies related to e-health, as discussed in the literature review. The present study includes the following aspects related to e-health readiness (as identified in the literature review):

- Knowledge of e-health:
  While assessing e-nursing readiness, it is important to gather information about nursing community knowledge and past experience in e-health applications.
- E-health used communication techniques:
  This section has been included in order to obtain more details about the nursing staff experience in e-health applications. It aims to collect information on specific details on common e-health applications used by nursing participants.
- Nursing opinion on e-health relevant applications:
  Adoption of each application in different areas in the healthcare sector requires acceptance of e-health system as a comprehensive solution for the main healthcare task and operation.
- Attitude towards using e-health in nursing profession:

Moving from e-health to e-nursing depends on positive attitude of nursing committee on e-health applications as platform to be efficient used from developing and enhancing nursing profession and practice.

- Barriers to acquiring knowledge and skills in e-health:

  This section has been included in order to identify the main challenges and obstacles facing nursing staff in adopting knowledge and skills in e-health applications.

- Current utilised telemedicine/ e-health applications:

  In order to obtain information on the status of e-health applications technical infrastructure, this section has been included to collect responses on the common application of e-health, which might be utilized within healthcare establishment.

- Opinion toward e-health education:

  This section has been included to identify whether the nursing community view the inclusion of e-health within education curricula favourably and to assess their trust in learning using e-health.

- Preferred mode of learning:

  To identify the preferred mode for the nursing community to learn about e-health this section has been included to identify the most acceptable mode that might be used in the future to support teaching and learning for e-health application.

4.2.2 The Questionnaire Structure

The questionnaire was organised into two parts: the first covered the demographics and professional status of the participants as well as IT and internet skills; and the second investigated knowledge of e-health, current status of e-health practice, nursing opinion on e-health relevant applications, attitude towards using e-health in nursing profession and barriers to acquiring knowledge and skills in e-health. In addition, the second part covered the current utilised telemedicine/e-health application, opinions toward e-health education as well as preferred mode of learning.

4.2.3 Pilot Study

A questionnaire should be designed carefully, particularly when it is distributed once in one go. A pilot study enables a researcher to test the validity of the research instrument prior to conducting the real study by administering it to a group of people similar to the target population of the study. Sharp (2007, cited in AlFawwaz, 2012: 50) pointed out that

a pilot study allows the potential problems to be identified in order to avoid and correct them.

Questionnaires must be designed to allow for all possible participant responses and should be easily comprehensible, direct and engaging (Oates, 2005: 128). Feedback from reviewers should be taken into consideration to make changes and improvements to questionnaires (such as wording and question order) in order to form a final copy (Judd, 1991: 127). Several changes were made to the questionnaire based on the recommendations and feedback of the ten reviewers, such as changing the wording of some items to facilitate comprehension and altering the order of some questions to improve clarity. It is worth mentioning that the pilot study assists in improving the data reliability and facilitates better analysis of the data subsequently collected by the study.

4.2.4 Sample

The study participants can be defined as a part of the study population being investigated in order to serve the main objectives of the research and to draw conclusions about the whole population (Pedhazur, 1991: 52).

As stated earlier, since the objective of this study is to investigate the level of readiness of the e-nursing sector in the case studies from the perspective of the nursing community, the participants from Jordan were selected randomly to reflect the nursing community in terms of different ages, experience, backgrounds and educational qualifications.

A specially designed questionnaire was distributed among 300 participants. Since it is impossible to include the entire population in a study, a convenience sampling technique was used, which is the most common sampling technique (Fink, 2003: 51). Out of 300 distributed questionnaires, 255 were returned, a high response rate of 85%. Fourteen were discarded due to being incorrectly filled in, leaving a final response rate of 241 participants (80.3% response rate).

4.2.5 Procedure

Studying the previous literature and related projects helped to formulate a draft questionnaire. During the questionnaire drafting, the questions were concentrated on the main issues with short and simple wording, avoiding unclear or ambiguous phrases.

The researcher informed the participants about the purpose of this experiment with a cover letter, to ensure that the sample understood what the survey is about.

The survey took on average 25 minutes to complete. Upon completion of the testing exercise, the questions and their responses were coded to be analysed using SPSS software.

4.3 Analysis and Outcomes

In this study, some major data analysis techniques were carried out using SPSS Version 21.

4.3.1 Demographics and Professional Status

53.1% of the study participants were male (46.9% female). The highest percentage age group was 25-35 years old (63.2%), followed by the under-24 age group (23.2%) then the age group 35-50 years old (13.7%).

92.9% of the participants are Jordanian and they finished their studies in Jordan. The vast majority (73%) held BSc. degrees (the remainder held postgraduate qualifications). 66.8% of participants worked in the private sector, with 33.2% from the public sector. 34% had up to four years' of work experience, while 44% had experience of 5-9 years, 18.7% had 10-19 years and 3.3% had over 20 years of nursing experience.

As for IT and internet skills, the vast majority of participants have good skills in IT and internet access from home and in some cases from work too. This can be considered as a very positive indicator of readiness for using e-health, given the fact that nursing staff come from an educational background not expected to give sufficient attention to IT skills, based on the literature review, which was hitherto one of the main obstacles to e-learning readiness. This reflects that during the last four years internet development has increased exponentially in Jordan and prices have become more reasonable. More choice and options are also available for internet connections. Moreover, there are some government initiatives on increasing the number of PCs per-household which contributed in narrowing the digital gap. The only downside of the results is that the fluency of using IT and internet results from personal efforts and familiarity, not from any kind of structured learning, thus skills and proficiency are likely to vary greatly among nurses. The response to the 'formal computer training' question was not ,high which would justify the results from the next section, 'Knowledge of e-health'.

4.3.2 Reliability

The level of consistency between multiple variables is known as data reliability (Hair, 1986: 130). High reliability is determined if variables in the same measuring group are correlated within others. One of the commonest test methods for data reliability is

Cronbach's alpha, which determines how closely each variable is related to the sum of the remaining variables.

In this study, to ensure high data reliability, as stated earlier, a pilot study was run and several changes to the draft questionnaires were made based on the feedback. Then, Cronbach's alpha test was carried out to assess the data reliability. According to the obtained results, Cronbach's alpha was found to be 0.842 (above 0.70), which is considered acceptable according to Hair (1986: 130).

4.3.3 Outcomes

In this study, some major preliminary data analysis techniques were carried out. The descriptive analyses of the frequency and the percentages for each question were performed, using SPSS.

The tables below present the obtained frequency and percentages according to the tested categories of knowledge of e-health, current status of e-health practice, nursing opinion on e-health relevant applications, attitude towards using e-health in the nursing profession and barriers for acquiring knowledge and skills in e-health. In addition, the tables present the results of the current utilised telemedicine/ e-health application, opinion toward e-health education and preferred mode of learning.

The lack of formal IT training and even self-learning aids mentioned earlier to endorse e-health in general is reflected in the low attention given to e-health training seen in the results. This is a negative sign for the deployment of e-health applications within the nursing profession and could be a risk factor for any investment in e-health projects.

Table 4.1: Knowledge of E-Health (Jordan)

Criteria	Option	Frequency	Percentage
Have you ever heard of e-health?	No	68	28.2
	Yes	173	71.8
Do you consider yourself having fair knowledge in e-health?	No	115	47.7
	Yes	126	52.3
Have you ever been exposed to e-health education in your study?	No	104	43.2
	Yes	137	56.8
Have you ever been exposed to e-health at work?	No	98	40.7
	Yes	143	59.3
Have you ever read some literature on e-health?	No	140	58.1
	Yes	101	41.9
Have you ever attended any seminars/workshops on e-health?	No	144	59.8
	Yes	97	40.2

The results presented in table/graph 4.2 show that nursing staff do have some basic experience of using IT and internet applications in the medical field. This is a useful milestone for further e-health teaching.

Table/Graph 4.2: Communication Techniques of E-Health (Jordan)

	Internet No	Internet Yes	Videoconferencing No	Videoconferencing Yes	Email No	Email Yes	Telephone/Cell phones No	Telephone/Cell phones Yes	Storage devices No	Storage devices Yes
Frequency	44	197	99	142	96	145	111	130	80	161
Percentage	18.3	81.7	41.1	58.9	39.8	60.2	46.1	53.9	33.2	66.8
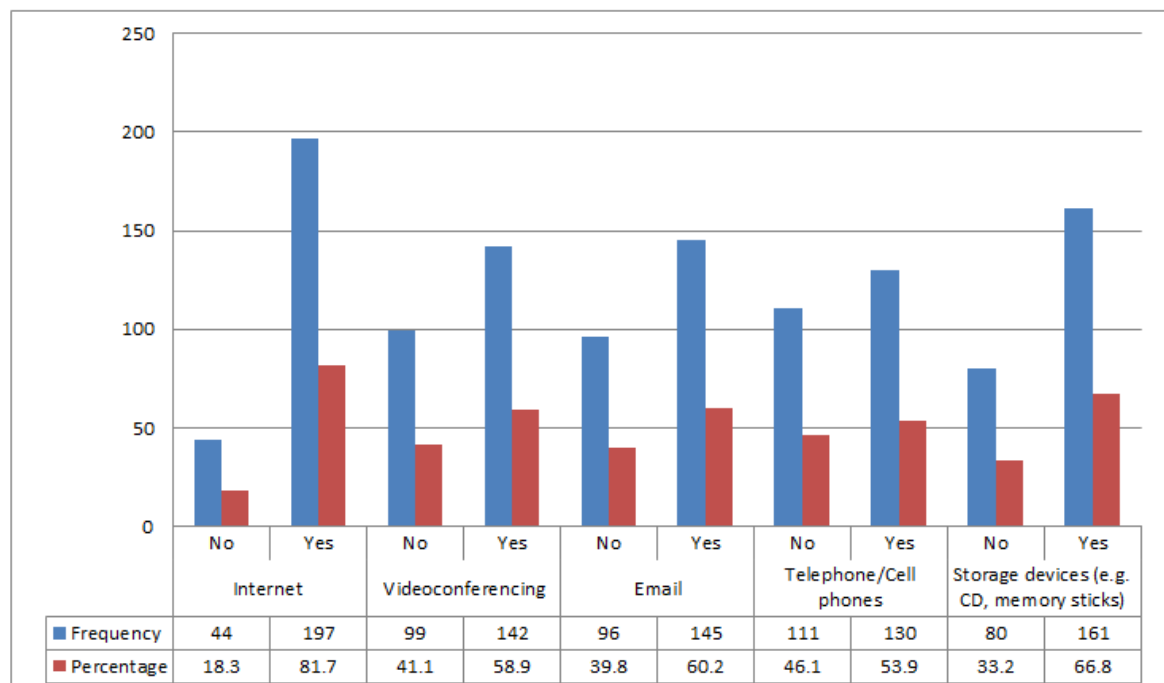
It is clear that there is a generally positive opinion of nursing staff regarding adopting e-health applications in different area; as shown in table/graph 4.3. This is a very encouraging factor toward investing on such applications and the expansion of the current system towards making e-nursing a reality.

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Table/Graph 4.4: Nursing Opinions on E-Health Relevant Applications (Jordan)

		No	Yes	No	Yes	No	Yes	No	Yes
		Clinical practice		Health management		Administration		Research	
Frequency		41	200	39	202	44	197	47	194
Percentage		17	83	16.2	83.8	18.3	81.7	19.5	80.5
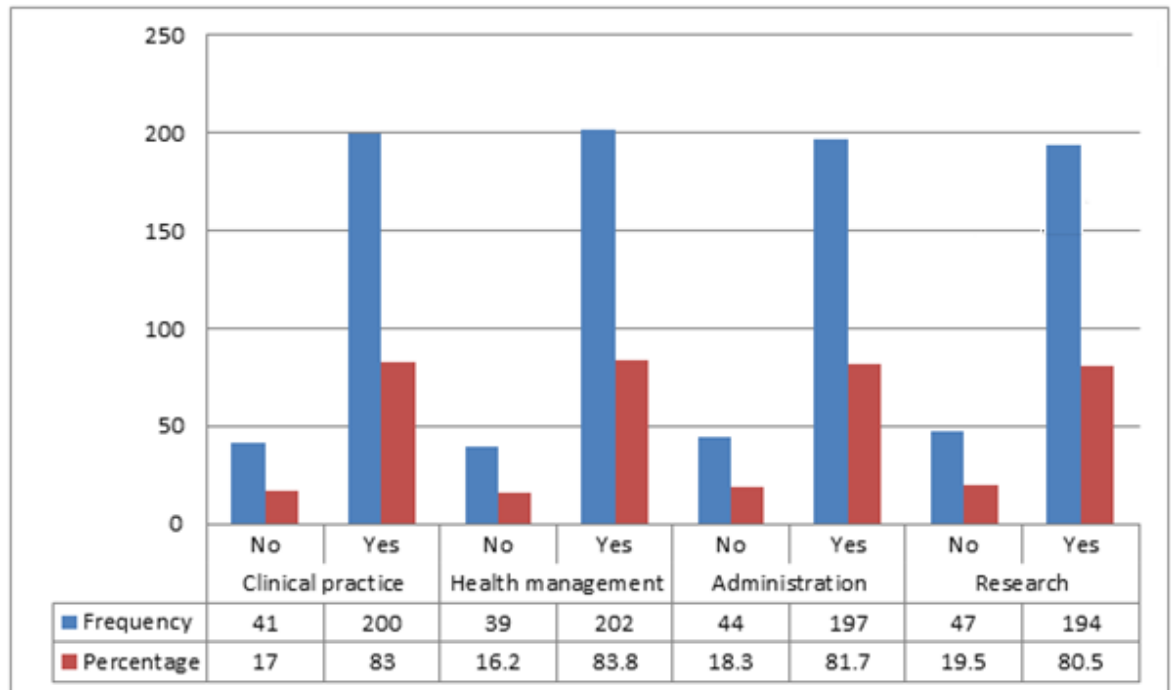
Adding to some positive outcomes stated earlier, and table/graph 4.4, nursing staff do have a positive attitude towards on integrating e-health as part of their profession. This can be seen as an advantage for establishing future e-health projects.

Table 4.5: Attitude Towards Using E-Health in Nursing Profession (Jordan)

Criteria	Option	Frequency	Percentage
Do you consider e-health important to nursing profession?	No	29	12.0
	Yes	212	88.0
Do you believe there is a potential for using e-health in nursing field?	No	67	27.8
	Yes	174	72.2
Do you believe that e-hearth could improve nursing practice?	No	45	18.7
	Yes	196	81.3
Do you believe it would be beneficial to develop knowledge and skills in e-health in order to improve the service you provide?	No	49	20.3
	Yes	192	79.7

Furthermore, the results presented in Table 4.5 identify the main obstacles facing e-health in general and obstacles facing the acquisition of knowledge and skills in e-health from the perspective of nursing staff.

Table 4.6: Barriers to Acquiring Knowledge and Skills in E-Health (Jordan)

Criteria	Option	Frequency	Percentage
Lack of education in e-health	No	44	18.3
	Yes	197	81.7
Lack of time	No	57	23.7
	Yes	184	76.3
Lack of guidance/IT support	No	59	24.5
	Yes	182	75.5
Lack of incentives and support from management	No	56	23.2
	Yes	185	76.8
Lack of access to appropriate technology	No	52	21.6
	Yes	189	78.4
Poor relevant infrastructure	No	75	31.1
	Yes	166	68.9
Fear of using new technology	No	83	34.4
	Yes	158	65.6
Lack of awareness of e-health importance	No	35	14.5
	Yes	206	85.5
Lack of available flexible training program	No	40	16.6
	Yes	201	83.4
Low level of English language	No	82	34.0
	Yes	159	66.0
Low level of computer literacy	No	78	32.4
	Yes	163	67.6
Fear of medical data security and privacy	No	77	32.0
	Yes	164	68.0

To make these results easier to understand and to provide clustering for the results in accordance to their degree of importance, Figure 4.1 displays the clear finding that, in-line with the aim of this research, the top challenges to e-health in Jordan are related to education. This justifies the need to establish an educational platform for e-health promotion.
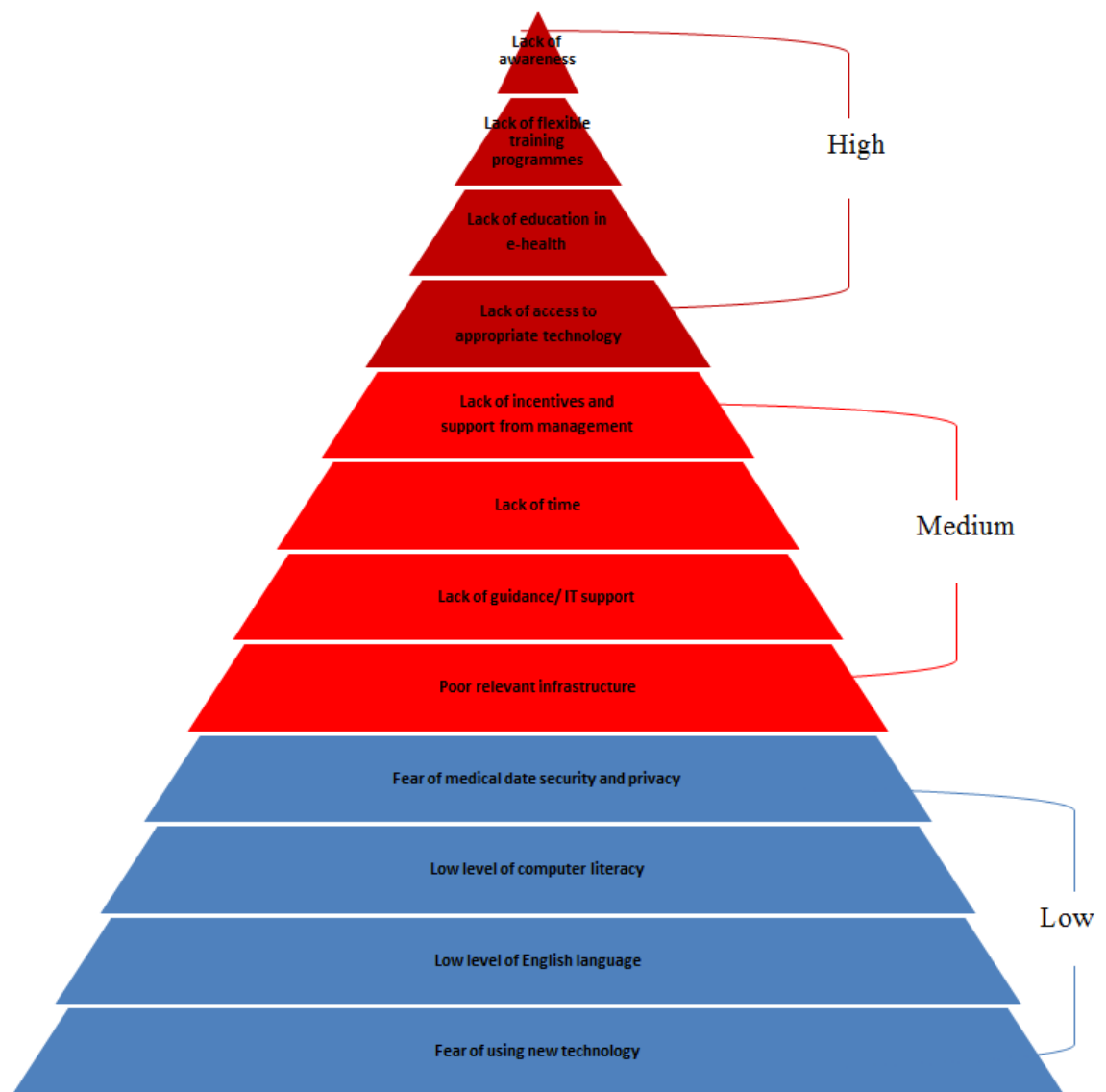
Figure 4.1: E-Health Barriers and Challenges for Nursing Staff (Jordan)

In the attempt to assess the level of e-health infrastructure within Jordan's healthcare establishments, nursing staff can reflect on the activities that have been covered on the common e-health applications. These results do not reflect the wide use of e-health and show that most of the applications scored low apart from X-rays and image applications. This leads to the conclusion that the infrastructure for e-health applications is still below the required level.

Table 4.7: Current Utilized Telemedicine/E-Health Applications (Jordan)

Criteria	Option	Frequency	Percentage
Obtaining lab results via the internet/intranet	No	134	55.6
	Yes	107	44.4
Making out-patient appointments	No	142	58.9
	Yes	99	41.1
Transmission of ECG	No	148	61.4
	Yes	93	38.6
Transmission of X-rays	No	90	37.3
	Yes	151	62.7
Transmission of still images	No	82	34.0
	Yes	159	66.0
Teleconferencing by phone	No	125	51.9
	Yes	116	48.1
Video conferencing of consultation with health professionals	No	148	61.4
	Yes	93	38.6
Video conferencing for education	No	145	60.2
	Yes	96	39.8
Monitoring patient at home	No	140	58.1
	Yes	101	41.9

Additionally, the results obtained from asking nursing staff if they are interesting in learning more about e-health and if whether it should be included within educational programs show that their response was in favour of these suggestions (Table 4.7). This shows that it is very promising for further inclusion of nursing staff in e-health or for establishing e-nursing.

Table 4.8: Opinion of E-Health Education (Jordan)

Criteria	Option	Frequency	Percentage
Are you interested in learning more about e-health?	No	43	17.8
	Yes	198	82.2
Do you think that e-health should be a prerequisite for nursing registration?	No	39	16.2
	Yes	202	83.8
Do you support that e-health should be included in nursing postgraduate programs?	No	40	16.6
	Yes	201	83.4

When asking nursing staff questions regarding their preferred mode of learning for the delivery of e-health education and training, the results showed that, a blend of both face-to-face lectures and a web-based approach was the best preferred style; as shown in

table/graph 4.9. These results come in very handy and could help to enable establishing a training program which could help in handling the major challenges found early and can be used flexibly anywhere and at any time with the teaching and learning platforms.

Table/Graph 4.10: Preferred Mode of Learning (Jordan)

	Face-to-face lectures only		Web-based only		A blend of the above two modes	
	No	Yes	No	Yes	No	Yes
Frequency	98	143	137	104	91	150
Percentage	40.7	59.3	56.8	43.2	37.8	62.2
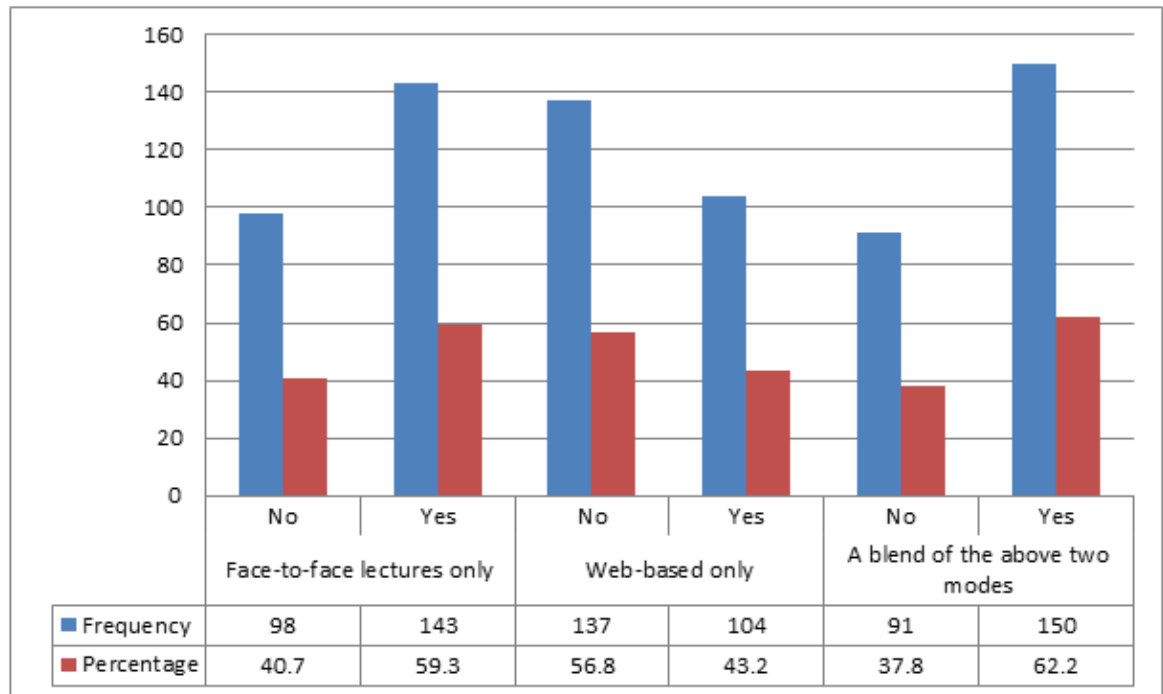
4.4 Summary

The results of this study showed that the attitudes towards implementing e-health are positive and encouraging among nurses working in the public and private sectors. The results showed that the nursing community is keen on using and implementing e-health services and they see them as very relevant to the healthcare sector, particularly the nursing profession. The results showed that the top challenges facing e-health are educational related aspects, hence, a plan for promoting and providing education on the benefits and use of e-health processes and applications, as for ICT, is necessary, as the results showed that nurses lack sufficient knowledge about e-health exact processes and applications, despite their favourable predisposition towards the concept.

CHAPTER 5: E-NURSING READINESS IN QATAR

5.1 Introduction

This chapter presents a study conducted with the objective of evaluating the e-nursing readiness within the Qatari healthcare sector from the perspective of nursing community. The study measurement includes knowledge of e-health, current status of e-health practice, nursing opinion on e-health relevant applications, attitude towards using e-health in nursing profession and barriers to acquiring knowledge and skills in e-health, the current utilised telemedicine/ e-health application, opinion toward e-health education as well as preferred mode of learning.

5.2 Methodology

5.2.1 The Study

Since the objective of this study is to investigate the level of e-nursing readiness in Qatar from the perspective of the nursing community, the approach was based on the previous study related to e-health readiness in Jordan, explained in the previous chapter.

5.2.2 Sample

The study participants can be defined as a part of the study population being investigated in order to serve the main objectives of the research and to draw conclusions about the whole population (Pedhazur, 1991: 52). As stated earlier, since the objective of this study is to investigate the level of readiness of the e-nursing sector in Qatar from the perspective of the nursing community, the participants were selected randomly to reflect the nursing community in Qatar in terms of different ages, experience, background and educational qualifications.

A specially designed questionnaire was distributed among 400 participants. Since it is impossible to include the entire population in our study, a convenience sampling technique was used, which is the most common sampling technique (Fink, 2003: 51). Out of 400 distributed questionnaires, 383 were returned (response rate = 95.75%).

5.3 Analysis and Outcomes

In this study, some major data analysis techniques were carried out. As stated earlier, these analyses were calculated using SPSS.

5.3.1 Demographics and Professional Status

18% of the study participants were male, and 82% were female. The highest percentage age group was 25-34 years old (58.2%), followed by the age group 35-50 (30.5%), the age group under 25 years old (7%) and the age group over 50 years old (4.2%).

44.1% of the participants are Filipinos and the vast majority finished their studies in the Philippines, followed by India (33.9%). The participants from Egypt and Qatar came next at 7.8% and 5% respectively, followed by Tunisians and Jordanians with 5% and 2.9% respectively.

The vast majority (70.5%) held BSc degrees, 24.5% held diplomas and 2.9%, 1.6% and 0.5% held master's, PhD and post-basic diplomas respectively.

50.9% of the participants worked in the public sector, while 49.1% were from the private sector. 41.3% had up to 10-19 years of work experience, while 32.4% have experience of between 5-9 years, 17.2% up to 4 years and 9.1% had more than 20 years' experience.

As for IT and internet skills, the vast majority of participants use the Internet regularly and have good skills in IT, and they have convenient access to the internet from home and from work. This can be considered as a very positive point towards readiness for e-health, largely attributable to the educational background of the nurses and to the fact that the internet development has increased and prices have become more reasonable. Additionally, the general standard of internet provision in Qatar is relatively good compared with most developing countries. Moreover, there are some government initiatives on increasing the number of PCs per household, which contributed to narrowing the digital gap.

Regarding the attendance of formal computer training, the results showed that 69.2% of the participants had attended formal computer training while 30.8% had not. This perhaps justifies the positive response about the confidence of using computers, which showed that 93.5% feel confident using computers while 6.5% do not.

5.3.2 Reliability

As mentioned previously, the level of consistency between multiple variables is known as data reliability (Hair, 1986: 130). High reliability is determined if variables in the same measuring group correlates within others. One of the commonest test methods for data reliability is Cronbach's alpha, which determines how closely each variable is related to the sum of the remaining variables.

In this study, to ensure high data reliability, as stated earlier, a pilot study was run and several changes to the draft questionnaires were made based on the feedback. Then, Cronbach's alpha test was carried out to assess the data reliability. According to the obtained results, Cronbach's alpha was found to be 0.889 (above 0.70, the acceptable benchmark according)(Hair, 1986: 130).

5.3.3 Outcomes

In this study, some major preliminary data analysis techniques were carried out. The descriptive analyses of the frequency and percentages for each question were performed. The frequency and the means were calculated using SPSS.

The tables below present the obtained frequency and percentages according to the tested categories of knowledge of e-health, current status of e-health practice, nursing opinion on e-health relevant applications, attitude towards using e-health in nursing profession and barriers to acquiring knowledge and skills in e-health. In addition, the tables present the results of the current utilised telemedicine/e-health applications, opinions toward e-health education as well as preferred mode of learning.

As mentioned earlier, the lack of formal IT training and self-learning resources for e-health in general and as inferred from the results presented in this chapter evidences the low attention given to e-health training, a very negative sign for the deployment of e-health applications within nursing and a risk factor for any investment in e-health projects.

Table 5.1: Knowledge of E-Health (Qatar)

Criteria	Option	Frequency	Percentage
Have you ever heard of e-health?	No	138	36.0
	Yes	245	64.0
Do you consider yourself having fair knowledge in e-health?	No	191	49.9
	Yes	192	50.1
Have you ever been exposed to e-health education in your study?	No	259	67.6
	Yes	124	32.4
Have you ever been exposed to e-health at work?	No	210	54.8
	Yes	173	45.2
Have you ever read some literature on e-health?	No	224	58.5
	Yes	159	41.5
Have you ever attended any seminars/workshops on e-health?	No	290	75.7
	Yes	93	24.3

In addition, the results presented in table/graph 5.2 show that nursing staff do have some basic experience of using IT and internet applications in the medical field. This is a useful milestone for further e-health teaching.

Table/Graph 5.2: Communication Techniques of E-Health (Qatar)

	Internet No	Internet Yes	Videoconferencing No	Videoconferencing Yes	Email No	Email Yes	Telephone/Cell phones No	Telephone/Cell phones Yes	Storage devices (e.g. CD, memory sticks) No	Storage devices (e.g. CD, memory sticks) Yes
Frequency	79	304	237	146	106	277	175	208	144	239
Percentage	20.6	79.4	61.9	38.1	27.7	72.3	45.7	54.3	37.6	62.4
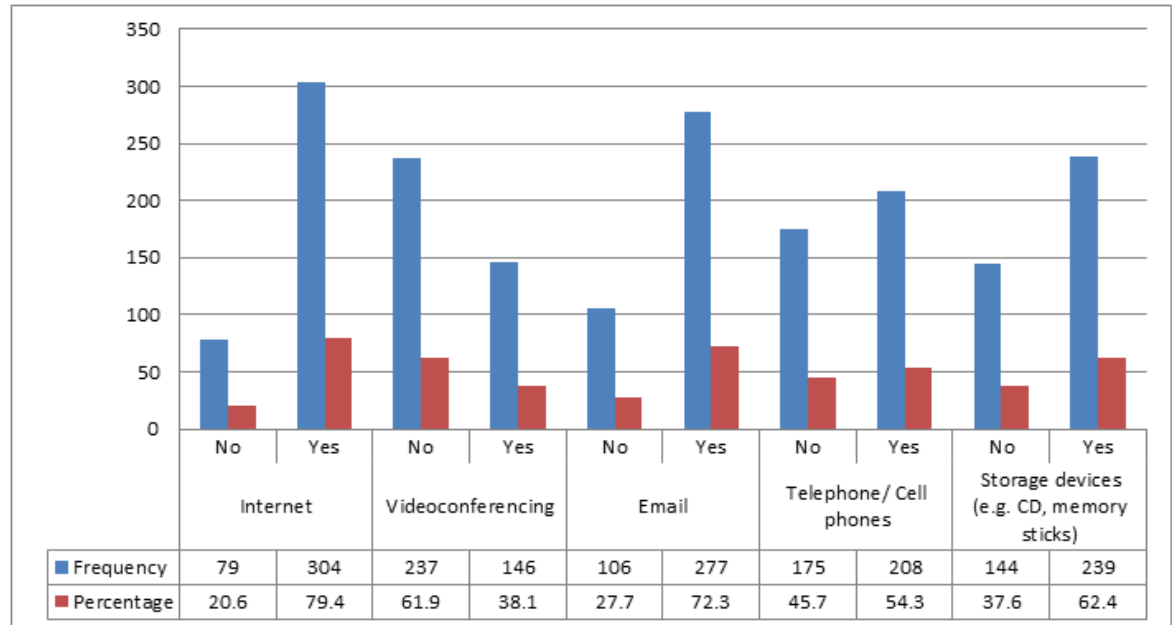
It is clear that a very positive opinion exists among nursing staff regarding the adoption of applications of e-health in different areas; as shown in table/graph 5.3. This is a very encouraging factor toward investing on such applications and expansion of the current system towards implementing e-nursing.

Table/Graph 5.4: Nursing Opinions on E-Health Relevant Applications (Qatar)

	No	Yes	No	Yes	No	Yes	No	Yes
	Clinical practice		Health management		Administration		Research	
■ Frequency	57	326	60	323	73	310	56	327
■ Percentage	14.9	85.1	15.7	84.3	19.1	80.9	14.6	85.4
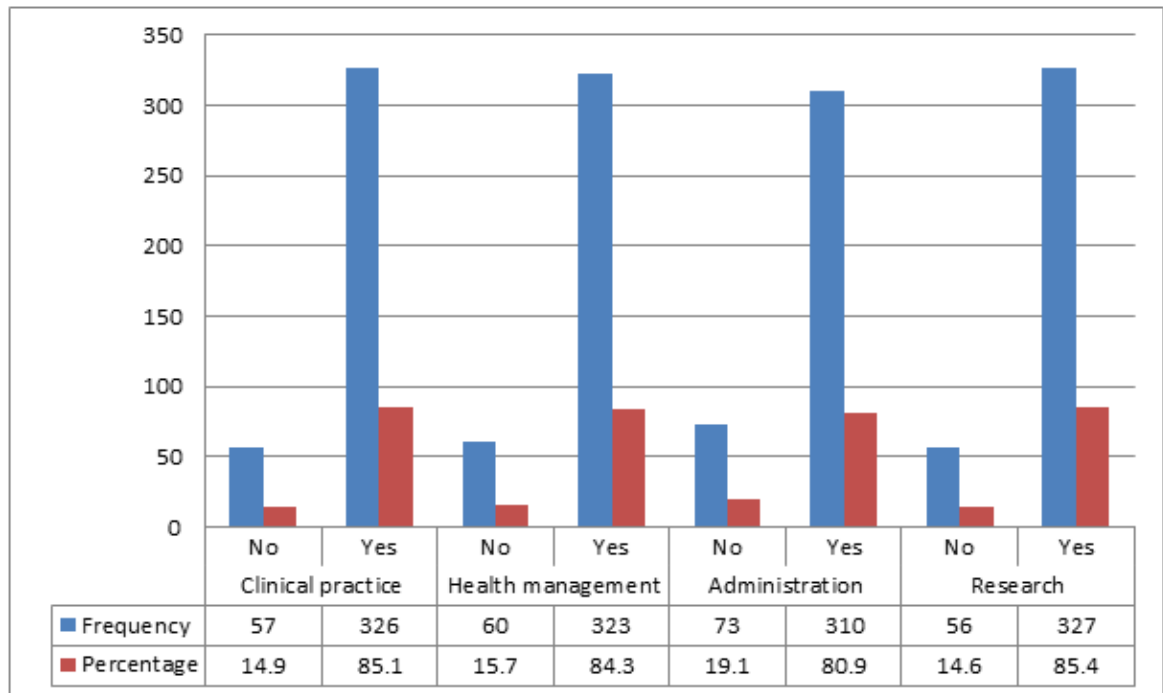
Adding to the some positive outcome, nursing staff have a positive attitude towards integrating e-health as an integral part of their profession (Table 5.4). This can be seen as an advantage for establishing future e-health projects.

Table 5.5: Attitude Towards Using E-Health in Nursing Profession (Qatar)

Criteria	Option	Frequency	Percentage
Do you consider e-health important to nursing profession?	No	29	7.6
	Yes	354	92.4
Do you believe there is a potential for using e-health in nursing field?	No	48	12.5
	Yes	335	87.5
Do you believe that e-hearth could improve nursing practice?	No	33	8.6
	Yes	350	91.4
Do you believe it would be beneficial to develop knowledge and skills in e-health in order to improve the service you provide?	No	23	6.0
	Yes	360	94.0

Furthermore, the results presented in table 5.5 were used in order to identify the main obstacles facing e-health in general and obstacles facing the acquisition of knowledge and skills in e-health from the perspective of nursing staff.

Table 5.6: Barriers to Acquiring Knowledge and Skills in E-Health (Qatar)

Criteria	Option	Frequency	Percentage
Lack of education in e-health	No	65	17.0
	Yes	318	83.0
Lack of time	No	97	25.3
	Yes	286	74.7
Lack of guidance/IT support	No	64	16.7
	Yes	319	83.3
Lack of incentives and support from management	No	91	23.8
	Yes	292	76.2
Lack of access to appropriate technology	No	90	23.5
	Yes	293	76.5
Poor relevant infrastructure	No	122	31.9
	Yes	261	68.1
Fear of using new technology	No	172	44.9
	Yes	211	55.1
Lack of awareness of e-health importance	No	103	26.9
	Yes	280	73.1
Lack of available flexible training program	No	66	17.2
	Yes	317	82.8
Low level of English language	No	220	57.4
	Yes	163	42.6
Low level of computer literacy	No	178	46.5
	Yes	205	53.5
Fear of medical data security and privacy	No	191	49.9
	Yes	192	50.1

To make these results easier to understand and to provide their clustering in accordance to their degrees of importance, Figure 5.1 was constructed. The clear finding, which is in-line with aim of this research, is the fact that the top challenges are related to education; hence, this justifies the need to establish an educational platform for e-health promotion.
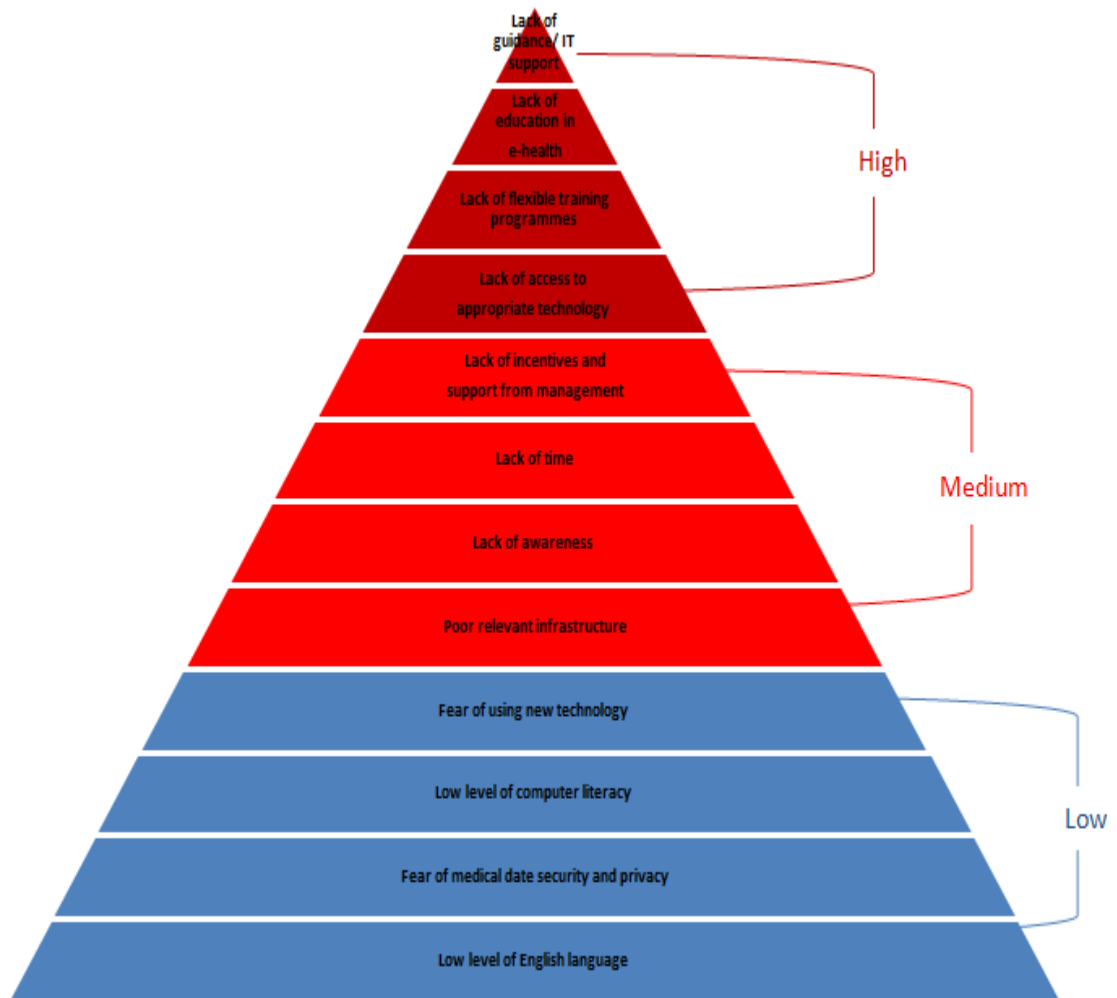
Figure 5.1: E-Health Barriers and Challenges for Nursing Staff (Qatar)

In the attempt to assess the level of e-health infrastructure within Qatar healthcare establishments, nursing staff reflected on the activities that have been covered on the common e-health applications. These results do not reflect on the wide use of e-health and also show that most of the applications scored low apart from the X-rays and images applications. This leads to the conclusion that the infrastructure for e-health applications is still below the level that is expected.

Table 5.7: Current Utilized Telemedicine/E-Health Applications (Qatar)

Criteria	Option	Frequency	Percentage
Obtaining lab results via the internet/intranet	No	90	23.5
	Yes	293	76.5
Making out-patient appointments	No	157	41.0
	Yes	226	59.0
Transmission of ECG	No	256	66.8
	Yes	127	33.2
Transmission of X-rays	No	150	39.2
	Yes	233	60.8
Transmission of still images	No	201	52.5
	Yes	182	47.5
Teleconferencing by phone	No	283	73.9
	Yes	100	26.1
Video conferencing of consultation with health professionals	No	284	74.2
	Yes	99	25.8
Video conferencing for education	No	249	65.0
	Yes	134	35.0
Monitoring patient at home	No	288	75.2
	Yes	95	24.8

Additionally, the results obtained from asking nursing staff if they are interested in learning more about e-health and if it should be included within educational programs revealed that they were in favour of these suggestions. This is very promising for further inclusion of nursing staff in e-health development and deployment.

Table 5.8: Opinion of E-Health Education (Qatar)

Criteria	Option	Frequency	Percentage
Are you interested in learning more about e-health?	No	16	4.2
	Yes	367	95.8
Do you think that e-health should be a prerequisite for nursing registration?	No	112	29.2
	Yes	271	70.8
Do you support that e-health should be included in nursing postgraduate programs?	No	40	10.4
	Yes	343	89.6

When asking nursing staff questions regarding their preferred mode of learning for the delivery of e-health education and training, the results showed that a blend of both face-to-face lectures and a web-based approach was the preferred style as presented in table/graph 5.9. These results suggest the establishment of a training program to help in

handling the major challenges found early during the e-learning development to enable flexible e-nursing education anywhere and at any time with teaching and learning platforms.

Table/Graph 5.10: Preferred Mode of Learning (Qatar)

	Face-to-face lectures only		Web-based only		A blend of the above two modes	
	No	Yes	No	Yes	No	Yes
■ Frequency	125	258	133	250	35	348
■ Percentage	32.6	67.4	34.7	65.3	9.1	90.9
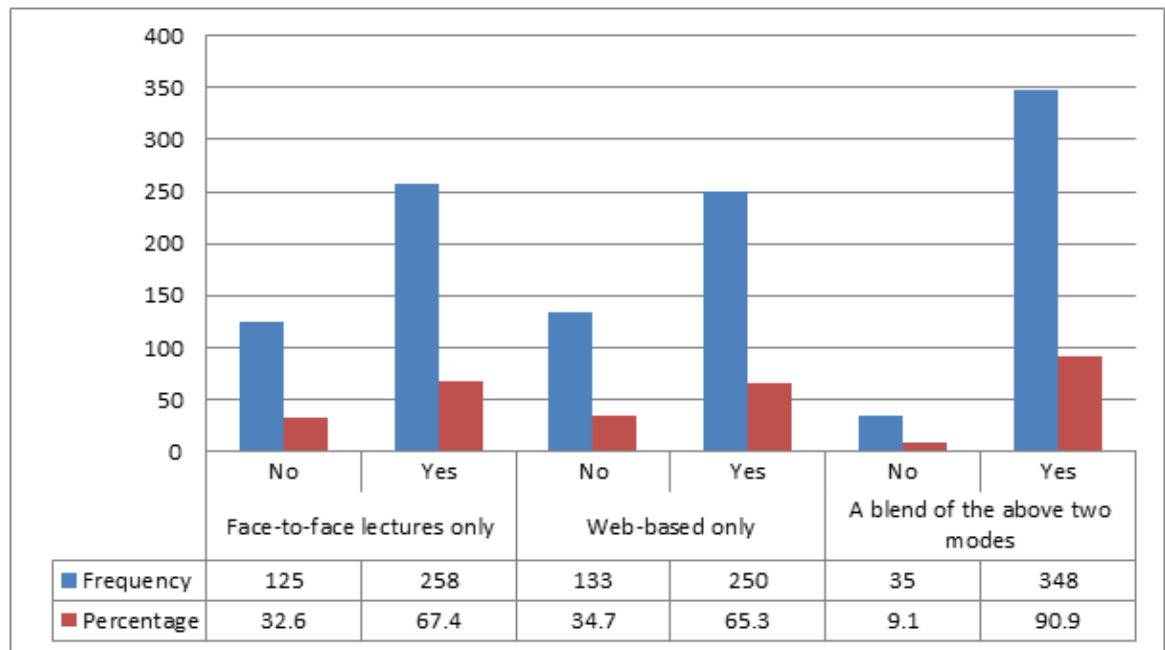
5.4 Summary

The results of this study showed that the attitudes towards implementing e-health are positive and encouraging among nurses working in the public and private sectors. The results showed that the nursing community is keen on using and implementing e-health services, and they see it as very relevant to healthcare sector and the nursing profession in particular. The results showed the top challenges facing e-health are in education-related aspects, hence a plan for promoting and providing education on the benefits and use of e-health processes and applications must include ICT instruction, as the results showed that nurses lack ample knowledge of specific e-health processes and applications.

By comparing results obtained from Jordan and Qatar (the case studies) it seems that; although each of the two countries has different economic status, the challenges facing e-health deployment in nursing practice are still common.

CHAPTER 6: THE PROPOSED MODEL FOR DEVELOPING COUNTRIES

6.1 Introduction

For the purpose of establishing this model, e-learning, e-health and medical education literature have been reviewed, and two studies were conducted. In Jordan, due to the largely indigenously educated workforce in healthcare, nurses can be nationally trained to establish/assess the readiness of nursing community for e-health deployment in nursing practice and to identify the major challenges facing e-health deployment. In Qatar, the vast majority of the nursing force is internationally recruited, thus there is need for a roadmap for educating both national and international nurses in e-health as part of the pre- and post-registration process. Therefore, this chapter describes an e-learning model or framework for e-health education for nurses that can be used as a platform for e-health education and as a pre-request for medical registration and Continuing Professional Development (CPD) in developing countries.

The model emerged after analysing the findings from the literature and the studies undertaken in this work, which revealed a number of issues relating to e-health adaption and e-health education. These findings have been analysed and translated into sets of requirements, which the model intends to satisfy.

The expert evaluation required to validate the model was conducted before adopting the final form. Figure 6.1 illustrates the approach that was adopted for creating the model.
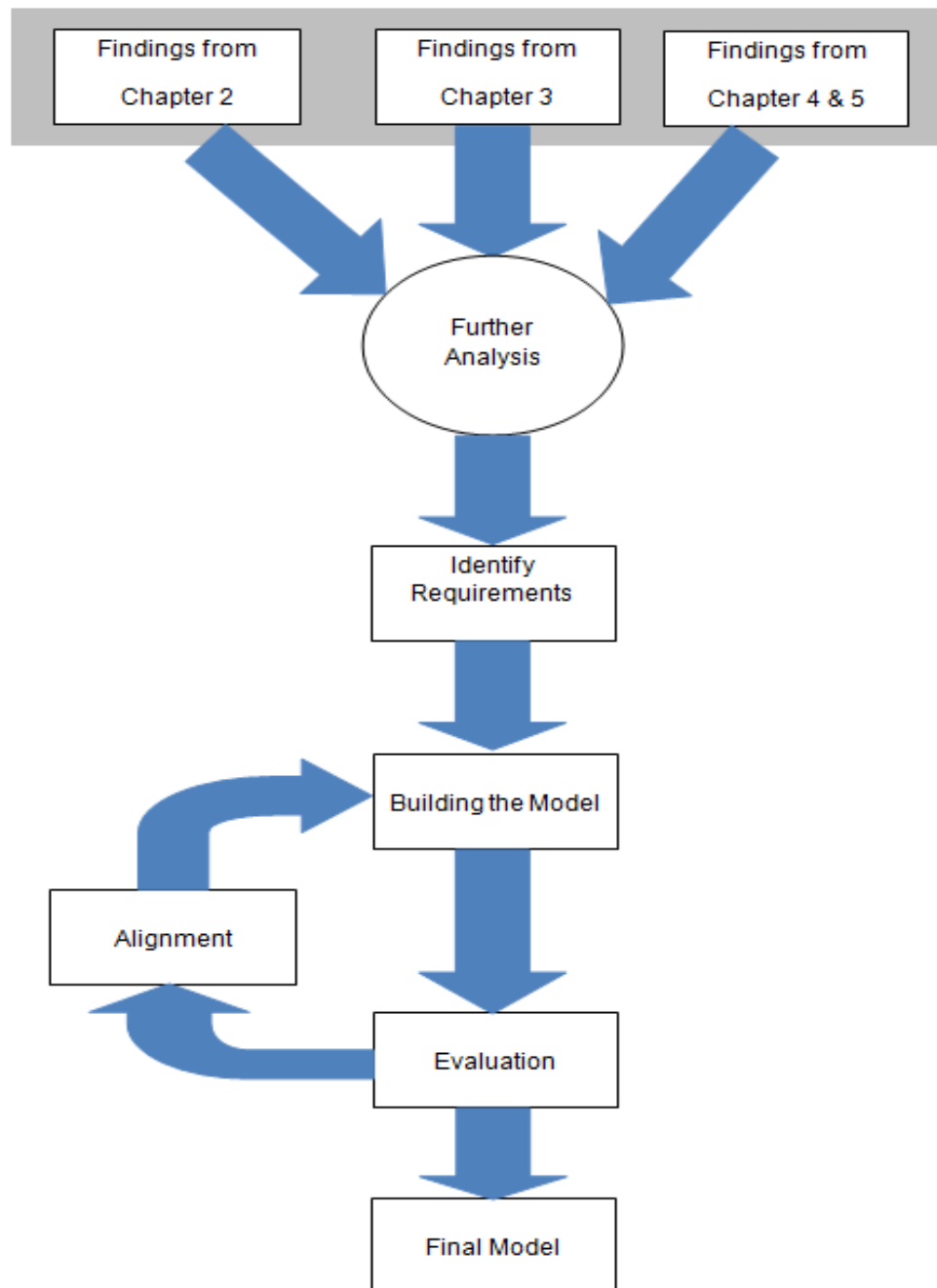
Figure 6.1: Approach for Creating the Model

It is believed that the proposed model will contribute to the existing body of knowledge by presenting a roadmap that assists in enabling better inclusion of e-health education for future e-health within nursing practice. It is worth mentioning that the proposed model is useful not only from the perspective of improving developing counties' context, but also for comparable contexts, such as developed countries that have similar characteristics (e.g. a large expatriate component of the nursing workforce).

This chapter is includes a summary of the research findings, followed by the requirements of the model, followed by the model validation and finally the summary and conclusion.

6.2 Summary of Previous Research Findings

For the purpose of establishing this model of e-learning, e-health and medical education literature were reviewed. Two studies were conducted, in Jordan (where the nursing community is largely homogenous and indigenously educated) and in Qatar (where the nursing workforce mainly comprises expatriate workers) to assess the readiness of the nursing community for e-health deployment in nursing practice and to identify the major challenges facing e-health deployment in order to be considered in the proposed model. Findings of both studies showed that nurses lack the necessary knowledge towards e-health processes and applications are ill-prepared for e-health deployment. The top challenges facing e-health implementation are educational, attributable to a lack of formal e-health education.

In view of the studies' findings, a plan for promoting and providing education on the benefits and use of e-health processes and applications was devised in which ICT is fundamentally important. This is in agreement with findings of Thinyane (2009: 133), who pointed out that training and infrastructure has the potential to facilitate the implementation of e-services including e-health; and those of Hugenholtz (2008: 22), who considered lack of computer skills to be a major barrier to e-health deployment in the healthcare sector; and Harrison and Lee (2006), who found the internet can be a way to streamline healthcare administrative costs and improve communication among healthcare organizations. The integration of ICT in healthcare has been slow due to the lack of infrastructure, high cost, computer illiteracy, restrictive telecommunication legislations, the lack of human capacity in the field of e-health and the lack of systematic education in e-health (Edirippulige, 2007: 10; Mars, 2012: 57). Moreover, health literacy has been identified as a public health goal for the 21st century and a significant challenge facing healthcare globally (Norman, 2007: 141). The readiness studies analysis of nursing curricula from several countries to evaluate nurses' training for the concept of e-health education and their contents of ICT and e-health/ e-nursing courses were conducted. Findings showed that there was no evidence of the introduction of the concept of e-health/e-nursing as such in any of the curricula studied; only basic computer and fundamental courses were included. The lack of a systematic education in e-health and e-nursing makes it hard for nurses to support professional practice with ICT in a formal, structured manner. Since the healthcare information technology landscape is changing so rapidly and health information courses are not routinely included in nursing curricula, it is incumbent on nursing leaders to foster an environment amongst clinical staff to support new and innovative uses of information technology. Nursing curricula must be infused with a meaningful e-health contents to

ensure that future nurses are well prepared to work in a technologically driven healthcare system and to become a part of the clinical mass of health providers, and they must act as change agents in e-health initiatives (Booth, 2006: 6). More importantly, nursing leadership is in a unique position within the healthcare industry to take the lead in leveraging health information technology to enhance the quality of patient care. The findings support the introduction of an online e-health/e-nursing learning module that should be integrated in nursing curricula for the national nursing institutions; it should also be a prerequisite for registration of general scope nurses.

Hence, findings from literature and the outcome from the three studies justifies the need to establish an educational framework for e-health implementation, since e-health is an opportunity to improve efficiency, reduce costs, facilitate communication and enhance patient care.

6.3 Model Requirements

Based on the previous studies, the findings have identified some essential requirements (Table 6.1). These requirements are to be met by the specific elements within the model. The requirements have been used to establish the whole architecture of the model, in accordance with TAM (Sheppard, 1988: 144; Holden, 2010: 119). With regard to the TAM framework for the proposed model, perceived ease of use and perceived usefulness determine one's behavioural intention to use a technology, which has been linked to subsequent behaviour.

Table 6.1: Model Requirements

No.	Requirements	Description
1	Should enable flexible and educational learning.	The model should allow nurses to access learning materials from anywhere and during flexible times to suit their needs (i.e. anytime, anywhere).
2	Easy to implement with affordable cost.	The model should be easy to implement and affordable.
3	Can be integrated as part of the national nursing education program.	The model should be easy to align within curricula and/or as part of continuous professional development and CME.
4	Can enable pre-arrival training for international nurses.	The model should be designed to accommodate international nurses, with pre-arrival training awareness, and accessibility from home countries.
5	Can be integrated within nurses' medical registration system.	The model should be able to be part of all the stages of the medical registration system (as part of quality assurance measures).
6	Can narrow any gap in ICT literacy.	The model should make sure that nurses have sufficient training in ICT.

No.	Requirements	Description
7	Should enable continuous support and update on ICT innovation.	The model should enable nurses to request any help that they might need related to ICT. In addition it should allow them to be up to date with any new ICT that might be an impact on e-health systems.
8	Should involve different healthcare departments and other bodies/agencies (for example universities) in a collaborative approach.	The model should allow all healthcare departments and other bodies/agencies in e-health education to work together.
9	Should have common setup/style to the actual e-health system.	The model should allow the delivery of e-health education/training using the common platform (like e-learning).
10	Can be integrated within healthcare continuous professional development.	The model be easily adaptable as part of continuous professional development programs.

6.4 The Model

The model (Figure 6.2) consists of four main interrelated components/elements that should to be in synergy for the effectiveness of the model to allow for injection of e-health education for nurses at the different levels on the professional continuum, from pre-registration undergraduate students, during registration for graduate nurses and post-registration for CPD and for maintaining active registration. Elements of the proposed model will be discussed in the following sections.
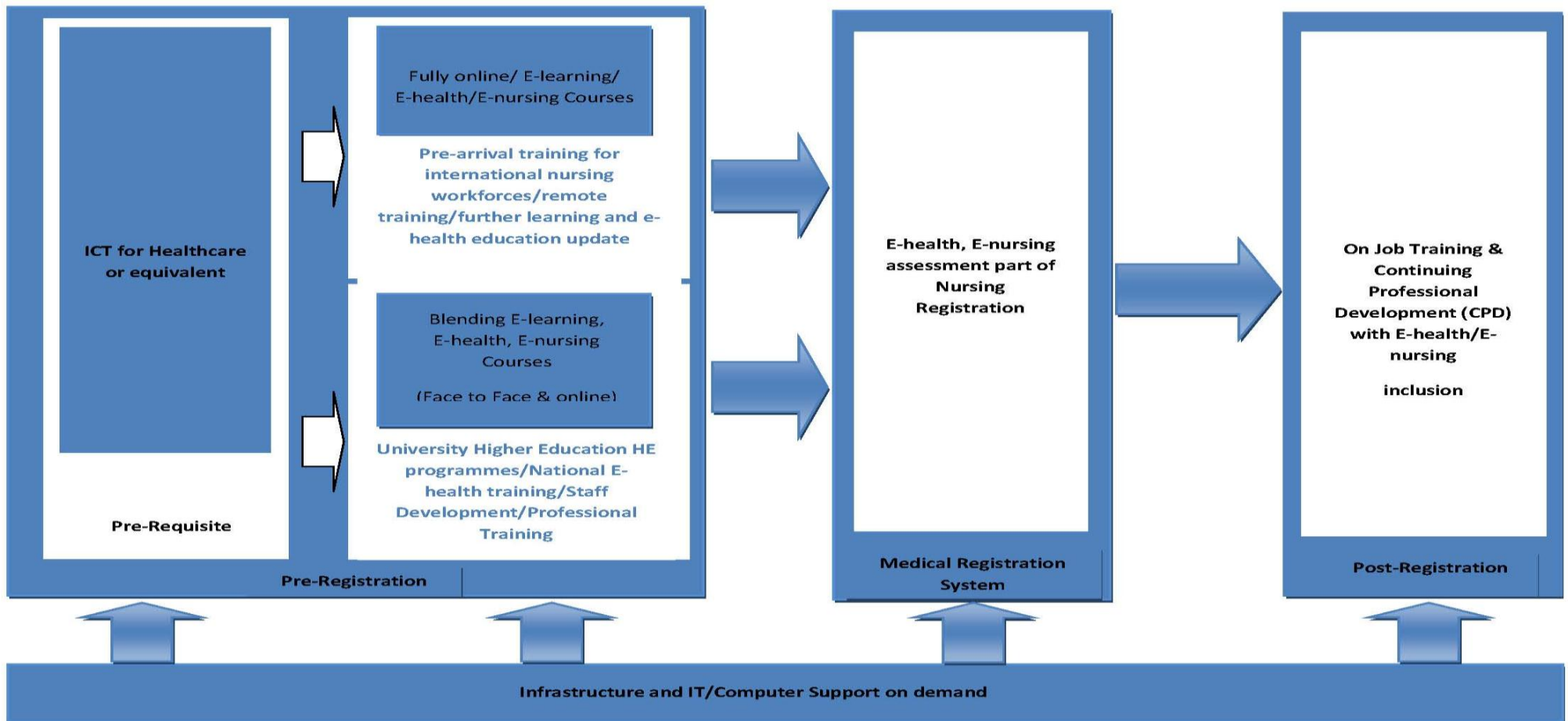
Figure 6.2: Proposed Model

6.4.1 ICT for Healthcare or Equivalent Training

Nurses need to master a considerable level of ICT skills competency that enables them to utilize e-health implications in their daily work and overcome major challenges to e-health deployment in their practice. Both internationally recruited nurses and undergraduate student nurses in national nursing institutions require the provision of ICT training or its equivalent to overcome computer anxiety and to ensure effective utilization of e-health deployment in nursing processes and practice; they should be well prepared and e-health ready, ICT literate and technically competent to work in an increasingly computerized health service.

The lack of technically ICT competent healthcare professionals is a major challenge for deployment of e-health in the Eastern Mediterranean Region, which is attributable to the lack of ICT training in undergraduate programmes and in-service training and continuous education in the area of health informatics (Al-Shorbaji, 2001: 145). In this context, special consideration should be taken to ensure quality of ICT training and prevent students who lack computer skills from being disadvantaged or from developing computer-hostile attitudes which will lead to frustration and negative attitudes towards e-learning, as there is no one-size-fits all course design available to address this need; individualized learning of ICT must be considered in the design of ICT course components (Sandars, 2010: 33). To overcome any technical obstacles, IT support must be on-going and available as needed.

6.4.2 Pre-Registration E-Health Education

To ensure that nurses are e-health competent and able to implement e-health applications in their practice, online and blended learning will be used for e-health education; fully online e-nursing e-health modules should be made available for internationally recruited nurses/nurses seeking medical registration in developing countries prior to their arrival in the work environment. The required courses will be available with online authorization and will be offered and accredited by registration authorities. Once they have completed the required mandatory modules, the results are added to nurses' credentials and registration of the e-portfolios will be utilized. E-portfolios were found to be effective tools to promote and facilitate continuous assessable learning in response to changes and complexities in nursing practice and to foster personal qualities such as critical thinking and individual assessment and accountability (Anderson, 2009: 54).

In view of the fact that e-health literacy is not static, the validity of e-health courses' results will be decided by the registration authority and accreditation body with reference to CME to ensure that nurses are up to date with e-health innovations and applications. In conventional education within developing countries, nurse training will be blended (face-to-face and e-learning e-health education) and integrated into undergraduate nursing curricula.

The integration of e-learning into curricula is found to be an effective solution for effective e-learning for health professionals if it results from a well-designed plan that begins with a need assessment and concludes with the decision to use e-learning (Childs, 2005: 35; Ruiz, 2006: 19).

6.4.3 During Registration/Medical Registration System/E-health Assessment in Medical Registration

To ensure that both nationally and internationally recruited nurses are mastering the required level of competency required for medical registration, an assessment for e-health competency is conducted as an assessment component or during evaluation. This will include reviewing the e-portfolios of the applicants and inclusion of e-health questions in registration qualifying exams.

6.4.4 Post Registration E-Health Education CPD

For registered nurses to maintain the required level of e-health knowledge, skills, competencies to practice throughout their careers in their specific area of practice, and to improve personal performance, education using e-learning will be utilized, and e-portfolios will maintain CME records. Control and validation of training will be conducted by CPD to enhance career progression and keep abreast of e-health applications. E-health education will be offered and e-health competencies will be included in CPD. The effectiveness of e-leaning in medical education will be ensured and maintained by e-health teams in collaboration with registration authorities.

Licensure laws in several registration authorities require that health practitioners demonstrate they are regularly updating medical knowledge and skills by maintaining a certain number of CME credits, and in light of this requirement e-learning will become an attractive option for busy medical professionals to fulfil CME requirements (Weber, 2010: 153).

6.5 Model Evaluation

6.5.1 Procedures

In order to evaluate the validity of the proposed model, a consortium consisting of seven groups, as listed in Table 6.2, will give comprehensive feedback from all healthcare departments included in the model. Each group has participated in a briefing session during the research, followed by an interview sheet filled by each evaluator. The sheet includes 18 questions to gather separate opinions on the inclusion of component with the model, as listed in Table 6.3.

Before conducting the evaluation by the mentioned groups, a draft of the interview sheet was formulated based on the model components; it was piloted with four participants and refined into the final format, in order to ensure clarity.

The introduction section of the sheet provided support and explained the objectives of the conducted studies and the findings obtained from past studies. In addition, a figure of the proposed model was attached, and the introductory section explained how the model was developed.

The next section of the interview sheet gathered the demographic data. The last section comprised questions associated with elements in the proposed model. The interview sheet questions were measured using a standard five-point Likert scale. The interview sheet was in English. On completion, all participants' answers were digitized for SPSS analysis.

Table 6.2: Evaluators Category

Evaluator Category	Number	Role in Healthcare Sector
Nursing Administrators	9	To work as pivotal nursing leaders in chief executive level at variety of positions in the healthcare environment their responsibilities include overseeing nursing teams and patents care Budgeting and maintaining practice and standard guidelines and promoting the development of nursing staff.
Nursing Educators	6	To work in academic institutions or clinical settings and medical education departments to teach and prepare the future nursing professionals.
Nursing/ Medical Registration and Licensing Officers	5	To carry out special duties in respect of the nursing registration and licensing to practice including verification and evaluation of qualifications and other credentials such as CPD points. Also to ensure eligibility for licensing to practice specified role in health.
Nursing Informatics and E-health Officers	4	To use a combination of nursing knowledge and expertise in computers to manage the information systems used by nurses in hospitals, medical offices and clinics in order to collect and analyse data, plan the design of information systems and oversee their implementation and train nurses and administrators in their use.
HR/Nurse Professional Development Officers	2	To work in a variety of practice settings and environments of care to contribute to professional development in practice and learning environments and services and provide orientation, in services, and competency and continuing education programs for interdisciplinary and inter professional employees.
Policy Makers/Healthcare Planners	3	To set healthcare policies and strategies to achieve operational improvements within the healthcare sector.
Nurses	11	Currently practicing nursing in hospitals and clinics.
Total	**40**	

6.5.2 Analysis and Outcomes

Cronbach's alpha test was calculated in order to judge the reliability of the gathered data. Cronbach Alpha was 0.953; much higher than the required 0.70. This means the collected data is very reliable according to Hair et al. (1986). After that, descriptive data were generated and a summary is presented in Table 6.3 The following points can be made:

- Most of the groups view most of the questions positively.

- Nurses group showed negative opinions towards Q11, Q12, Q13, Q14 and Q16; they showed a neutral opinion to elements of Q2 and Q7.

- Nursing HR professional development officers negatively view Q13 and are neutral about Q7 and Q10.

- Policy makers group were only negative about Q7.

- Nursing educators group were negative about Q16 and neutral about Q8, Q14 and Q15.

Table 6.3: Descriptive Analysis Summary

	Question (Q)	Total Mean	SD
1	Using the proposed model provides a flexible educational/training platform for promoting e-health/e-nursing education and awareness.	1.80	0.823
2	Using the proposed model takes into consideration the different levels of ICT skills.	1.95	0.552
3	The proposed model can be easily implemented within national e-health strategy.	2.26	0.773
4	Using the proposed model will help in enforcing nursing medical registration system.	1.97	0.707
5	The proposed model can be easily integrated within nursing education/training programs.	1.95	0.639
6	The proposed model can be integrated and used within the staff development and national training programs.	1.77	0.669
7	Using the proposed model can help in hindering most of the challenges facing e-health/e-nursing adaptation and deployment.	2.13	0.670
8	Using the proposed model can easily be used as a pre-arrival educational platform for international workforces.	2.45	1.036
9	Having e-learning courses within the model will contribute in easing understanding and the use of e-health/e-nursing systems. (As both of these deals with electronic content)	2.00	0.751
10	Using the proposed model will enable learners to acquire knowledge in the time of their choice and pace.	1.93	0.730
11	Using the proposed model helps in the future promotion of e-health/e-nursing and other subjects for further learning.	2.05	0.783
12	Using the proposed model enables and supports better monitoring and tracing nursing staff learning in e-health and other subjects.	2.15	0.736
13	Using the proposed model helps in improving the general performance in healthcare sector.	1.83	0.408
14	Using the proposed model helps in building capacity of health practitioners without disturbing the work/service.	2.13	0.648
15	Using the proposed model is cost effective.	2.15	0.770

Question (Q)		Total Mean	SD
16	Using the proposed model helps healthcare practitioners to maintain competency and to fulfil Continuing Medical Education (CME) requirements.	2.05	0.749
17	Using the proposed model can easily be used as a platform Continuing Professional Development (CPD) in health sector.	2.03	0.577
18	Using the proposed model enhances evidence-based practice in health field.	2.03	0.660
Total Mean Average		**2.035**	**0.7045**

Table 6.4 shows that the means varied between 1.77 and 2.45 (out of 5) for the related questions, and the total mean average was 2.035 (SD: 0.7045) This provides a clear indication that the evaluators are in favour of the model and see it as useful to achieve the main goal. However, findings from descriptive analysis do not guarantee a high degree of credibility. Hence, to support the good indicators and in order to get better outcomes from the evaluation, analysis of variance (ANOVA) was performed (Table 6.5).

Table 6.4: Significance of Variance between Evaluators Groups

Between groups in each question	Sum of squares	df	Mean square	F	Sig.
Q1	2.571	6	0.429	0.593	0.733
Q2	3.279	6	0.547	2.092	0.081
Q3	2.385	6	0.398	0.614	0.717
Q4	9.602	6	1.600	5.464	0.001
Q5	2.335	6	0.389	0.947	0.476
Q6	2.869	6	0.478	1.088	0.398
Q7	4.428	6	0.738	1.956	0.112
Q8	5.258	6	0.876	1.632	0.169
Q9	4.851	6	0.808	1.556	0.191
Q10	3.816	6	0.636	1.238	0.313
Q11	5.373	6	0.895	1.595	0.180
Q12	8.125	6	1.354	3.444	0.009
Q13	14.075	6	2.346	5.943	0.000
Q14	5.531	6	0.922	2.805	0.026
Q15	3.791	6	0.632	1.080	0.394
Q16	6.055	6	1.009	2.102	0.080
Q17	1.604	6	0.267	0.776	0.595
Q18	1.950	6	0.325	0.714	0.641

The one-way ANOVA test analysis performed to find the differences between the groups. As can be seen in Table 6.5, the outcomes from the majority of questions support the earlier mentioned findings. The ANOVA table shows the differences between groups if the value of Sig. column is less than or equal than 0.05. Therefore, questions Q4, Q12, Q13, and Q14 are significantly different across the groups. However, this does not identify which groups differ from which (i.e. which group is causing the difference). Hence, the multiple comparison tests, also known as Tukey HSD (Honestly Significant Difference), were conducted (Table 6.5).

Table 6.5: Summary for Multiple Comparisons - Tukey HSD

Dependent Variable	(I) GROUPS	(J) GROUPS	Sig.
Q4	Nurses	Nursing Administrators	0.001
		Informatics/E-health officers	0.001
	Nursing Administrators	Nurses	0.001
	Informatics/E-health officers	Nurses	0.001
Q12	Nurses	Nursing/ Medical Registration & Licensing Officers	0.016
Q13	Nurses	Nursing Administrators	0.027
		Informatics/E-health officers	0.001
		Nursing/ Medical Registration & Licensing Officers	0.021
		Nursing Educators	0.003
	Nursing Administrators	Nurses	0.027
	Informatics/E-health officers	Nurses	0.001
	Nursing/ Medical Registration & Licensing Officers	Nurses	0.021
	Nursing Educators	Nurses	0.003

The multiple compression table exactly shows significance difference across the groups with specific items. All the significant differences are listed in Table 6.5 and values are lower than 0.05 in sig. column. The values significantly different are in questions 4, 12, and 13. For instance, in question 4, the Nurses group gave a significantly different answer than the Nursing Administrators group and Informatics/E-health officers. Similarly, in question 12, group 1 differed from Nursing Educators group, and finally in question 13

Nurses group differed from the majority of the sample. This shows that the Nurses group have major differences of perception compared with other groups, which is significant as nurses form the frontline caregivers and are patient advocates (i.e. nurses' perceptions are most closely related to healthcare delivery in real clinical settings).

For Q14 the one-way ANOVA test shows difference, but Tukey test shows no difference. This means that out of the 18 questions only three questions exhibited concern or disagreement, which resulted from the opinions of the nursing group. By revisiting questions 4, 12, and 13, it is clear these questions are directly related to aspects that might induce nurses feel that the model would add extra hurdles to their job; that feeling might have emerged due to the reasons explained in earlier chapters, linked with education, training and awareness of e-health. Hence, another phase of evaluation was introduced and conducted, as explained in the next chapter.

Moreover, when running the same analyses without including the nursing group to see if the other six groups had any significant differences on the 18 items, ANOVA reveals no significant differences among the groups. Although it was superfluous, running the Tukey TSD test generated the same results.

6.6 Summary

This chapter presented the most important part of this research work: the purposed model, which will be in introduced as roadmap for stakeholders to be integrated in nursing curricula or professional development, and as a part of the nursing registration process to promote e-health adaptation within the nursing community. In addition, the chapter presented the evaluation of the proposed model, which has showed a high level of acceptance from the majority of the model elements by the consortium of which consists of seven groups. Some concerns have emerged relating to the nurses group, which could be associated with the lack of education, training, and awareness of e-health. Hence, a separate evaluation was conducted to resolve this issue.

CHAPTER 7: NURSING ATTITUDES TOWARDS E-LEARNING FOR E-HEALTH EDUCATION

7.1 Introduction

Following the outcomes presented in the last chapter, in order to have more feedback on the proposed model from the nursing community an evaluation was conducted to assess the readiness of the nursing community for e-health deployment in nursing practice and to identify the major challenges facing e-health deployment and propose practical solutions. This chapter presents the evaluation conducted.

Since findings of previous literature and previous studies suggest that e-learning system is the solution that will establish an educational framework for e-health implementation, it is essential in order to achieve success to assess and evaluate the attitude of the nursing community - who are the end user - towards the possibility of implementing the proposed e-learning system as a solution to educate the nursing community. This is central to the findings of the literature review, which found that e-health strategies often foundered in developing countries and succeeded in developed ones due to the former not considering stakeholders and end users from the planning stage: "To start with people rather than with technology or with the organization, is an important prerequisite for success" (Hallin, 2007: 41).

7.2 Methodology

In this part of the research, a survey captured 52 nurses' attitudes towards an online e-learning website (NHS, 2013: 66). This section covers the research methodology for undertaking this research. This research has been achieved through a number of tasks as shown in Figure 7.1.

Prior to completing the survey each participant was shown a presentation which explained what was required of them via an on line e-learning website (NHS, 2013: 66), as illustrated in Figure 7.2. This website is a service which offers online training for healthcare professionals; its development was a partnership between the NHS and healthcare professional bodies within the UK. This demonstration was selected as it was felt that it gave the necessary overview about the concept of healthcare education and training services. Having sat through the introductory overview, each participant was then asked to complete the survey (Appendix).
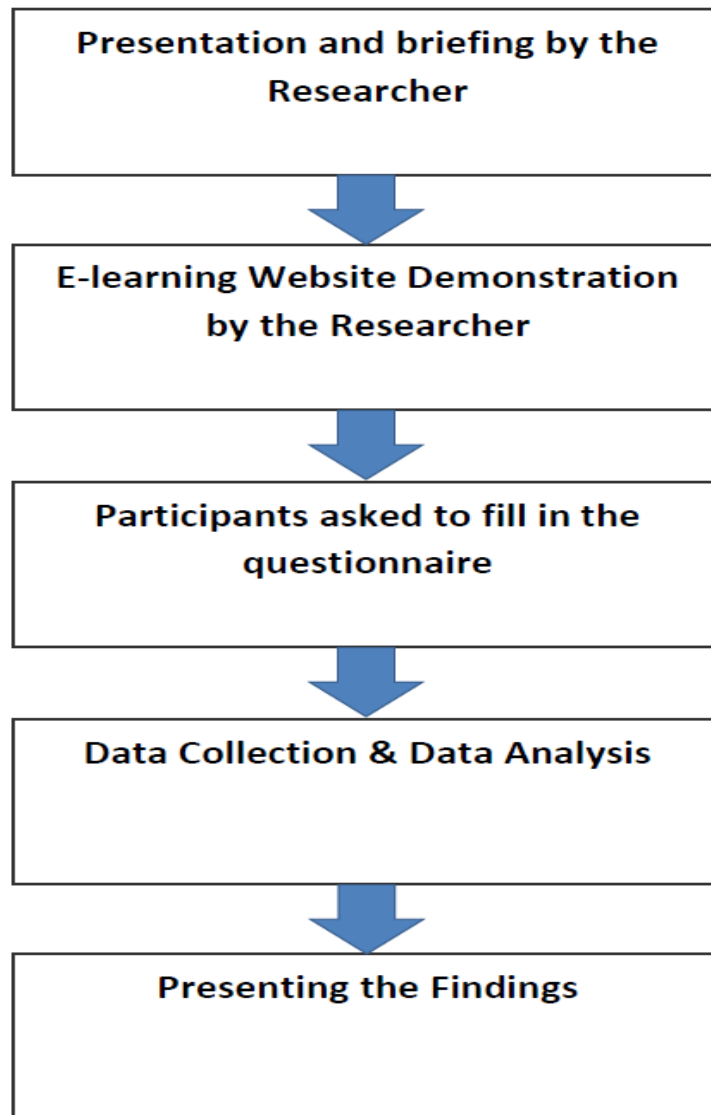
Figure 7.1: Study Research Protocol

Figure 7.2: E-Learning for Healthcare Website Used in Demonstration

7.2.1 Questionnaire Design

Participants' understanding of what was required and sufficiently clear definitions were ensured within the first section for both e-learning and e-health. The questionnaire's second section dealt with demographic information, and the third dealt with the concept of using e-learning for e-health.

The questionnaire items were measured using a standard five-point Likert scale. The questionnaire was designed in English. On completion, all participants' responses were coded to be analysed using SPSS.

7.2.2 Research Questions

The aim of the current research study is to assess and evaluate the attitude of the nursing community towards the possibility of implementing the e-learning system as a solution to educate the nursing community. This study answered the following research questions:

- The proposed e-health system can provide me with flexibility to learn in my own learning style.
- The proposed E-health system can be used in my own time in different places (anytime, anywhere).
- I can easily use the system with my current computer skills.
- I'm happy to use the system in courses/training related to my personal (professional) development.
- I'm happy to use the system with courses/training as part of my undergraduate or postgraduate nursing education.
- There are some similarities between e-learning and e-health systems which makes it suitable in education for e-health.
- Learning about e-health/e-learning can help me to understand the topic easily.
- The system can be used for international nursing staff to learn about e-health before their arrival (part of pre-arrival to work environment).
- I can use the system completely to learn without the need for face-to-face teaching (when conventional face-to-face learning is not possible).
- The system will be a good platform for training of national healthcare staff.
- In general the system is very good and easy to implement.

7.2.3 Research Hypotheses

The research used a five-point Likert scale to test the following hypothesis:

The nursing community working in hospitals and clinics has positive attitudes towards the possibility of implementing an e-learning system as a solution for education on e-health systems/applications, as well as to foster its adoption and deployment.

In order to test the hypothesis, the research stated the following hypotheses:

The null hypotheses (H0): all variables means are less than agreement value, which can be written as H0: $\mu1 < 4$

Where:

H0 = the null hypothesis

$\mu1$ = the mean of each variable

4 = represents users' agreement value in the scale from 1-5.

The alternative hypothesis for testing hypothesis one (H1): variables means are equal or more than agreement value which can be written as H1: $\mu1 \geq 4$

Where:

H0 = the alternative hypothesis

$\mu1$ = the mean of each variable

4 = represents users' agreement value in the scale from 1-5.

7.3 Results

This section describes the research sample and covers the reliability and validity of the research instrument. Furthermore, this section tests the research hypotheses.

7.3.1 Sample Distribution

The 52 participants were selected from broad backgrounds and therefore included both nationals and expatriate workers within medical hospitals and clinics of different years of experience, genders, nationalities and qualifications, as shown in the following tables:

Table 7.1: Sample Distribution by Gender

Gender	Frequency	Percentage
Male	14	26.9
Female	38	73.1
Total	**52**	**100.0**

Table 7.2: Sample Distribution by Academic Qualifications

Qualifications	Frequency	Percentage
High School	3	**5.8**
Diploma	19	**36.5**
BSc	25	**48.1**
MSc	5	**9.6**
Total	**52**	**100.0**

Table 7.3: Sample Distribution by Nationality

Nationality	Frequency	Percentage
Nationals	38	73.1
USA	1	1.9
Indian	1	1.9
Pilipino	6	11.5
South African	2	3.8
New Zealand	4	7.7
Total	**52**	**100.0**

7.3.3 Reliability and Validity

The research instrument was piloted with five nurses to ensure that questions were clear and to incorporate any suggested improvements. The questionnaire was modified based on piloted participants' comments and feedback. Having collected the data, further evaluation was undertaken applying the Cronbach's alpha procedure. The result was 0.959, indicating a strong internal consistency among variables and scale reliability (Pallant, 2010: 63).

7.3.4 Hypotheses Testing

All questionnaire variables' means scored more than 4 out of 5; therefore, the null hypothesis H0 is rejected and the alternative hypothesis H1 is accepted. Variables' means varied between 4.27 to 4.58 (out of 5), as listed below in Table 7.4. It was clear that the assessors believe that the use of e-learning applications in training for e-health applications is useful and applicable in order to educate them and to accomplish usable e-health applications. Additionally, the outcome covers a range of important points that can be accomplished once the system is implemented and can be taken in consideration when designing applications.

Table 7.4: Questionnaire Variables' Means

Criteria	Mean	SD	N
The proposed e-health system can provide me with flexibility to learn in my own learning style	4.42	0.499	52
The proposed e-health system can be used in my own time in different places (anytime, anywhere)	4.52	0.641	52
I can easily use the system with my current computer skills	4.40	0.634	52
I'm happy to use the system in courses/training related to my personal (professional) development.	4.58	0.667	52
I'm happy to use the system with courses/training as part of my undergraduate or postgraduate nursing education	4.31	0.781	52
There are some similarities between e-learning and e-health systems which makes it suitable in education for e-health	4.37	0.768	52
Learning about e-health/e-learning can help me to understand the topic easily	4.29	0.776	52
The system can be used for international nursing staff to learn about e-health before their arrival (part of pre-arrival to work environment training).	4.46	0.609	52
I can use the system completely to learn without the need for face-to-face teaching (when conventional face-to-face learning is not possible).	4.42	0.667	52
The system will be a good platform for training of national healthcare staff.	4.27	0.795	52
In general the system is very good and easy to implement.	4.42	0.696	52

7.5 Summary

This study's objective was to evaluate the attitude of nursing community working in hospitals and clinics towards the possibility of implementing an e-learning system as a solution to educate the nursing community on e-health systems and applications, as well as to foster its adoption and deployment. The findings displayed a very positive attitude from the nursing staff towards the proposed model, and there does not appear to be any apparent obstacles to deploying the concept of e-health.

It is very important to understand that the proposed model presented in the previous chapter is user-centric and covers all required procedures in both pre- and post-implementation phases.

CHAPTER 8: CONCLUSION AND FUTURE WORK

8.1 Conclusion

After the analysis of the related literature, it was found that although a significant amount of research work has been conducted on issues of adapting and deploying e-health systems, and a number of models have been presented, no practical model or framework exists to include the nursing community or inculcate them with any training related to e-health in developing countries. In addition, despite all the recommendations concerning the importance of e-health training for healthcare staff in general and nursing staff in particular, the outcomes of previous studies were limited and did not tackle issues such as pre-arrival training of international nursing staff using e-learning before their departure to the hosting countries, or e-learning as part of university education curricula, nursing registration schema or CME.

Despite being well established in theory for over two decades, it is clear from the analysis of nursing curricula from different countries feeding the market with nursing graduates that e-health is not embedded in nursing education. Moreover, despite the initiatives and a great deal of knowledge and enthusiasm about e-health in Jordan and Qatar, there is still a major technological gap to be addressed to reach the same level as developed countries with regard to e-health. This is due to the lack of e-health training provided to nursing staff.

Results from the case studies of Jordan and Qatar to evaluate e-nursing readiness within healthcare sector showed that the attitudes towards implementing e-health are positive and encouraging among working nurses in both public and private sectors. Moreover, the nursing community is keen to use and implement e-health services, and they see its relevance to the healthcare sector, particularly the nursing profession. However, results showed the top challenges facing e-health are education-related aspects. This finding reflected the lack training in e-health, and can be justified by the early task conclusion. Hence, a plan for promoting and providing education on the benefits and use of e-health processes and applications with a fundamental ICT component is essential, as the results showed that nurses had insufficient enough knowledge about the operational processes and applications of e-health.

Therefore, based on the last two conclusions, the major task of this research has been devoted to establishing the needed framework to tackle issues of education and training in e-health for the nursing community. Hence, to enable education and training to be

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delivered in national and international levels with flexibility and the possibility to be integrated with nursing registration or professional development programmes, an e-learning based framework has been proposed.

The proposed framework was evaluated by different groups of stakeholders, including Nursing Administrators, Nursing Educators, Nursing/Medical Registration and Licensing Officers, Nursing Informatics and E-health Officers, HR/Nurse Processional Development Officers and healthcare planners. Findings revealed that the vast majority of the evaluators are in agreement with the structure and elements of the proposed framework, and they see it as a key contributor in enhancing e-health education and e-health adaption to solve the central issues highlighted in the main goal of this research project. Moreover, it can contribute to enhanced healthcare services' quality.

Finally, this research project has contributed in presenting some useful findings related to e-health in general and in Qatar and Jordan in particular. The proposed framework can be utilised with some modifications to foster similar electronic applications.

8.2 Recommendations

The following are suggestions for future research work that can be taken into consideration after this project:

- During the course of this research, only Jordan and Qatar were considered. It would be useful to obtain data from other countries, to enhance the sample size, enforce the findings and to enable drawing comparison between countries and their journeys toward e-health education and its deployment.
- Since the proposed framework has been evaluated subjectively, it will be very essential to investigate its real-life application in order to obtain concrete evidence on the effectiveness of the framework to achieve the main goal.
- The evaluation with the nursing community was very limited; more numbers with different groups could be useful to identify any differences between groups and to calibrate the framework accordingly.
- Further research can be conducted to establish the possibility of transferring (and adapting) the NHS experience of building a collaborative e-learning healthcare training platform to developing countries.
- Further research can be conducted on exploring the possibility of applying the proposed framework to other areas such as unified medical education platform to

cover training in other aspects such as pre-arrival intercultural training for newly recruiting staff or other electronic applications.

- Further research can be conducted to establish the need for international partnerships and collaboration in order to construct infrastructure to promote capacity building and knowledge transfer at both the academic and clinical levels, to establish a well-organized national e-health program.

- Further research can be conducted to identify barriers and enablers to integrating e-health programmes into pre-registration nursing curricula and to raise educationalists' awareness of the nature and scope of e-health.

- Further research can be conducted to establish authentic e-health educational resources, e-health tools and services which will contribute to resolving e-health grand challenges and eventually support the transformation of e-health into mainstream activity of national healthcare systems.

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APPENDICES

الإشارة:

التاريخ 2011/10/31

To whom it may concern

This letter is to confirm that the research proposal, submitted by Mrs. Rasmeh Al Huneiti, has been reviewed and approved by the Department of Research at Supreme Council of Health.

The research study has been categorized as exempt research.

Sincerely,

Dr. Eman Sadoun
Manager, Clinical Research
Supreme Council of Health
Office: 4407-0612

Mrs. Rasmeh Al Huneiti
Supreme Council of Health
Medical Licensing/Registration Section
PO Box: 42
Doha, Qatar

Dear Mrs. Al Huneiti,

Research proposal# 11337/11: Assess the knowledge, Experience and Comprehension of e- health among nurse to evaluate their readiness to e - health

The above Research Proposal submitted to the Medical Research Center has been reviewed and classified as 'exempt', according to the rules and regulations for research at HMC.

On behalf of the Research Committee we inform you that the above Research Proposal meets with the ethical requirements of the Hamad Medical Corporation and approval is granted for one year from 15th December 2011.

This research study should be conducted in full accordance with all the applicable sections of the rules and regulations for research at HMC and you should notify the Research Committee immediately of any proposed changes that may affect the 'exempt' status of your research proposal .It is the Principal Investigators responsibility to obtain review and continued approval of the proposal before the date of expiry of the ethical approval.

A study progress report should be submitted bi-annually and a final report at the study's completion.

We wish you all success and await the results in due course.

Yours sincerely,

Dr. Anjum Susan John
Coordinator, Research Committee

Copy to DN's.

o K
W. Dalha
25/12/2011

Cc:
1. Dr. Eman Sadoun, Manager, Clinical Research, Supreme Council of Health
2. Manager, Medical Licensing/Registration Section, Supreme Council of Health

Ms. Rasmeh Ali

66190008

Sa/Su
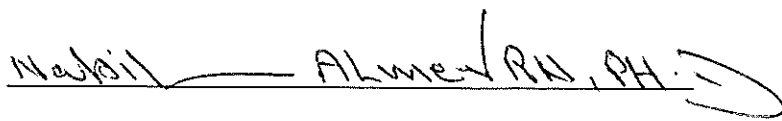
Memo

ATTENTION	Dr. Anjum Susan John Coordinator, Research Committee	DATE	18th Sep, 2012
FROM	Dr. Nabila Almeer Executive Director of Nursing	REF. NO.	NA/0150/'12
SUBJECT	Ms. Rasmeh AL Huneiti – Request to conduct research study Topic: "Evaluation of a learning framework that will be used as a platform for e-health education and pre-requisite for medical registration in developing countries".		
CC			
□ URGENT □ CONFIDENTIAL □ PLEASE PROCESS □ FYI			

This is concerning the request of Ms. Rasmeh Al Huneiti, requesting to do a research study on the above mentioned topic. I have reviewed her proposal and have no objection for her to conduct this research.

Thank you

Dr. Nabila Almeer, Executive Director of Nursing

Ref. No: RC/115212/2012
Date: 1st October 2012

Ms. Rasmeh Al Huneiti
SCH

Dear Ms. Rasmeh,

Research proposal #12196/12: "Evaluation of an learning framework that will be used as a platform for e-health education and prerequisite for medical registration in developing countries"

Reference is made to the above Research Protocol submitted for review and approval from the Research Committee.
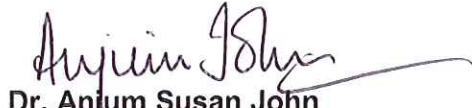
On Behalf of Research Committee, this is to inform you that the above research proposal meets up with the ethical requirements of the Hamad Medical Corporation for "expedited review" and approval is granted for one year from 1st October 2012.

One copy of Waiver of Signed Informed Consent should be handed over to the participant and the second copy should be kept with Principal Investigator in the research records. No research participants may be involved in any research procedure after the expiration date of the ethical approval. Any modifications to the research protocol must be approved by the Research Committee, prior to implementation (this includes any change of investigators(s)). All recruitment materials and tools must be approved by the Research Committee, prior to being used.

Progress report of the study should be submitted bi-annually and final report upon completion to Medical Research Center.

We wish you all success and await the results in due course.

Yours sincerely,

Dr. Anjum Susan John
Coordinator, Research Committee

Cc: 1). Dr. Nabila Al Meer, Department of Nursing
      2). Dr. Wasmiya Dalhem, Department of Nursing
      3). Medical Director – HGH

مـؤسسـة حمـد الطبية
Hamad Medical Corporation
صحة · تعليم · بحوث   HEALTH · EDUCATION · RESEARCH
حمـد
Hamad

HAMAD MEDICAL CORPORATION	مؤسسة حمد الطبية
HGH■ WH□ RH□ AAM□ AKH□ Others■	م. حمد العام □ م. النساء □ م. الرميلة □ م. الأمل □
HC NO:	م. الخور □ م. أخرى □
PATIENT NAME:	رقم السجل:
DOB:	إسم المريض:
GENDER:	تاريخ الميلاد:
NATIONALITY:	النوع (ذكر / أنثى) :
	الجنسية:

WAIVER OF SIGNED INFORMED CONSENT/VERBAL/ORAL CONSENT FORM

تخويل موافقة خطية / لفظية / شفوية

Information to participants

1. You are free to ask as many questions as you like before, during or after this research, should you decide to consent to participate in this research study.
2. The information in this form is only meant to better inform you of all possible risks or benefits. Your participation in this study is entirely voluntary.
3. You are entitled to participate in this study if you satisfy certain eligibility criteria
4. You do not have to take part in this study, and your refusal to participate will involve no penalty or loss of rights to which you are entitled.
5. You may decide not to participate in this study at any time without penalty or any loss of rights or other benefits to which you are otherwise entitled.

(1) لك مطلق الحرية في طرح أى سؤال أو إستفسار عن هذا البحث وذلك قبل , أثناء أو بعد إكمال إجراء البحث الذي قررت موافقة المشاركه فيه.
(2) الهدف الرئيسى من المعلومات الواردة في هذا النموذج هو أن نقدم للمشارك الشرح الوافى والمستفيض عن كل الأخطار والفوائد التى يمكن أن تتمخض عن إجراء هذا البحث. المشاركة فى هذا البحث عمل طوعى.
(3) لك حق المشاركة فى البحث المطروح وذلك بعد إستيفاء الشروط المطلوبة.
(4) لك الحق الكامل فى إتخاذ قرار عدم المشاركة بالبحث. قرارك بعدم المشاركة فى هذا البحث العلمى لا يترتب عليه اى تبعات او حرمان من حقوقك المستحقة.
(5) لك مطلق الحرية فى إتخاذ قرار عدم المشاركة بالبحث وذلك فى أى وقت من غير تبعات او حرمان من حقوقك المستحقة.

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Research project #:12196/12	رقم المشروع:
Project Title : Evaluation of an learning framework that will be used as a platform for e-health education and pre-requisite for medical registration in developing countries.	عنوان المشروع :
Name of Principal Investigator: Rasmeh Al-Huneiti	اسم الباحث الرئيسي:

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Contact address and phone number: Mobile :66190008 Email :rasmehalhuneiti@yahoo.com	موقع إجراء البحث وأرقام الهواتف (أثناء أوقات الدوام , بعد الدوام وفى العطلات): *HMC Research Commit...* *Approved* *Approval Date : 1/10/12* *Expiry Date : 30/9/12*

<u>(Each item given below has to be filled in. Please write NA, if not applicable. This form may be read to the participant or the participant's legally authorized representative by the principal investigator or his/her representative)</u>	يجب ملئ كل البنود أدناه وفى حال عدم توفر الإجابه الرجاء كتابة غير متوفر. يمكن للباحث الرئيسى أو احد مساعديه فى إجراء الدراسة قراءة هذا النموذج للمشارك بالبحث أو الوصى الشرعى للمشارك بالبحث.
1. Introduction: For the purpose of evaluation of the proposed model Researcher will explain the model for the participants by explaining the model this will be in one session utilizing power point presentation and giving them written description of the model , answers their questions if needed the presentation will take approximately 10 minutes then ask the participants to complete the questionnaire filling the questionnaire will take not more than 20 minutes approximate number of participants will be 50 participant the explanation will be in English .English speakers	(1) مقدمة عن البحث الطبى (صف وصفاً موجزا للدراسة مع تحديد مكان إجراء الدراسة، الوقت المطلوب من المشارك تخصيصه لمشاركته والمدة الزمنية المتوقعة لإتمام الدراسة، ومن يقوم بإجراء البحث. أعطى بالتقريب العدد المتوقع للمشاركين بالدراسة والتكلفة الفعلية للمشاركة. إشرح للمشارك الاسباب والدوافع التى بموجبها إختياره للمشاركة بالدراسة .(

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people involved in medical education ,medical registration , nursing informatics, e-health and health care policy makers and nursing management will be will be eligible for participation is voluntary , there will be no cost for participation .	
2. Purpose of the research study:	(2) الغرض من إجراء الدراسة البحثية (قدم وصفا موجزا عن الغرض من إجراء هذه الدراسة).
The aim for conducting the research is to evaluate an e-learning model for e-health education that can be used as a platform for e-health education, Continuing Professional Development (CPD) as pre-requisite for medical registration in the developing countries . **Specific Objective:** The model to be evaluated in this study is built on results of three previous studies to aimed to assess nurses readiness to e-health deployment in nursing practice in Jordan and Qatar and analysis of nursing curricula for e-health education .	HMC Research Committee *Approved* Approval Date : 1/10/12 Expiry Date : 30/09/13

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3. Description of the procedures that will be followed during the research: Questionnaire consists of two sections section A General Information including current job title and name of the department and section consists of 19 statements where will indicate to what extent he/she agrees or disagrees on scale of 5 (1=strongly agree, 2=Agree, 3=Neutral, 4=disagree and 5=strongly disagree), Statistical Package for Social Sciences (SPSS) software will be utilized to analyze data .	(3) شرح الاجراءات التي يتعين استخدامها فى الدراسة (أشرح بإيجاز الاجراءات المطلوبة والمتعلقة بالدراسة. قدم شرح وجيز عن كيفية التعامل مع المعلومات المتحصل عليها. وصف كافة الإجراءات البديلة أو خيارات العلاج المتاحة و غير المطروحة في الدراسة البحثية والمحتملة للمشارك بحيث تتوفر حرية إختيار المشارك لإسلوب العلاج البديل. MC Research Committee Approved val Date : 1/10/12 Date : 30/09/13
4. Description of any foreseeable risks or discomforts to the participants The study will not include collecting any sensitive issues or identifying data from the applicants risks are not expected .	(4) وصف المخاطر والإزعاج الذي قد يتعرض لهما المشارك: (صف مخاطر الإجراءات المتخذه و أي إزعاج فيزيولوجي, نفسي أو إجتماعي قد يتعرض له المشارك بسبب مشاركته في الدراسة و أين يمكنه الحصول على المعلومات في هذا الجانب).
5. Description of any benefits to the participant or to others which might be reasonably expected from the research: The study findings can be utilized by policy makers to be integrated into medical education model implemented in the national institutions .	(5) شرح الفوائد المتوقعة من البحث لصالح المشارك بالدراسة أو لغير المشاركين (وصف بإيجاز وبدون تحيز للفوائد المتوقعة المباشرة أو غير المباشرة والمترتبة للمشارك بهذه الدراسة).

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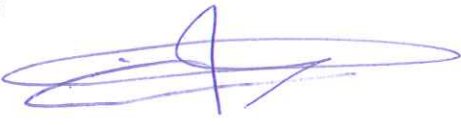|	
6. Confidentiality : The study will not include any identifying information from the participant questionnaire is anonymous the data collected will be used for study purpose and will be kept secured in safe place for 5 years or as recommended by MRC.	(6) السرية: (صف خطوات حماية سرية البيانات، العينة المختبرية أو أي نتائج أخرى من شأنها الكشف عن هوية او اسم اى مشارك بالدراسة).
I, Rasmeh Al-Huneiti-- have fully explained to Mr. / Mrs. ----------------- the nature and purposes of the above describe research project. I believe that he/ she understands the nature, purpose and risks of the study. I have also offered to answer any questions relating to this study that he/she might have and I declare hereby that I have completely and fully answered all such queries.	أقر انا _____ بأني قدمت الشرح الوافى والمستفيض للسيدة/السيد _____ وذلك عن طبيعة ودوافع دراسة البحث المنتظرة. وبحسب الشرح الوافى والمستفيض، أعتقد أن السيدة/السيد قد فهم طبيعة ودوافع البحث وكذلك ما يمكن أن ينجم من اخطار نتيجة مشاركتهم بالبحث. كما أقر بأنني قد قمت بطرح إستعدادى للإجابة عن كل الاسئلة والاستفسارات الخاصة بالدراسة والبحث. وبموجب ذلك اكون قد إستوفيت الشرح الكامل للبحث المنتظر واجبت عن كل ما يمكن أن يطرح من سؤال او إستفسار.
Signature of the person obtaining the consent:	توقيع الشخص طالب الموافقة

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Name of the person obtaining the consent:	إسم الشخص طالب الموافقة:
Rasmeh Al-Huneiti	
Date:Sept.11, 2012	تاريخه:

Note : Waiver of signed informed consent or informed consent is given to prospective studies in the situations given below:

1. That the only record linking the participant and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. (When the Research Committee waives the requirement for documentation of consent under this condition, each participant must be asked whether he/she wants documentation linking him/her with the research, and the participant's wishes will govern.)

2. That the research presents no more than minimal risk or harm to the participants and involves no procedures for which written consent is normally required outside of the research context.

It could be used in situations such as the ones given below:

1. For researches which involve drawing of additional blood samples when blood is already being obtained for clinical purposes or during blood donations
2. For researches which involve sampling of additional bodily secretions when such secretions are already being sampled for clinical purposes
3. For researches that involve no more than minimal risk of harm to the participant and the research does not involve any intervention/procedure/invasion of privacy of the participant
4. For qualitative researches like surveys using

ملاحظة : تخويل موافقة خطية / لفظية / شفوية وذلك بغرض إجراء دراسة بحث طبى أو الموافقة الخطية للابحاث السريرية في مؤسسة حمد الطبية , لا تعطى إلا للدراسات المستقبلية في الحالات الواردة أدناه :

1. ان تكون هذه الموافقة هي حلقة الوصل بين المشارك و البحث و ان الخطر الرئيسي سيكون الأذى نتيجة خرق الخصوصية. (عندما تخول لجنة الابحاث الى طلب لهذا المستند, في هذه الحاله يتم سؤال المشارك ان كان يرغب في مستند يصل بينه و بين البحث و رغبة المشارك لها الأحقية.)

2. ان يقدم البحث أقل مخاطر أو أذى للمشارك و ان لا يحتوي على إجراءات تتطلب الموافقة خارج إطار البحث ذاته.

كما يمكن استخدام هذه الموافقة لإحدى الحالات التالية:

* للأبحاث التي تتضمن سحب عينات إضافية اخرى غير التي سحبت للأسباب السريرية , أو عند التبرع بالدم .

* للأبحاث التي تتضمن أخذ عينات إضافية من جسم المريض كإفرازات غير التي سحبت للأسباب السريرية .

*للأبحاث التي يكون الأضرار والأذى المتسبب من هذا البحث طفيفة , على ان لايكون للبحث صلة بالإجراءات المطلوبة الأخرى.

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questionnaires or interviews with participants.	* للأبحاث النوعية, الاستبيانات و المقابلات .

HMC Research Committee
Approved

Approval Date : 1|10|12

Expiry Date : 30|9|13

Dear Sir/ Madam,

Many thanks for helping us in participating in this part of the study which aims to:

"Investigate *the knowledge, experience & comprehension of e-health among nurses to evaluate their readiness to (e-health[1])*"

Please be sure that all information obtained from this study will be kept confidential and it will be only used for academic purposes. However should you need to know the outcomes of the study, we will be very happy to let you know.

If you have any further enquiries please do not hesitate to contact me .

Sincerely yours,

Rasmeh Al-Huneiti
rasmehalhuneiti@yahoo.com

1. Demographic Details:

---

[1] E-Health: an overarching term is used to describe the
application of information and communication technologies in the health sector. It encompasses a range of purposes from purely administrative through to health care delivery.

A-Gender

Male ☐   Female   ☐

B-Age (year)   25< ☐ 25-34 ☐ 35-50 ☐ >50 ☐

C- Nationality …………..

2. Qualification Educational background
A. Bsc nursing ☐ diploma in nursing ☐ Master in Nursing ☐
   Post basic diploma in nursing   ☐ PhD in nursing ☐   others specify ……

B. Where did you study nursing (country)? ……….

C. What was the medium of instruction ?……….

D. Did your study involve the use of computers and information and communication technology like e-learning web-learning etc?
 Yes ☐   No ☐

3. Professional Nursing Experience:
A. Post graduation Experience (year).
0-4 ☐   5-9 ☐   10-19 ☐   20+ ☐

B. Area of practice/ sector:
  Public health facility ☐   Private health facility   ☐

4. IT skills:

A- Do you have a computer at home?
Yes ☐   No ☐

B- Do you have access to a computer at work?
       Yes ☐   No ☐

C- Do you feel confident using computer:
       Yes ☐   No ☐
D- Have you ever attended formal computer training?
       Yes ☐   No ☐
E. Are you confident in connecting different peripherals to your computer such as (digital cameras, microphone, speakers…etc)
       Yes ☐   No ☐

5. Knowledge in e-health:

A-Have you ever heard about e-health?
Yes ☐ No   ☐

B- Do you consider yourself having fair knowledge in e-health:

Yes ☐ No ☐

C-Have you ever been exposed to e-health education in your study?
  Yes ☐   No ☐

D-Have you ever been exposed to e-health at work?
  Yes ☐   No ☐

E-Have you ever read some literature on e-health?
  Yes☐   No☐

F-Have you ever attended any seminaries / Workshops on e-health?
  Yes ☐   No ☐

G-Which communication technique/s do you use for e-health

A	Internet	Yes ☐	No ☐
B	Videoconferencing	Yes ☐	No ☐
C	Email	Yes ☐	No ☐
D	Telephone/ Cell Phones	Yes ☐	No ☐
E	Storage devices (CD, Memory Sticks…etc)	Yes ☐	No ☐

H- What do you consider e-health is relevant to?

A	Clinical practice	Yes ☐	No ☐
B	Health management	Yes ☐	No ☐
C	Administration	Yes ☐	No ☐
D	Research	Yes ☐	No ☐

I- Tick whatever you think is a barriers to acquire knowledge & skills in e-health :

A	Lack of education in health.	Yes ☐	No ☐
B	Lack of time	Yes ☐	No ☐
C	Lack of guidance/ IT support	Yes ☐	No ☐
D	Lack of incentives and support from management.	Yes ☐	No ☐
E	Lack of access to appropriate technology	Yes ☐	No ☐
F	Poor relevant infrastructure	Yes ☐	No ☐
G	Fear of using new technology	Yes ☐	No ☐
H	Lack of awareness of e-health importance	Yes ☐	No ☐
I	Lack of available flexible training program	Yes ☐	No ☐
J	Low level of English language	Yes ☐	No ☐
K	Low level of computer literacy	Yes ☐	No ☐
L	Fear of medical data security and privacy	Yes ☐	No ☐

6. Relevance of e-health to Nursing Profession:

A-Do you consider e-health important to nursing profession?
Yes ☐   No ☐

B- The e-health activities are often used in my department?
Yes ☐   No ☐

C-Do you believe there is a potential for using e-health in Nursing field?
Yes ☐   No ☐

D-Do you believe that e-health could improve nursing practice?
          Yes ☐   No ☐

E- Do you believe it would be beneficial to develop knowledge and skills in e-health in order to improve the services you are providing?
          Yes ☐   No ☐

7. Use of the internet / e health

A-Do you have convenient access to the internet at home?
          Yes ☐   No ☐

B- Do you have convenient access to the internet at work?
          Yes ☐   No ☐

C-Do you use the internet regularly?
          Yes ☐   No ☐

J-Which of the following Telemedicine / e health applications that you use at work?

A	Obtain lab results via the internet/intranet	Yes ☐	No ☐
B	Making out patients' appointments	Yes ☐	No ☐
C	Transmission of ECG	Yes ☐	No ☐
D	Transmission of X-rays	Yes ☐	No ☐
E	Transmission of still images	Yes ☐	No ☐
F	Teleconferencing by phone	Yes ☐	No ☐
G	Video conferencing of consultation health professionals	Yes ☐	No ☐
H	Video conferencing for education	Yes ☐	No ☐
I	Monitoring patients at home	Yes ☐	No ☐

8- Opinion towards e-health education
A- Are you interested in learning more about e-health?
Yes ☐   No ☐
B- Do you think that e-health should be a pre-requisite for nursing registration?
Yes ☐   No ☐

 C- Do you support that e-health should be included in nursing postgraduate programs?

Yes ☐   No ☐

D- What is your preferred   mode of learning?

A	Face to face lectures only	Yes	☐	No	☐
B	Web based learning only	Yes	☐	No	☐
C	A blend of the above two modes	Yes	☐	No	☐

thank you.

Dear participant,

The aim for conducting the research is to evaluate an e-learning model for e-health education that can be used as a platform for e-health education, Continuing Professional Development (CPD) as pre-requisite for medical registration in the developing countries .

The research started by analysis of nursing curricula from several countries to evaluate whether nurses are trained for the concept of e-health education and their contents of ICT and e-health/ e-nursing courses. then two investigations/ studies were conducted one in GCC country (Qatar)were the vast majority of nursing force is internationally recruited and a non -GCC country(Jordan)were nursing force is nationally trained to assess the readiness of nursing community for e-health deployment in nursing practice and to identify the major challenges facing e-health deployment in order to be considered in the proposed model .

findings showed that there were no evidences of the introduction of the concept of e-health /e-nursing as such in any of the curricula studied only basic computer and fundamental courses were included. moreover nurses lack the necessary knowledge towards e-health processes and applications also they are ill-prepared for e-health deployment and the top challenges facing e-health implementation are of educational related aspect this can be attributed to lack of formal e-health education .

The model has emerged after the conducted studies which revealed number of issues affect e-health deployment . These findings have been analysed and translated into sets of requirements, general and specific requirements which the model intends to satisfy them. The general requirements are ; to be satisfied by the whole architecture of the model, while the specific requirements are to be satisfied by the specific elements within the model.

Hence, the outcome from studies justifies the need to establish an educational framework for e-health deployment since e-health is an opportunity to improve efficiency, reduce costs, facilitate communication and enhance patient care.

Now the purpose of this questionnaire is to validate the model which has been conducted before we adopt the final form.

The figure (annexed)illustrates the proposed model for e-learning for e-health in developing countries .

In addition, the table below illustrates requirements which were mentioned earlier in more details and how they are represented in the model.

Number	Requirements	Description
1	Should enable flexible and educational learning.	The model should be done in a way to allow nurses to access learning materials from anywhere and during flexible times to suit their needs i.e. anytime, anywhere.

2	Easy to implement with an affordable cost.	The model should be accomplished in a way that can be implemented easily with an affordable cost.
3	Can be integrated as part of the national nursing education program.	The model should be done in a way that can be aligned easily within universities education or/and part of continuous professional development.
4	Can enable pre-arrival training for international nurses.	The model should be designed to accommodate international nurses, pre-arrival training awareness and can be accessed from their home countries.
5	Can be integrated within nurses' medical registration system.	The model should be done in a way that can be part of all the stages of the medical registration system as part of quality assurance measures.
6	Can narrow any gap in ITC Literacy.	The model should emphasize the fact that nurses have been undergo through the sufficient training on ICT.
7	Should enable continuous support and update on ICT innovation.	The model should be done in a way to enable nurses to request any help that they might need related to ICT. In addition it should allow them to be up to date with any new ICT that might be an impact on e-health systems/applications .
8	Should involve different health care departments and other bodies/agencies (for example universities, staff development in a collaborative approach.	The model should be done to allow all health care departments and other bodies/agencies in e-health education to work together, an integrated based Model.
9	Should have common setup/style to the actual e-health system.	The model should allow the delivery of e-health education/training using the common platform like e-learning.
10	Can be integrated within health care continuous professional development.	The model should be done in a way that can be easily adapted as part of the continuous professional development programs .

Table 1: Model Requirements

Participation in this study is voluntary and the information you give will be entirely confidential and will not be shared with any people not directly connected with this research. Please answer honestly and as accurately as much as you can. Your contribution is much appreciated.

Thank you very much for your assistance and co-operation.

Rasmeh AlHuneiti

rasmehalhuneiti@yahoo.com

Section A: General Information

1. Your **current job title**......................................
2. Name of your department ....

Section B: In the following section, please indicate to what extent you agree or disagree the following statements regarding on scale of 5 (1=strongly agree, 2=Agree, 3=Neutral, 4=disagree and 5=strongly disagree), please answer the following questions based on your own opinions and experience (circle the appropriate number).

1. Using the proposed model provides a flexible educational/training platform for promoting e-health/e-nursing education and awareness.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

Any suggestion please
....
....

2. Using the proposed model takes into consideration the different levels of ICT skills.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

Any suggestion please

....
....

3. The proposed model can be easily implemented within national e-health strategy.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

Any suggestion please
....
....

4. Using the proposed model will help in enforcing nursing medical registration system.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	2	3	4	5

Any suggestion please
....
....

5. The proposed model can be easily integrated within nursing education/training programs.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
     1   2   3   4   5

Any suggestion please

....

....

6. The proposed model can be integrated   and used within the staff development and national training programs.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
     1   2   3   4   5

Any suggestion please

....

....

7. Using the proposed model can help in hindering most of the challenges facing e-health/e-nursing adaptation and deployment.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
     1   2   3   4   5

Any suggestion please

....

....

8. Using the proposed model can easily be used as a pre-arrival educational platform for international workforces.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
     1   2   3   4   5

Any suggestion please

....

....

9. Having e-learning courses within the model will contribute to ease understanding and the use of e-health/e-nursing systems. (As both of these deals with electronic content)

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
     1   2   3   4   5

Any suggestion please

....

....

10. Using the proposed model will enable learners to acquire knowledge in the time of their choice and pace .

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
     1   2   3   4   5

Any suggestion please

....

....

11. Using the proposed model helps in the future promotion of e-health/e-nursing and other subjects for further learning.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
     1   2   3   4   5

Any suggestion please

....

....

12. Using the proposed model enables and supports better monitoring and tracing nursing staff learning in e-health and other subjects.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
    1   2   3   4   5

Any suggestion please

....

....

13. Using the proposed model helps in improving the general performance in health care sector.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
    1   2   3   4   5

Any suggestion please

....

....

14.Using the proposed model helps in building capacity of health practitioners without disturbing the work/ service .

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
    1   2   3   4   5

Any suggestion please

....

....

15.Using the proposed model is cost effective .

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
    1   2   3   4   5

Any suggestion please

....

....

16. Using the proposed model helps healthcare practitioners to maintain competency and to fulfil Continuing Medical Education (CME) requirements.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
    1   2   3   4   5

Any suggestion please

....

....

17.Using the proposed model can easily be used as a platform Continuing Professional Development (CPD) in health sector.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
    1   2   3   4   5

Any suggestion please

....

....

18.Using the proposed model enhances evidence-based practice in health field .

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree
     1   2   3   4   5

Any suggestion please

....

....

Thank you

Questionnaire

E-learning for forcing E-health System

My name is Rasmeh Al-Huneiti, PhD Student at Brunel University, conducting this study part of my Research project .

Many thanks for taking parts in this study which is aimed to investigate the possibility of implementing the E-learning system as a solution to educate nursing community on E-health systems as well as to foster its adaptation.

E-health definition:

"E-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology".

http://www.jmir.org/2001/2/e20/
[Eysenbach, 2001, adapted by Pagliari et al, 2005].

E-learning definition:

"Education via the Internet, network, or standalone computer. e-learning is essentially the network-enabled transfer of skills and knowledge. e-learning refers to using electronic applications and processes to learn. e-learning applications and processes include Web-based learning, computer-based learning, virtual classrooms and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM.
E-learning was first called "Internet-Based training" then "Web-Based Training" Today you will still find these terms being used, along with variations of e-learning such as elearning, Elearning, and eLearning".

http://www.webopedia.com/TERM/E/e_learning.html
[Source: Learnframe: e-Learning Management System]

Kindly after my demonstration fill in the attached questionnaire.

Please note that ;
- - You have the full right to withdraw from participating in this study at any point.
- - No personal information will be taken and the data of this study will be only used for academic purposes.

If you have any quires please do not hesitate to contact me on my email:Rasmeh.Al-Huneiti@brunel.ac.uk. or by phone: +97466190008.

Sincerely yours Rasmeh Al -Huneiti
Email: Rasmeh.Al-Huneiti@brunel.ac.uk

Gender: **Male   Female**

Qualification: High School   Diploma   BSc   Ms   PhD
Nationality:

Question	Agree	Strongly agree	Nether Agree/Disagree	Disagree	Strongly disagree
The proposed E-health system can provide me with flexibility to learn with my own learning style					
The proposed E-health system can be used in my own time in different places (anytime, anywhere)					
I can easily use the system with my currant computer skills					
I'm happy to use the system with courses / training related to my personal (staff) development.					
I'm happy to use the system with courses / training as pre-requisite for medical registration					
I'm happy to use the system with courses / training as part of my undergraduate or postgraduate nursing education					
There are similarities between E-learning and E-health systems					
Learning about E-health/E-learning can help me to understand the topic easily					
The system can be used easily for international nursing staff to learn before their arrival (part of pre-arrival)					
I can use the system fully to learn without the need for face to face teaching (when it is not possible to do face to face classes)					
The system can be a good platform for national training and staff development situation for health care work forces					
In general the system is very good can very easy to implemented					

All the questions are easy to understand and answer	yes	No
If No please list which one is not clear		

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-
-

List of Publications:

- **R. Al-Huneiti**, Z. Hunaiti, E. Mansour and W. Balachandran, "Analysis and Integration of Nursing Education for e-health/e-nursing Components ", International Conference on E-Health & Telemedicine(ICEHTM), Nicosia - North Cyprus., 10-12 October 2011.

- **R. Al-Huneiti**, Z. Hunaiti, and W. Balachandran, "E-Learning in Relation to Healthcare", International Journal of Sciences: Basic and Applied Research (IJSBAR); 2014 (in press).

- **R. Al-Huneiti,** "E-Health Readiness and challenges facing e-health deployment in nursing: Jordan as a case study". School of Engineering and Design Research conference 2012 Brunel University UK.

- **R. Al-Huneiti,** "Attitude of Nurses towards E-Learning for E-health Education", School of Engineering and Design Research conference 2013 Brunel University UK.

- **R. Al-Huneiti**, Z. Hunaiti, M. Al Masarweh, E. Mansour and W. Balachandran." Integration of E-health Education in Undergraduate Nursing Curricula". (submitted)

- **R. Al-Huneiti**, M. Al Masarweh, Z. Hunaiti, E. Mansour and W. Balachandran. " Analysis of Nursing Curricula & E-health Strategies for E-health/E-nursing Education"(accepted)

- **R. Al-Huneiti**, A. Masaeed, Z. Hunaiti , E. Mansour and W. Balachandran. "Nursing Attitudes towards E-Learning for E-health Education". (To be submitted).

- **R. Al-Huneiti**, B. Alfawaz, Z. Hunaiti , E. Mansour and W. Balachanrdan. "Online Learning Model for e-health Education in Developing Countries" (To be submitted).