EHEALTH COMPETENCIES NEEDED TO PROVIDE NURSING CARE TODAY AND IN THE FUTURE

TIIVISTELMÄ

Sähköiset terveydenhuoltopalvelut ovat muuttaneet nykyajan hoitotyön toteuttamista Suomessa parantaen sekä tehokkuutta, saatavuutta ja hoidon laatua että vähentäen kuluja. Samalla ne jatkuvasti määrittelevät uudelleen sairaanhoitajien roolia ja kompetensseja hoitotyössä tänään ja tulevaisuudessa. Sähköistä terveysteknologiaa voidaan pitää tehokkaana vain jos sairaanhoitajilla on vaadittava pätevyys hoitotyöhön ja hoidon tarjoamiseen sähköisessä terveyspalveluympäristössä.
Tutkimuksen tavoitteena oli täten tunnistaa taitoja, joita sairaanhoitajat voivat kehittää ylemmän asteen koulutuksen kautta kyetäkseen tarjoamaan hoitoa potilaille sähköisessä terveyspalveluympäristössä nyt ja tulevaisuudessa, ja uuden tiedon ja käytännön sovelluksia.Tämä tutkimus on osa korkeamman sähköisen terveydenhuollon sairaanhoitotutkinnon opetussuunnitelman kehitysprosessia Lahden ammattikorkeakoulussa.

Tutkimuksessa käytettiin laadullista tutkimussuunnittelua hoitajien kokemusten kartoittamiseen. Osallistujien valinnassa käytettiin teleologisen otantamenetelmää. Tiedonkeruussa käytettiin puolistrukturoituja henkilöhaastatteluja. Osallistujia oli 15. Heidät valittiin Keski-Suomessa sairaanhoitajina työskentelevästä väestöstä. Tiedonkeruun jälkeen induktiivisen sisällön analyysin apuna käytettiin laadullisen analyysin ohjelmisto Nvivo 11:ta. Tutkimuksessa tunnistettiin neljä sähköisen terveydenhuoltopalvelun osaamisaluetta, jotka ovat tiedonhallinta, tietotekniikka, viestintä ja etiikka ja joihin liittyy 14 muuta taitoa. Nämä osaamisalueet edustavat selkeästi nyt ja tulevaisuudessa tarvittavia sähköisen hoitotyön perusvalmiuksia.

Tutkimus osoitti vahvemman yhteyden näiden neljän osaamisalueen ja parempilaatuisten hoitotyön palveluiden, paremman potilasturvallisuuden, paremman tietojen ja palvelujen saatavuuden, inhimillisten virheiden aiheuttamien haitallisten vaikutusten vähentymisen, hoitotyön suorituskyvyn ja tulosten parantumisen ja hoidon, innovaatioiden, tutkimuksen ja yhteistyön jatkuvuuden kanssa. Joten sähköisen terveydenhuoltopalvelun osaamisalueet tulisivat juurtunut uudessa sähköisen terveydenhuoltopalvelun opetussuunnitelmissa, jotta korkeamman terveydenhuollon tutkinnon suorittaneet ovat päteviä ja valmiita kohtaamaan sähköisen terveyspalveluympäristön dynaamiset ja monimuotoiset haasteet.

Asiasanat: Sähköiset terveyspalvelut, terveysosaaminen, hoitotyö, hoitotyön osaaminen, mobiiliteknologia, asiantuntijasairaanhoitaja

Lahti University of Applied Sciences
Master's Degree in Social and Health Care Development and Management

ALUOCH, ERNEST: EHealth nursing competencies needed to provide care
                     today and in the future
86 pages, 13 pages of appendices

Autumn 2016

ABSTRACT

EHealth services have metamorphosed the provision of nursing care today in Finland, boosting efficiency, availability, quality of care and reducing costs while continuously re-defining the roles and competencies of nurses in providing care today and into the future. The use of eHealth technologies in nursing care can only be deemed effective, if nurses have the required competencies to be able to operate and provide care in an eHealth environment.

The aim of this study was to identify nursing competencies which can be developed by nurses through a higher educational training to enable them to provide nursing care to patients today and in the future working in an eHealth environment. While generating knew knowledge and practical applications for the development of a new eHealth master's degree programme by Lahti University of Applied Sciences.

This study adopted qualitative research design to explore the experience of nurses. A maximum variation purposive sampling technique was used in identifying the participants to be included in the study. Semi-structured face to face interviews, were used to collect the data, in which 15 participants participated.

Participants were sampled from a population of registered nurses working in in the central region of Finland. After the data collection process, inductive content analysis as a tool, assisted by qualitative analysis software Nvivo 11, was used to analyze the data. The study identified four main eHealth nursing competencies that include, Knowledge management, Informatics, Communication and Ethics, with an array of fourteen other related skills. These competencies represent squarely the fundamental eHealth nursing skills needed today and for the future nursing care needs.

The study demonstrated a stronger link between these four main competencies and better quality nursing care services, improved patient safety and accessibility of information and services, reduced adverse effects caused by human errors, improved nursing performance and outcomes, a guaranteed continuity of care, innovation, research and collaboration. Thus, these eHealth competencies should be entrenched in the new eHealth curriculum to enable advanced nursing graduates to be competent and ready to face the dynamic and complex challenges and new roles in eHealth nursing care environment.

Keywords: EHealth, health literacy, nursing care, nursing competency, advance nursing, mobile technology

APPENDIX 1. Interview question guide

APPENDIX 2. Consent form and letter of information

APPENDIX 3. Themes and representative quotes identified in the analysis

FIGURE 1. Lily Model

FIGURE 2. Timelines for Finnish Healthcare ICT Standardization

FIGURE 3. Education system in Finland

FIGURE 4. Ehealth competencies identified in the study

FIGURE 5. Brief summary of new knowledge developed by the study

1   INTRODUCTION

Electronic healthcare service (eHealth), is a dynamic and an ever expanding field in healthcare delivery systems in Finland today, (Ministry of Social Affairs and Health 2013, 15). The introduction of information and communication technologies in healthcare delivery systems has revolutionized the meaning and the concept of nursing care, to an even wider dimension (Monkman & Kushniruk 2015, 542).

EHealth related technologies have taken root in the provision of nursing care today in Finland. They have become a daily norm in the delivery of nursing care services, boosting the efficiency, availability, costs, quality and safety of care, while continuously re-defining the roles and competencies of nurses in providing nursing care today and into the future. (Finnish Nurses Association 2014.)

In the recent past, Finland has witnessed a gradual and steady rise of eHealth applications and services in nursing care. For example telenursing care, which has substituted face to face nursing visits by nurses to clients, with telephone consultations, (Finnish Nurses Association 2015, 4; Karhula et.al 2015.)

 In addition to that, mobile technology devices have been used by nurses to monitor vital signs remotely and transmit data to nurses and other healthcare practitioners, for real-time action (Doctagon 2016). Other examples includes, tracking devices installed in elderly citizen's homes to monitor movements and activities, designed with alarms systems, that alert nurses in case of a problem, and smartphone applications, just to name but a few of these eHealth applications. (High-tech Finland 2015; Smart Ageing Network Finland 2011.)

Furthermore, the availability of national electronic patient records, electronic prescription and electronic archive platforms in Finland, that are accessible by both healthcare professionals, and citizens alike, has boosted the accessibility and availability of crucial healthcare information (Kanta 2015a). This list of service delivery systems will continue to grow into the future, with the view of effectively meeting the challenges and demands of nursing care and healthcare delivery in Finland (Finnish Nurses Association 2014).

The use of eHealth technologies in nursing care can only be deemed as effective if nurses have the required competencies to be able to operate and provide nursing care in an eHealth environment. Therefore, nurses need to gain, further knowledge and skills through higher educational training to nurture these competencies. (Booth 2006; Stellefson et.al 2011; Sharma & Clarke, 2014, 164; Ahonen et.al 2016, 203-207.)

The provision of nursing care today is undergoing a constant metamorphosis. The dawn of eHealth services has accelerated the access and availability of care services and information to patients. Thus, nurses need to advance their eHealth competencies to match with the dynamic pace of nursing care provision in this eHealth era and into the future. (Finnish Nurses Association 2015, 4.)

Previous studies have highlighted the significance, for nurses and other healthcare practitioners, to improve their eHealth skills through higher education training. This is with the view of effectively operating in the ever dynamic eHealth environment. (Norwegian Nurses Organisation, 2013, 15-16; Barakat et.al 2013, 1; Doswel et.al 2013, 103-107; vanHouwelingen et.al 2015, 50-62; Finnish Nurses Association 2015, 4-5; Alpo et.al 2016, 127-136.) Moreover, the Finnish Nursing Associations (2015, 7) eHealth strategy 2015-2020, also suggests that nurses need training to acquire the right competencies, in areas of informatics and media literacy among others competencies.

With the rising need to improve eHealth nursing competencies through higher education for today and into the future, higher learning educational institutions in Finland should take the lead, in fulfiling this demand. This research, will therefore explore the experiences of nurses working in Finland, in the contemporary eHealth settings, with the view of identify nursing competencies, which can developed by nurses through a higher educational training, to enable them to provide nursing care effectively to patients, today and in the future, and generate new knowledge and practical applications, for the development of eHealth nursing education.

2   NURSING CARE AND EHEALTH SYSTEMS IN FINLAND

2.1   Definition of key terms used in the study

EHealth (Electronic Health)

The World Health Organization (2016), defines eHealth as: -

The transfer of health resources and health care by electronic means. Encompassing, the delivery of health information, for health professionals and health consumers, through the Internet and telecommunications. Using the power of IT and e-commerce to improve public health services, e.g. through the education and training of health workers, and the use of e-commerce and e-business practices in health systems management.

 EHealth Literacy

Norman & Skinner (2006b), defined eHealth 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.

Gilstad (2014, 69), further defined eHealth literacy as a: -

The ability to identify and define a health problem, to communicate, seek, understand, appraise and apply eHealth information and welfare technologies in the cultural, social and situational frame and to use the knowledge critically in order to solve the health problem.

Nursing Competence

This can be defined as the expected knowledge and skills, including personal attribute and judgement skills, which a nurse need to possess, in order to perform their duties, to the required level safely and efficiently. (American Nurses Association 2013, 240-246; Oxford University Online Dictionary, 2016.)

Mobile technology

Mobile technology can be described according to this study, as those technological gadgets, that employ the use of sensors and wireless network, usually adorned or carried or can be easily accessed by the user(patient) while they carrying out their activities of daily living. This is with a goal of monitoring,

their health and wellbeing and providing necessary information. (Doswel et.al 2013, 99.)

Advance Nursing

A Nurse Practitioner/Advanced Practice Nurse is a registered nurse who has acquired the expert knowledge base, complex decision-making skills and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice. A master's degree is recommended for entry level (International Council of Nurses 2001 – 2016.)

Nursing Care

Nursing care refers to a purposeful activity and emotional state that outlines the relationship between a nurse and a patient that focuses on holistic of individuals, families and communities. It focusses mainly on humanism, helping the patient to be in synch with their mental, physical, social health. (Leininger 1991, 35; Watson 1988, 175 -181.)

2.2   Overview of nursing in an eHealth environment

The speedy application of eHealth systems and the continuous advancement of technologies in healthcare delivery systems in the contemporary nursing care setting, has overridden the age of empirical knowledge seeking, that nursing care is founded on. This has transformed the concept of holistic care to the next platform of virtual care, which demands that nurses be equipped with the right competencies, in order to deliver the much needed care and information. (Sharma & Clarke, 2014, 164; van Houwelingen et.al 2015, 47-56.)

Nursing care, is largely dependent on the availability of information that is crucial in making decisions. Nursing processes are based on knowledge and information management, being able to obtain and disseminate information is key to patient care and safety. (Vinson et.al 2011, 265-275.) Nurses who have the required competencies, are be able to collect, analyse, interpret and disseminate health

information to patients, efficiently and effectively to fulfil the nursing care demands in the eHealth environment. (Whittaker et.al 2015, 2).

Nursing care for ages, has been associated with the practice of the nurse being physically present and engage in assessing the patient, creating a bond and trust that the care process is built (Nagel et.al 2013, 104-110). This, has today proved not to be cost effective and efficient, given the challenges of time and resources (both human and economic resources), and the need to access care among other challenges. (Pare et.al 2007, 270-275; Polisena et. al 2009, 339-349; Vinson et al. 2011, 265-275.)

However, the era of eHealth has replaced the physical presence of a nurse with that of technology. Nurses have continued to provide holistic care through the use of technological gadgets such as remote controlled video conferencing, remote monitoring gadgets, smart home solutions, and robots, among other modes of technologies adapted in Finland today to provide nursing care. (Meedoc 2016.)

Telenursing has been proved through studies to have the potential limit the nurse's ability to carry out, proper assessment of the patient condition, necessary to provide accurate nursing diagnosis. This is due to lack of physical presence and dependence on the quality of the technological gadgets used, for example cameras, video or audio equipment's. (Nagel et. al 2013. 105.)

Nursing care, demands that nurses need to be well acquainted with their patient, to be able to draw an effective care plan and initiate interventions, while incorporating patient's goals and working together to achieve the desired targets (Burton & Ludwig 2014, 66). Training nurses to achieve the desired competency levels will go a long way in incorporating eHealth into nursing interventions.

Nursing care is not merely a process whereby nurses provide holistic care and information to the patients on ways of taking care of their ailment and staying healthy, but also, process of enhancing the patient's ability to take care of themselves safely and effectively (Bastable 2006, 11- 154). The entire focus here is the patient, who plays the central role in the whole care process. Patients are seeking information that is necessary for them to take responsibility of their

health, improving their competencies in managing their own health status, and to make informed decisions and choices. (Perry et.al 2012, 10.)

Nursing care in the eHealth environment today is based on the diverse, rich and more accurate patient information, which is collected, exchanged, analyzed and distributed through an array interconnected systems, networks and devices. This has greatly improved the monitoring, managing, preventing and caring for patients with chronic ailments, more efficiently and effectively. (Care et.al 2010, 238-245; Doctagon 2016.)

Information has been described as an essential tool in care and recovery process for patients. Well informed patients tend to improve the quality of their lives, by making informed choices, they are able to continue with the care processes initiated at the hospital well after getting discharged, and are less anxious of their care process and more satisfied. (DeMarco & Nystrom 2009, 15.) This is due to the fact that they are more independent and feel empowered to manage their conditions and reduce complications. (Bastable 2006, 11-154.)

Nurses providing care in an e-health environment are still obliged to be compassionate, caring, and knowledgeable and provide safe practice, as they go through their daily pursuits. The holistic care process, demands that they need to develop a care relationship with the patient. (Burton & Ludwig 2014, 118.)

The nature of technology used, dictates the type of information that the nurses and the patients can receive and relay, if an appropriate mode has been chosen by either of the parties involved, the information gathering and relaying may not provide effective and proper care. For example, a patient who chooses to consult a nurse about a wound through a call, may not be able to get a proper assessment as compared to one, who a video conferencing mode to consult. (Care et.al 2010, 238-250.)

The future of providing nursing care in an eHealth environment is set to be a challenging and demanding prospect for nurses. This is based on the dynamic changes that are taking place in the healthcare delivery sector that has been brought about by healthcare reforms, effects of globalization, technological

advancements, and the active role that the patients have taken in determining their health. (Ministry of Social Affairs and Health 2011, 5.)

2.3   The need to educate nurses on eHealth

The goal of eHealth services in nursing care, today and in the future, is to boost service delivery, by making information easily accessible and interactive. This is with a view of making the patients more informed, care services more ed, to enable them manage their ailments. However, not all nurses have the required competencies to provide care in the dynamic and ever changing field of eHealth. (Pare et al. 2007, 270-273; Norwegian Nurses Organization 2013 -2016.)

Patients today, are striving hard to get information about their health through different sources and means such as the internet, phone applications, and health related monitoring gadgets, that are essential to keep them healthy and active (Xiao et. al 2014, 417-427). Now more than ever, there is rising need for patients to access information and services that help them to improve the quality of health and wellbeing, cutting down on costs, sustaining health and welfare services. (Finnish Nurses Association 2015, 7-32).

As global population continues to grow older, and the rate at which chronic diseases have increased in the recent past, there is a need to replace the workforce, make services efficient, cost effective, personalized and accessible. In order to achieve this and minimize the effect of the shortfall of trained workforce in healthcare systems, and costs, eHealth services have continued to take root and fill the void (Gilstad 2014, 8- 9.)

In the contemporary healthcare setting, patients are worried about the cost, quality and accessibility of care services and information. On the other front, health care systems today are strained of resources and facilities to cater for patient hospitalizations. New developments and care methods have sprung up, that tries to encourage the patients to manage their diseases at home. (Allison & Smith 2013, 14.)

The duration of in-patient stay in hospital today, has drastically reduced, as patients are discharged earlier go to home to recuperate, where they need much information and guidance from nurses to recover. (DeMarco & Nystrom 2009, 15-23.) Patients who used eHealth services in Finland, according to Hyppönen et al (2015, 138), reported a 1.37 less visits to hospitals, due to the information gained, translating into about 700,000 visits and over seven million saving nationally.

Healthcare professionals today, are more concerned on how to make the care services cost effective, efficient, sustainable, and be able to deliver better services to meet the needs of clients today and in the future. They are concerned with how to create, distribute and manage patient information easily, securely, in the various multi-professional levels of practice, and build a sustainable and mutual client relationship. (Finnish Nurses Association 2015, 5-7.)

The incorporation of information and communication technologies in healthcare delivery today and in the future, is geared to satisfy the challenging demands of patients, their families, and that of the healthcare fraternity. The use of these technologies are intended promote health and wellbeing by empowering all stakeholders involved, through the promotion of wellness activities that help to prevent diseases and promote a healthy living and assist in managing ailments. (Varshney 2014, 20-35.)

The Finnish eHealth strategy 2020, intendeds to empower patients and healthcare practitioners, to seek and access information freely, enable the promotion of smart health solutions and gadgets, manage knowledge, protect data and cooperation among all eHealth players to better the health and wellbeing of all citizens. Finland today and in the future, will continue to face reforms, thus this will result into further expansion of e-welfare and eHealth in Finland. (Finnish Nurses Association 2015, 4-7.)

2.4   Benefits and challenges of eHealth in nursing care

In the wake of healthcare transformations and budget cuts in Finland, eHealth, has been in the forefront as an alternative in meet the ever demanding needs of the dynamic healthcare delivery. Through shaping and enabling efficient, cost effective, faster mode of retrieving and distributing healthcare information and care, that is essential for health and wellbeing. (Finnish Nurses Association 2014; Finnish Nurses Association 2015, 4-7.)

EHealth today in Finland, has given the patients the possibility to monitor and manage their chronic health conditions, personalized access to healthcare service and information, and reducing hospital and physician visits (Hyppönen et.al 2015, 133-138). It has enabled the elderly to stay longer at the comfort of their homes, while remaining independent and active assisted by medication remainders, sensors, and smart home solutions among other eHealth applications. (High-tech Finland 2015; Smart Ageing Network Finland 2011.)

Smart healthcare systems (mobile or phone applications technology and smart homes), have changed drastically the process by which nurses are able to accesses timely patient data, at their own comfort without having to be hospitalised. (Smart Ageing Network Finland 2011; Doctagon 2016; Meedoc 2016).

These systems provide patient centered nursing intervention and nursing care follow-up, network and communicate with patients, their families and other multi-professional teams. Thereby, boosting the efficiency, quality, safety and accessibility of care services and information, that is essential to health and wellbeing. (Finnish Nurses Association 2014.)

The availability of information increases the best nursing practices. EHealth, has the potential to increase in many folds' research in healthcare and social systems in Finland. This has been attributed to the timely data gathered from the patients and the entire care fraternity. This is information is usually essential in improving service delivery. (Hyppönen et.al 2015, 133-136.)

EHealth is a tool to promote better care opportunities, prevent diseases, and raise diagnostic levels to even greater depths. It is able to improve patient health literacy and reduce the inequalities experienced in many municipalities, in accessibility and affordability of services thereby cutting costs of care. (Finnish Nurses Association 2015, 4-7.)

With eHealth, patients are able to own information collected and share it at their own choice, with the healthcare practitioners (Kanta 2015a). Patients centered approach to e-health, has given the patients the ability to take charge of their care, be able to monitor and manage chronic illnesses, promote healthy living and above all reduce the burden in health care service delivery, due to the timely and trusted information (Finnish Nurses Association 2015, 4-7).

EHealth interventions such as electronic health records, e-archives and e-prescriptions, telenursing among other interventions in healthcare service provision is transforming the way by which nurses and patient gather and use information. This is due to the improved access to seamless flow of information, giving the nurse and patients, the possibility to source information from a multi-disciplinary field and departments that are essential in decision making. (Kanta 2015b; Finnish Nurses Association 2015, 4-7.)

 EHealth solutions have led to personalization of healthcare services, tailored to specific individual needs for the patients and care practitioners. Gone are the days when accessing personal healthcare data was a nightmare of shifting through a pile of folders in dusty archives to retrieve data. (Kanta 2015a.)

With the continuous and ever expanding array of benefits of eHealth systems in Finland, comes with a myriad of challenges for both the patients and healthcare practitioners. One of the continuous challenges for nurses is the issue of ethics and data protection. Nurses are continuously expected to protect and advocate for the patients' rights, safety, and data security, act according to the code of conduct and seeking consent from patients at all times. (Finnish Nurses Association 2014; Kanta 2015 a.)

It is important to note that while Finland continues to integrate healthcare and social systems into eHealth environment, ethical considerations, data security and patient's consent, will still continue to pose a challenge in accessing and delivery of eHealth services. Patient rights and confidentiality must be therefore observed, even while providing nursing care through eHealth platform. (Finnish Nurses Association 2014).

Due to the fast paced technological advancement in healthcare service delivery, issues of privacy and data protection will continue to be a challenge. This will require a quick and equal response from all quarters of both legal and policy development. (Finnish Nurses Association 2014).

In the contemporary healthcare and social services delivery systems, according to Hyppönen et al. (2015, 133), there several challenges to eHealth that includes, population growth, immigration, structural reforms and the growing expenditure in providing care. Furthermore, user's disability may limit access to computer, the interchanging of the physical presence of a nurse or a practitioner with that of technology is also a growing challenge.

Korhonen (2015, 7), further identified interoperability of the healthcare and social services systems, as a challenge to eHealth service delivery nationally. Interoperability, is whereby the systems that provide eHealth services to patients are synchronized to operate together seamlessly without service users having to rely on different systems to get service done, as healthcare data and information continue to grow. This will improve the accessibility of information, and patient safety. (Finnish Nurses Association 2014).

The list of challenges to eHealth nursing will continue grow in the future, hence the need for competent nurses. This can be attributed to the ever changing eHealth environment, which demands that nurses should adapt to new changes and ways of working. Moreover, for the patients, the challenge will still remain the ability to use the internet, smart systems and other forms of eHealth technologies effectively to their benefit. (Finnish Nurses Association 2015, 4-7; Hyppönen et.al 2015, 133-138.)

The future of eHealth services in Finland, will still remain to be bright, however challenges are bound to exist. Nursing care services will continue to have advanced care pathways brought about by the complex healthcare systems, as a result of the expansion of the eHealth industry. (Karhula et.al 2015)

The Finnish healthcare system will now and in the future be required to constantly tailor eHealth services, according to the needs of the patients and resource. Thus, making services for the patients more accessible and easy to use, providing equal opportunities for all without disadvantaging any group of service users such as disabled, aged, migrants, just to mention but a few of the groups. This will influence to a greater level how citizens use the eHealth services. (Finnish Nurses Association 2014.)

3   CONCEPT OF NURSING COMPETENCY AND EHEALTH LITERACY

3.1   The concept of nursing competency

Competency has been explored widely in various contexts that has generated several definitions and viewpoints. The term competent, is derived from a Latin word that means, the vital ability to act or perform in a certain way (Oxford University Online Dictionary, 2016).Ten cate & Scheele (2007, 542–547), further defines competence, as the ability to do something well and effectively. It refers to skills, actions and capability to carry out an activity, according to given standards (Garside & Nhemachena 2013, 541–545).

Traveling through time, the concept of nursing competence has elicited several definitions, with no proper consensus or measure of clarity (Tilley 2008, 58–64; Laibhen-Parkes 2014, 173 -184). According to Miller et al. (1988), nursing competence, is the capability of a nurse to be able to perform their role, by incorporating their cognitive skills in providing care. Cowan et al (2005, 355-362), further argues that, it is a holistic approach that encompasses the nurse abilities, knowledge and principles in providing care.

Nursing competence can be conceived through three main approaches. They include behavioural, trait, and holistic approaches. First and foremost, is the behaviour approach? This is pegged on one's skills and capabilities, which can be learnt or moulded through training. (Watson et al. 2002, 421-431; Meretoja et al. 2004, 329–336.; Cowan et.al 2005, 355-362; Anema & McCoy 2009, 6; Garside & Nhemachena 2013, 541–545.)

The second, is the generic approach, based on transferable traits, and can been achieved through talent. Last but not least, is the third approach that is holistic approach? This encompasses skills, knowledge and individual values and beliefs. This is broader and can be gained through working experience. (Watson et al 2002, 421-431; Meretoja et al 2004,330; Cowan et al 2005, 355-362 ; Garside & Nhemachena 2013, 541–545.)

Nursing competence for the purpose of this study shall be described as the ability of a nurse to put into practice their knowledge, skills, attitude, principals and judgment, in a professional or personal capacity, to demonstrate proficiency. These while incorporating their cognitive skills and evidence based care, to effectively and critically performs their roles according to established standards of nursing. (Miller et.al. 1988; Rebholz, 2006, 241-245; Wolfensperger & Shaffer, 2012 62-65; American Nurses Association 2013, 240-246; Laibhen-Parkes, 2014, 173-182.)

Competence in nursing, cannot be observed in action, but can be construed through performance (Anema & MacCoy 2009, 6-31). Nursing competence is built in three main pillars. They include, clinical nursing skills (Cowan et al 2005, 355-362; Garside & Nhemachena 2013, 541–545), nursing knowledge that have been acquired through education, training or work related experience of evidence based practise (Meretoja et al 2004, 329–336; Cowan et al 2005, 355-362; Tilley 2008, 58–64), and nursing values, that includes the ethical code of conduct, one's values and principles. (Ten Cate et.al 2010, 669–675).

Nursing competence still remains a key pillar in nursing practice and education, as we leap forward to the future. Therefore, this concept of nursing competence needs to be clarified in every core nursing duty to avoid opacities in nursing performance. Thus, this research intends to provide a clear picture of the today's and the future eHealth competencies demanded in the nursing care.

3.2   Ehealth literacy models

E-health literacy can be described as the ability and the capacity to use interactive information and communication technologies, to be able to access and provide care. This involves searching, collecting, understanding and determining the value of information derived through interaction with different electronic sources and technologies critically, and put this information in proper use to find solutions in healthcare. (Norman & Skinner 2006b; Chang & Kelly 2007, 145; Gilstad 2014,

70; Monkman & Kushniruk 2015, 542-543.) Low health literacy limits the one's understanding of their health conditions, resulting into poor judgement and management health and wellbeing (Murray et.al 2008).

Several eHealth models have been developed in the recent years, which describe and measure eHealth literacy competencies. Norman and Skinner (2006 b), developed the Lily model. Their model of understanding eHealth literacy comprised of six main competency levels that they suggested, as the key determinants of eHealth literacy competency. They include science, traditional and numeracy, computer, media, health and information, as shown in figure 1 below.

The Lily literacy model, lays its argument on the six competency levels that are deemed essential to operate in an eHealth environment. These six competencies have been further grouped into two main groups, those that are analytical skills such as the traditional and information competencies, which have broader focus, while the others as the context based and includes health computer and scientific skills, which are more precisely focused. (Norman & Skinner 2006 b; Chang & Kaufman 2011, 411-417; Gilstad 2014, 69- 70.)

First and foremost, Norman and Skinner (2006 b), argues that being computer literate and having the capability to use computers which is key. This is because most eHealth services are carried online or through the use of a computer. The second skill is that of media, this describes the ability of an eHealth service user to be able to recognize, identify, analyze critically and make sense of both visual and audio information health related information that is essential and beneficial to them or their clients, as in this case, the nurses. (Norman & Skinner 2006 b; Gilstad 2014, 69- 72.)

The third skills, is the science literacy as a competence, which is focused on the user being able to understand and process scientific findings, which has a bearing on their health and wellbeing. It expects the user to understand and interpret also biological factors related to their health and merger the two in order to make informed decisions. Thus, nurses are expected to assist the patients to understand

various research findings and hence practice evidence based care. (Norman & Skinner 2006 b; Chang & Kaufman 2011, 411-417; Gilstad 2014, 69- 70.)

The fourth skill, is the traditional literacy. This focuses on the basic literacy skills that are reading, writing and speaking, which are all essential skills to use eHealth systems. In addition to that, the fifth competency, is that of information. It advocates that eHealth users need to be able to gather, adduce and distribute health related information from various sources for the benefit of health and wellbeing. (Norman & Skinner 2006 b; Chang & Kaufman 2011, 411-417; Gilstad 2014, 69- 70.)

Last but not least, is the health competency, which demands that eHealth users need to have the general healthy capabilities, such as the ability to read, see, hear, also described as the functional skills or abilities , that enable them to be able to operate and gain healthcare related services, and effectively from the service offered. It is more about the user, being able to acquire and disseminate health related evidence through proper communication and decision making skills. (Norman & Skinner 2006 b.)

Gilstard (2014, 69-70), further developed the lily model, by adding, three more competencies that eHealth users need to possess such situational, cultural and communicative skills. She argued that eHealth competencies are influenced by several underlying factors such as the health problem in question, the technology being used and the institution that is providing the services.

Cultural literacy is about being conscious of customs, identity, and values of the users of eHealth services and this can only be achieved through situational awareness, where the eHealth services are designed for contemporary setting. Communication skills are critical in enabling the exchange of information and ensuring that healthcare resources are used effectively. (Gilstard 2014, 69-70.)

In addition to that, Monkman and Kushniruk (2015, 543-544), came up with another model that focuses on the usability and practically of eHealth systems. According to them, eHealth literacy and competency is determined by the user's eHealth literacy and the healthcare system needs for eHealth literacy. The model is based on the principle that, the higher the need for competent users with higher

skills, the lower the usability of the system, and benefits to health and wellbeing, and the lower the practicability and vice versa.
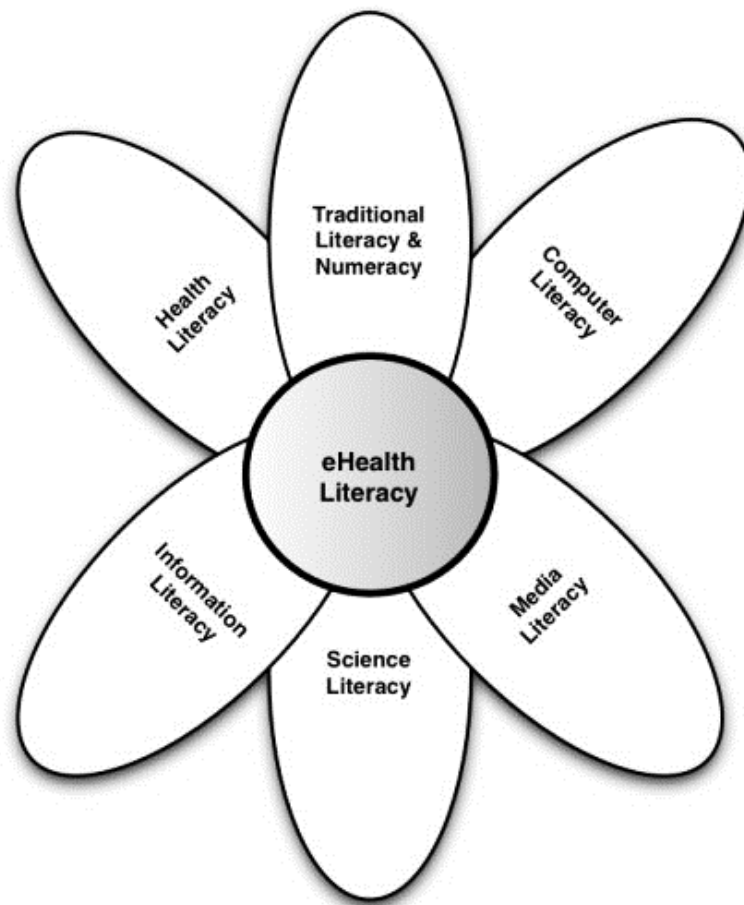

FIGURE 1. Lily model (Norman & Skinner 2006a)

4   THE DEVELOPMENT OF EHEALTH SERVICES IN FINLAND

Finland, a Scandinavian country, has a population of about 5.48 million, according to the official statistics of Finland of 2015. Finland has 317 municipalities, which form 172 healthcare units, out of this 172 units, 106 are municipal managed, while 36 centers operate through joint municipal ventures. The eHealth system in Finland is mainly funded by the municipalities, and government grants, and with the assistance from European council funds. (The Association of Finnish Local and Regional Authorities 2016.)

The initiation of eHealth system into Finnish social and healthcare systems, begun with the launch of a national strategy for integrating information and technology into healthcare in 1996, by the Ministry of Social Affairs and Health. This was with a goal of improving efficiency in service delivery, improving accessibility, quality and affordability of the healthcare services nationally. (Pirkko 2015, 7.)

Going through the roadmap of eHealth services in Finland, from its initiation in 1995, to its current phase II of data repository, it is important to note that the healthcare system today has undergone a tremendous transformation as shown in figure 2 below. This included, Pilot projects between 1998 and 2001, for seamless services, meant to streamline care services and processes. (Hämäläinen et.al 2005.) This was then followed by an electronic patient record (EPR) system pilot in 2002, and then its implementation nationwide in 2007. While E-prescribing pilots were between 2003 and 2006. All these systems, are run by the Finnish Social Insurance Institution (Kela). (Kanta 2015b, 2.)

In 2011, the government launched pilot projects that included the e-archive and e-prescription. With the migration of all public healthcare facilities patient record to the e-archive commencing by 2014 in the phase I and ending in 2016 in phase II, having transferred all citizen health information data to the National archive Kanta. As shown in figure 2 below. (Kanta 2015a.)

Nursing care today, and health information literacy in Finland, has been developed to greater heights, by the inclusion of e-health services such as the electronic patient records, e-prescription, e-archive, and e-access. (Korhonen 2015, 7). Nursing care processes have been made efficient, due to the availability

of updated data from different departmental, multi-professional teams and healthcare units around Finland, networked together, which has eased the decision making and care planning for nurses (Kanta 2015a).
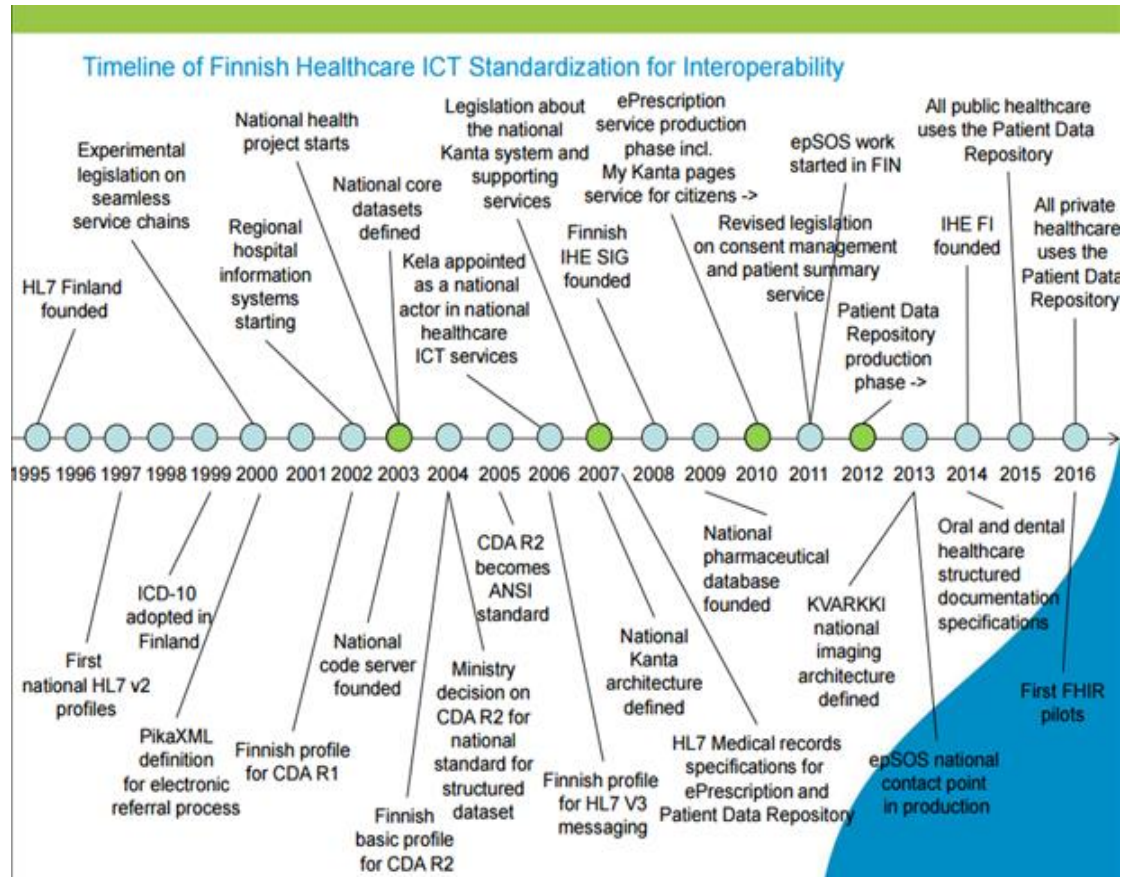
FIGURE 2. Timelines for Finnish Healthcare ICT Standardization, (Kanta 2015b, 2)

The National archiving Kanta, which came into force in 2015, enables citizens to confidentially, efficiently and securely access their personal health information, as enshrined in the constitution and the various acts that the government has implemented. Giving them the opportunity to be more informed of their health and wellbeing. (Kanta 2015a.)

According to Hyppönen et al. (2015, 132) about 87% of residents in Finland have access to internet and about 85% have identification to use electronic services. The most accessed e-health services used by citizens include booking appointments for doctors and nurses, social services, personal health data archive Kanta, checking prescription services and laboratory results.

According to Korhonen (2015, 7), Electronic healthcare record systems in Finland, has been fully implemented both in primary and tertiary healthcare systems at 100% and about 80% in the private sector providers. Social and welfare services in Finland is set to continuously transform in the near future, with the emphasis shifting from organization culture of service provision, to a client demands and flexibility to choose service point (Finnish Nurses Association 2015).

In the contemporary health care setting, physicians are able to prescribe medications through the e-prescription platforms, where medicines are prescribed electronically and are then stored in the national e-prescription archive. Electronic healthrecords in Finland has increased the acessability of patient information by the healthcare personalle. Today, electronic health records in Finland cover 100% of all the primary and secondary healthcare services and 80% of private sector. (Pirkko 2015, 11.)

The e-archive, is a patient data archive where healthcare professionals, securely update patient health information, such as diagnosis, discharge summaries, nursing information, laboratory tests, radiology tests, among other important patient information. This enables citizen's to access their personal health records anywhere, at all times without restrictions. It also allows other healthcare providers to share patient data, after gaining consent from the patient (Kanta 2015a; Korhonen 2015, 9; Pirkko 2015, 11.)

Accessing the e-archive currently requires a citizen to be an adult and in a possession of electronic banking identification, to securely access personal health information data and prescriptions, through e-access or e-viewing. There is a continuous development process that will in the future enable those whom are underage to access personal data. (Kanta 2015a.)

E-prescription is an electronic tool for doctors to prescribe medications or make prescription renewals, electronically to pharmacies nationally. It is also used by other healthcare professionals such as nurse to access information on patient medication, with the patient consent. (Kanta 2015a; Pirkko 2015, 11.)

The use of eHealth services has expanded in the Finnish healthcare systems tremendously. Today, all public health facilities have internet based services. This services include websites that carry information on services offered and locations and offers the possibility to make and cancel bookings online, provide feedback, with others having the possibility to provide online diagnosis for clients before booking for an appointment such as Hämeenlina City health centre services, known as "minunterveyteni" and also others such as homecare services for the elderly such as eHoiva (Hämeenlina City 2015; eHoiva 2016.)

The vision of eHealth and e-social strategy 2020, published by the Ministry of Social Affairs and Health, working in conjunction with the Finnish Local and Regional Authorities in 2015, is to realize, the possibility of providing citizens and specifically patients that use the health and social systems, with the opportunity to take charge of their health. This, while benefiting from the availability of information and smart systems, which utilize the scarce resources available, and to enable the health and social services systems to work together for better health and wellbeing. (Ministry of Social Affairs and Health, and Finnish Local and Regional Authorities 2015.)

5 HIGHER NURSING COMPETENCY BASED EDUCATION IN FINLAND

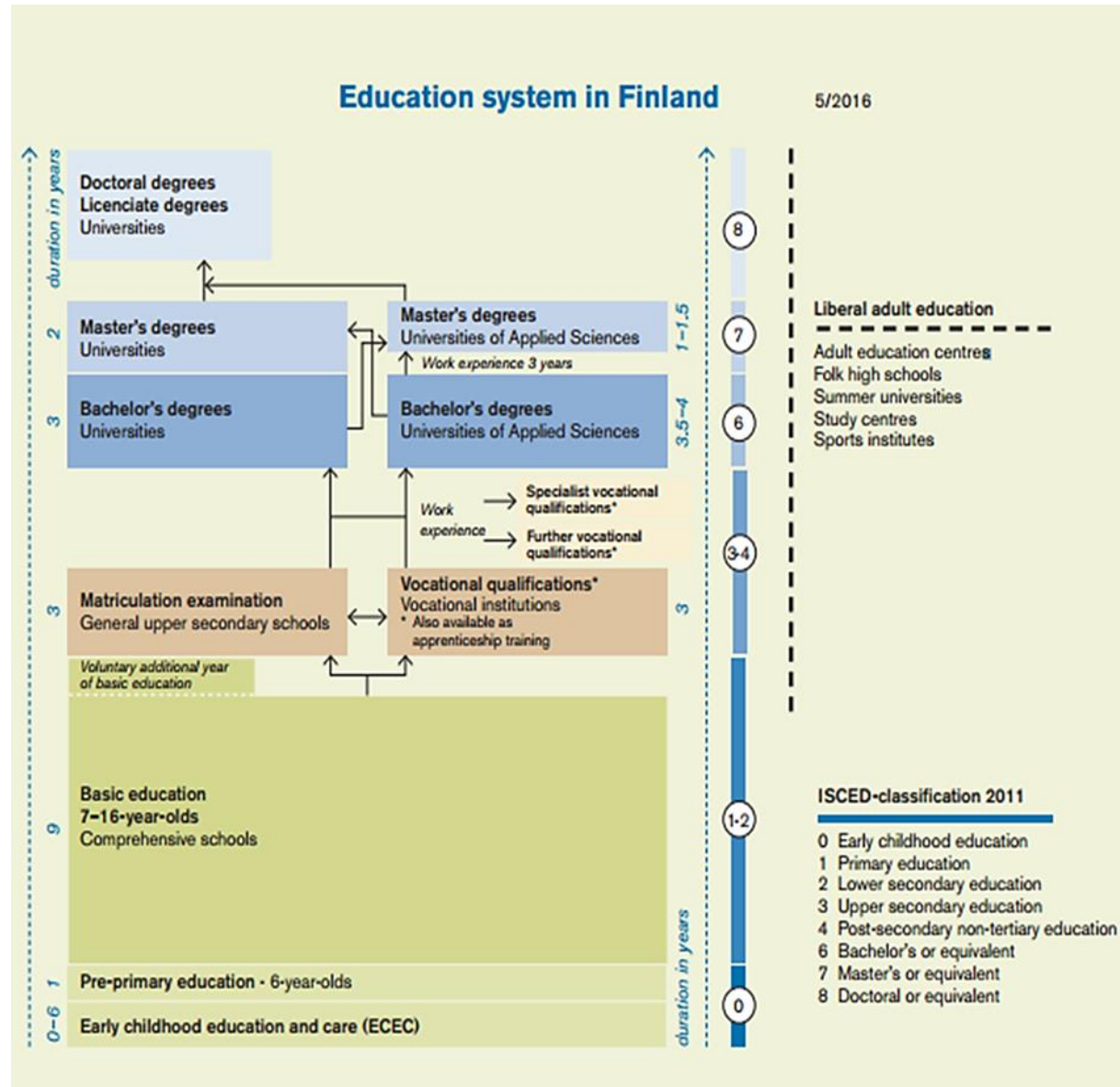## 5.1 Finnish higher education system at a glance

FIGURE 3. Education system in Finland (Ministry of Education and Culture 2016)

Finland has 24 Universities and 14 University of Applied Sciences. Higher education in Finland can be achieved through studies at the university level or at the universities of applied sciences, which were previously referred to as polytechnics. (Ministry of education & culture 2016; Finnish National Board of Education 2016.)

Higher education in universities are modelled on a scientific research base, and offers a broader variety of qualification levels such as undergraduate, graduate and post-graduate level. While the University of applied sciences higher education, are moulded on a more applied and practical model, offering qualifications at the levels of undergraduate and graduate degrees. (Ministry of education & culture 2015; Finnish National Board of Education 2016.)

Gaining admission into either University or university of applied sciences is based on individual institutions decisions. Admission is pegged on passing an entrance examination that is always conducted to eligible prospective students, due to the larger number of applicants for the study places. Finnish Matriculation exams is considered in many institutions as an eligible as a basic qualification for all institutions of higher education. (Finnish National Board of Education 2016.)

Admission to Bachelor degree level of education, can be based on Finnish matriculation exams, or vocational training qualifications in both the institutions. However, in the case of Master degree level, admissions are based on the previous degree earned at any of the institutions, but for master's studies at the Universities of applied sciences, an additional three years working experience is needed in the field that the applicant gained bachelor degree to be eligible for admission. In the case of post-graduate degrees offered at the Universities, the admission is based on the previous master degree obtained in either institution, as shown in figure 3 above. (Finnish National Board of Education 2016.)

Degree studies at the Universities of applied sciences, take about 3- 4 years to complete and are equivalent to 210 -240 European Credit Transfer and Accumulation System (ECTS), coupled with practical training experience. While the master studies take between 1.5 to 2 years to complete with an equivalent of 90 ects. While at the universities, the bachelor degree takes three years to complete and is equivalent to 180 ects credits. (Studyinfo 2015; Finnish National Board of Education 2016.)

Master's degree at the University is equivalent of 120 ects, with a study period of two years. Post- graduate studies at doctoral level is 240 ects and requires 4 years of studies and research, pre-doctoral Licentiate degree can be completed in 2 years and is equivalent to 120 ects. (Studyinfo 2015; Ministry of education & culture 2016; Finnish National Board of Education 2016.).

Both studies at all levels in universities and universities of applied sciences in Finland, comprise of main study units for all students, elective studies and final project work usually a dissertation. Higher education in Finland is free for Finnish citizens and EU/EEA, with those from outside EU/EEA having to pay tuition fee in the beginning of 2017. (Studyinfo 2015; Finnish National Board of Education 2016.)

Open University system in Finland also offer possibility to study courses at a higher education level that are considered as non- degree courses, but can be considered as elective courses. Specialization education after master's level intended to improve expertise in a given field that was initiated in 2015, and is set to take effect this year 2016. (Studyinfo 2015; Finnish National Board of Education 2016.)

Bachelor degree in nursing in Finland is only offered by the universities of applied sciences, with the study duration being in the average of three to three and a half year, to graduation. The curriculum structures of the degree programs are dictated by the European Union directive 2005/36/EC, but the institutions of higher learning, have the autonomy to develop the study units according to their needs. (Ministry of Education 2011; Lahtinen et al. 2014, 1040–1047.)

5.2   Competency based nursing education and the national qualifications
       framework (NQF)

Competency based nursing curriculum, is a target oriented and results motivated
learning method. Nursing students at all levels of studies, whether bachelor or
masters level, are expected to attain the performance levels stipulated for
accreditation. (Windsor et.al 2012, 213–222.)

It provides flexibility in achieving learning targets free from traditional learning
methods, which focused on specific routines, which required students to
memorize studies (Ironside 2005, 441–449), into a more individualized
performance based mode. Which guarantees that the nurse has attained the
knowledge, skills and mindset, necessary for the role in the working environment
and advance academically. (Anema & McCoy 2009, 3-5.)

Competency based nursing dictates that, educators need to critically and
strategically scan their learning and working environment, to scout for the
competencies that are needed currently and in the future. This is to enable them,
to draw a nursing curriculum that is competent, viable and are able to meet the
demands of nursing care for patients with complex challenges and a dynamic
healthcare system. (Candela et.al 2006, 59–66.)

Tilley (2007, 285-289), describes competency based education as a tool, that
tangles together theory gained through active learning and practical experience.
Thus it provides the student with the platform to build their competence in
relation to their workplace, since they have a feel of both worlds and understand
what is demanded of them.

Competency based nursing education, has proven to be challenging to assess, this
is based on the fact that competency as a concept is complex to measure, and that
nursing interventions and roles, embraces a broader spectrum of processes and
stages in the caring circle (Candela et.al 2006, 59–66).Chiarella et al. (2008, 45 -
53), suggests that competency levels, should assessed based on six key
determinants, that includes evidence based nature, performance orientation,
relativity to the desired target, reliability and validity of the results, performance,
accountability and cooperation.

The Finnish National Qualifications Framework NQF, was established in Finland in 2004, to gauge the competence levels and qualifications within the education system based on the Bologna process in Europe, thus encouraging mobility, improving a constant culture learning and encourages personalization of the studies. The competencies measure through this framework, includes both formal through training, and those achieved through non-informal means such as those related to work experience, that takes into consideration, the prior learning (Ministry of Education 2009, 3.)

Based on the National Qualifications Framework NQF, Finnish education system has eight levels of qualifications. Higher education qualifications in Finland are given at level 6 for a bachelor degree and level 7 for master's degree, as shown in figure 3 above. This qualification levels, stipulates the level of competence expected from the student, in order to be awarded these qualifications. (Ministry of Education 2009, 3-5.)

For the purpose of this study, the focus will be on the level 7, the master's degree competency level, this is because the study is part of a curriculum development for a master's degree program in E-health. The Finnish National Qualification Framework demands that a graduate at master's level, needs to demonstrate several competencies before qualifying for accreditation. (Ministry of Education 2009, 3.)

The competencies expected at level 7 in Finland for master's students, includes, demonstrating an in-depth knowledge of the wider study field, with the capability of putting them into practice. Developing critical evaluation skills and effectively apply them in research and innovation, both on individual basis and in group, in a multi-professional approach. (Ministry of Education 2009, 52.)

The student should be able to work independently and responsibly, communicate, in challenging environments, building viable strategies and methods that demonstrates their leadership and managerial skills, with a goal of being a continuous learner and a multi-lingual focused both locally and on a global perspective. (Ministry of Education 2009, 52.)

5.3   Lahti University of applied science

Lahti University of Applied Sciences (LUAS) is an internationally accredited higher education institution was founded in 1991, from a consolidation of eight colleges, which were later in 1999 expanded to eleven, by inclusion of music, tourism, and sports studies. The institution offers study programs in Finnish and English languages for international students and exchange students from about 200 partner universities worldwide. (Lamk 2015.)

 Lahti University of Applied Sciences is located about 100km from the capital city Helsinki in Lahti City. The university gained limited business identity in 2015. This multidisciplinary institution has for decades produced professionals in various fields, that have filled the gaps in working fraternity in social and healthcare, business and industry. (Lamk 2015; CIMO 2013, 11.)

The institution boasts of 5034 students with 60% being female students and 92% of the graduates employed in different sectors of the economy. It offers twenty bachelor degree courses and at least 40 specialist programs, in the faculties of business, music and drama, hospitality management, fine arts, technology and engineering, and social and healthcare, with about 250 lectures and 70 part-time lecturers. The list of bachelor degrees and master's degrees are continuing to grow and expand into the future (Lamk 2015.)

Lahti University of Applied Science is also a member of Federation of Universities of Applied Sciences (FUAS), and an active innovative research partner though the research development innovation (RDI), that involves the universities cooperation with the employment agencies, local and regional development agencies. This is aimed at producing new products and services for the region and nationally. (Lamk 2015.)

5.4   Advanced nursing in Finland

Advance nursing in Finland, which is known in Finnish as
(asiantuntijasairaanhoitaja), dates way back to the early 1980s (Meratso 2011).
However, the first bunch of nurses to practice as advanced nurses can be traced to
early 21st century in 2006, whom were 17 in number and whom were later
employed by seven healthcare organization in different capacities and roles.
Today, the number has grown exponentially (Fageström & Glasberg 2011, 926.)

The initiation of advanced nursing profession in Finland was as a result a shortage
of doctors in various municipalities, who could provide proper care and follow-up
visits, to the growing number of patients with chronic diseases such as diabetes,
heart problems among other chronic ailments. (Delamaire & Lafortune, 2010;
Nieminen et al, 2011, 661; Fagerström & Glasberg, 2011, 925-927; Lucille 2013,
87.)

In the contemporary nursing setting, the role of advance nurses has evolved, to be
an essential part of nursing care professionals, in healthcare delivery system
globally. (Delamaire & Lafortune 2010; Pulcini et al. 2010,). However, in many
parts of the world, Finland included, there are no clearly defined roles and proper
career guidelines, backed by legislation and code of practise, for registered nurses.
Hence, their operations and practice falls under the registered nurses code of
practice and conduct, and that of the organizations they are employed. (Jokiniemi
et al 2014. 1-5.)

In healthcare systems in Finland, Advanced nurses have acquired several titles
and names. According to Nursing Association in Finland, these names include
Clinical Specialist Nurses ("Kliinisesti erikoistunut hoitaja"), and Clinical Nurse
Science Specialist ("Hoitotieteen kliininen asiantuntija"). (Jokiniemi et.al 2014,
7.)

Advanced nursing qualification can be achieved in Finland through three distinct
methods. This can be through a registered nurse undergoing a specialised nursing
training for example wound care, to become wound care specialist nurse, usually
about 30 - 60 ECTS (European credit transfer and accumulation system). The
other means is through a master's degree, and the third, is through a doctorate

degree. (Jokiniemi et.al, 2014, 8.) Master's degree stands out as the most recognised means to become an advanced nurse, in Finland and globally (Pulcini et al.; Delamaire & Lafortune 2010). 2010

Nieminen et al. (2011, 662), describes the advanced nursing role in Finland as extension of competence gained by registered nurses. This is intended to boost the quality of nursing care, through the advanced skills, knowledge, that the registered nurse gains while specializing as an advanced nurse. In today's nursing world, nursing profession has tremendously transformed from the tradition of caring for the sick, to an even wider field of research, medical and nursing products development, smartcare solutions, and transforming the healthcare delivery systems and policies globally (Finnish Nurses Association 2015.)

The role advanced nurses in Finland and global circles, has been attributed to a reduction of hospital stay times, since these specialised nurses assist and empower the patients to manage their long term ailments at home, thus reducing cost of care and enabling the patients take control of their health independently, making them feel satisfied. This has also reduced the number of hospital readmissions. (Fargeström & Glasberg 2011, 229.) Other less developed role includes nurse prescribing, which is not limited to advanced nurses only, which is also undergoing transformation (Tynkkynen, 2010).

Advanced nursing roles in Finland will still face challenges in the future. These challenges are not limited to economic, nursing staff shortages and technological challenges brought about by the advance in eHealth environment, clear job description, and recognition across board. (Jokiniemi et.al 2014, 5.)

As the concept of nursing is widening, based on the challenges faced by healthcare services and reforms in Finland today, advance nurses, forms a greater tool and central in the transformation of nursing care in eHealth environment (Finnish Nurses Association 2015). Nurses with advanced nursing qualifications, have been identified to be satisfied with their roles due to the independence and self-determination granted by the title, enabling nurses to retain their jobs, and provide better care services to patients (Jokiniemi et.al 2014, 6-8).

6   PROBLEM STATEMENT

With the rise of eHealth applications in healthcare service delivery in Finland in the recent past, nurse educators have been at a slower pace to introduce nursing tailored eHealth curriculum at higher education levels, to enable nurses to gain the much needed competencies in eHealth nursing. With the view of enabling the nurses to provide nursing care today and in the ever changing future of eHealth nursing (Finnish Nurses Association 2015, 4-7.)

The Finnish Nursing Association in 2012, initiated a competency based electronic portfolio program for registered nurses in nursing informatics awarding credits based on the competencies gained, for up to 200 ECTS (European Transfer Crediting System). Since its initiation, only 4 registered nurses have been able to attain the credits and gained the required competencies, out of the 73, 664 registered nurses and midwifes in Finland by 2015 (Rajalahti & Saranto 2016, 2).

In the contemporary higher nursing education in Finland, only two institutions (Laurea University of Applied Sciences and University of Eastern Finland) out of the 14 Universities and 25 Universities of Applied Sciences, offered master's degree studies, which focuses on nursing informatics and eHealth? To date, there is no single institution that has developed an entire curriculum that focuses solely on eHealth nursing. (Rajalahti & Saranto 2016, 2; Studyinfo 2016.)

This remains a stumbling block, for nurses to embrace and realize the full potential of eHealth in nursing in Finland (Finnish Nurses Association 2015, 4-7). Hence, there is a growing need for nurses to have the necessary competencies and skills in eHealth, as nursing care delivery systems continues to transform, adapt and develop in the era of eHealth service delivery.

7   AIM OF THE STUDY AND RESEARCH QUESTION

7.1   Aims of the study

This study, is part of a curriculum development process, initiated by Lahti University of Applied Sciences, for the development of a new Master's Degree programme in eHealth for nurses. The commencement of this development study project in October 2014, was based on the necessity to develop a new curriculum for Nurses in English, that would cater for the shortage of higher learning education for nurses in eHealth in Finland,which is currently undergoing eHealth reforms. This, is also coupled by the need to gather new knowledge on nursing competencies, at the beginning of this new curriculum development process, since no equivalent curriculum existed in Finland. .

The spotlight of this study project will be shone on Nurses, based on the need to factor in their views, which is key in the development of the new curriculum process, that will have a direct benefit on the findings of this project, in their nursing care work, now and in the future. Hence, this study is intended, and structured to provide the nurses with a platform to share their views, and gather their experiences on eHealth competencies.

The purpose of this study therefore is to: -

> ➢ Explore the experiences of nurses working in Finland, in the contemporary eHealth settings, with the view of identify nursing competencies, which can developed by nurses through a higher educational training, to enable them to provide nursing care effectively to patients, today and in the future. This will be beneficial, in developing the understanding of the relevance of these competencies in nursing care practices, in meeting the changing care needs and roles for nurses, and the demand for skilled eHealth nursing workforce in Finland.

➢ Generate new knowledge and practical applications for the development of the new curriculum, based on ehealth competencies identified. This will be helpful in gauging, how the skills identified by this study , can be put into practice by Lahti University of Applied Sciences , in drawing out, what kind of courses or study modules should be included in the new curriculum, to equip nurses with the much needed competencies.

7.2   Research question

This research is intended to provide answers to the research question of: -

o   What nursing competencies are needed to be developed by nurses through higher education training, to enable nurses to provide nursing care to patients, working in an eHealth environment today and in the future?

8   RESEARCH METHODOLOGY

8.1   Design

The study adopted qualitative research method, to explore the experience of nurses, to identify the nursing competencies that are needed to be developed by nurses through higher education training, to enable them to provide nursing care and information effectively to patients, working in an eHealth environment in the future. Qualitative research methodology was chosen based on the fact that it gives the researcher the opportunity to explore reason behind phenomenon like why, how or what, to create the human experiences and deeper understanding (Green & Thorogood 2013, 22-60; Snyder 2012.)

Qualitative research method is not grounded in numbers or numerical strength, but of subjectivity to understand in depth, the meaning of the phenomena in question, and fill information gaps (Walsh & Downe 2006, 108-119). Which in relation to this study are the nursing competencies needed by nurses, to work in an eHealth environment.

Qualitative methodology, provides the researcher, the flexibility to collect data due to its open ended nature, and enable the researcher to get direct feedback from the participants on the phenomenon being studied. (Taylor et.al 2016, 7-11). Proponents of this research method argue that it provides the researcher with the option of changing the direction of the research based on the developing trends throughout the research (Steven et.al 2015, 8-10).

Critics of this research method however, argue that, it is prone to bias, based on its investigative nature, and that the skills of the researcher and participants, play a greater role in the end result. Based on the high volume of data it is argued to be time consuming, and prone to romanticism or emotional attachments to the participants, since the researcher tend to be closer to participants as in the case of interview. (Neergaard & John 2007, 4; Holloway & Wheeler 2013, 15-17.) Furthermore, they argue that sampling and generalizability of qualitative research are affected by the sample sizes and selection criteria that affects the quality, validity and reliability of the findings. (Taylor et al. 2016, 108).

8.2   Sampling Strategy

This study adopted a heterogeneous purposive sampling technique also known as, maximum variation sampling, in identifying the participants to be included in the study. This sampling technique is a non-probability sampling method, which provides the researcher with possibility to sample participants, from a wider pool, within the population of study, with a view of generating diverse knowledge, perspectives and deeper meaning on the phenomenon of study. (Holloway & Wheeler 2013, 142-144; Patton 2014, 43; DePoy & Gitlin 2015, 190-196.).

Based on this sampling methodology, participants are chosen according to their unique characteristics and knowledge, which are deemed beneficial to answering the research question and exploring the phenomena in the study. It relies on an inclusion and exclusion criteria that dictates the participants that are to be included and excluded in the study. (Holloway & Wheeler 2013, 144.)

Purposive sampling technique, demands that the research must have a deeper understanding of the population of the study, which in this study are the nurses (Ritchie et.al 2014, 113 -125). Towards this end, the researcher being a registered nurse by profession had a clear and deeper knowledge of the participants in this study.

Critics of purposive sampling however argues that, it is prone to research bias based on the fact that, sampling decisions are made by the researcher, and that it is difficult to argue out the representation of the entire population involved in the study. Hence, different selection of participants would yield different results or samples. (Palys 2008, 697-698.)

Therefore, in light of these criticism, the study, adopted a clear sampling criteria. This was intended to steer the decision making process, grounded on the research question and the purpose of the study, that would encompass all the eligible participants in the study, with a view of eliminating the decision making bias.

Inclusion criteria was developed based on the research question and aims, that focused on identifying the nursing competencies needed to be developed by nurses through higher education, in order to be able to provide nursing care for patients, in an eHealth based environment. Nurses to be included in the study, had to be: -

- Registered nurses, having more than one year working experience post-registration, since the study intended to gather the nurse's views based on their experience
- From various nursing departments and units, to bring the about the variation and broaden the experiences base, with a focus from the diverse background of nursing fraternity within the population of the study
- Able to express their views in English, since the interview, analysis and the entire research were to be conducted in English.
- Presumed to have experience or have encountered one of the various eHealth applications used in healthcare service delivery in Finland today, throughout their career.

According to Holloway & Wheeler (2013, 117), samples in qualitative study, should not be too large that complicate data extraction and analysis, while also not too small rendering data saturation un-achievable. A total of 15 participants participated in the study. Participants for this study were sampled from a population registered nurses working in in the Central region of Finland.

An email containing the information and consent form, that explains the aims of the study, the significance of the results achieved from the study, and the eligibility criteria for participating in the interviews, as shown in appendix 2, were emailed to various head nurses of the nursing departments, who later forwarded the emails to registered nurses in their units. Participants were assured of anonymity and confidentiality.

The email also informed the participants, that the participation in the study was voluntary, and that those interested to contact the researcher, to arrange for the interview sessions. Due to the voluntary nature of participation, participants were informed that there will be no financial incentives offered in order for participants to participate.

Initially, 20 nurses had indicated willingness to participate in the study, however, due to unavoidable circumstances, 5 nurses were not able to participate, and citing time constraints, lack of deeper knowledge on the research topic, as reasons for not being able to participate in the interviews. This therefore, left only 15 participants who participated in the interviews and had met the inclusion criteria. The nurses involved in the study, were then individually contacted by the researcher, and the interview times and places arranged. The researcher had no problems in identifying nurses for the study.

The tential participants were sourced from both the specialized care units from Central Hospital (5 participants), Health centre (6 participants) who represent the general nursing experiences from both outpatient and inpatient units, and also from the homecare and nursing home units within Jyväskylä municipalities (4 participants).

Sampling from these various units, was intended to gather a deeper insight and wealth of experience and knowledge, on nursing competency phenomenon in the era of eHealth from a wider scope of nurses. Thus, providing the research with the platform to identify common themes that cut across the nursing fraternity. The participants were a mixture of both new and experienced nurses, with years of experience working as a registered clinical nurse ranging from 1 – 30 years, with a mean average year of nursing care experience being 6.4 years. Among the participants. The participants included 5 males and 10 females.

8.3   Data collection

In this study semi-structured interview as a tool, was used to collect data from the participants. Semi-structured interviews are the most broadly used tool to collect data in qualitative research (Merriam & Tisdell, 111-120). Semi-structured interviews, are characterized by a partly defined parameters in the questioning, that gives the interviewer the control and focus throughout the interview, and does not require the interviewee to have previous experience (Hirsjärvi & Hurme 2008, 47; Klenke 2015, 131).

Semi-structured interview was chosen, since it gives the participants in this study the flexibility to elaborate on their views, on the questions during the interview. This enables the researcher to have control of the interview while at the same time giving the participants a free opportunity to express their experience and provide a deeper meaning on the topic of the interview in their own terms logically. (Bowling & Ebrahim 2005, 209 -220; Schultze & Avital 2011.)

In this study, a carefully constructed open ended questions, intended to stimulates discussion, and allow the nurses to substantiate their views were adopted (Taylor et.al 2016, 123).The interviews begun by first developing an interview guide, divided into two sections. The guide was founded on the research question and aims of the study, in which the research was seeking answers.

An interview guide is essential interview tool, in ensuring that the researcher has the opportunity to collect comparable data sets from the different participants in an interview, though the generated logic in questioning. (Bridges et.al 2008, 206-210; Holloway & Wheeler 2010). According to Griffiths (2009, 135), Interview guides, help in maintaining the thematic approach throughout the interview sessions.

However, in this study, it is important to note that the order of questioning was not strictly followed as laid in the guide, but conducted in a fitting flexible manner (Bryman 2012, 208 -468). With semi-structured interviews, the sequence of questioning is not the key to eliciting data, rather, the flexibility to ask for clarification (Ryan et.al 2009; Holloway & Wheeler 2010), since it allows for a spontaneous exploration of facts (Berg 2009, 101 – 157).

The first section was designed to collect the participant's background information. It included questions on the demographic characteristics of the participants of the study, such as years of experience and nursing speciality or departments the participants' worked and previous experience working with an eHealth service? This was with the view of gauging the diversity and experience of the participants in the subject of study.

The second section of the guide included exploration questions. This included questions such as the participants understanding of the concept of eHealth, their views based on experience, regarding eHealth nursing competencies, among other questions? Designed to unravel the concept of nursing competency needed by nurses to work with patients, in an eHealth environment.

A series of face to face semi-structured individual interviews, were carried out. The interviews were conducted between August 2015 and November 2015. The face to face interviews were conducted at agreed locations such as the participants working stations, in a private environment where only the researcher and the participants were present, behind closed doors, with minimal interference.

The interviews were initiated by overarching questions, which was intended to stimulate the narration and discussion, for example "Can you explain to me, what the concept of E-health means to you?" and "Can you tell me, what does eHealth context mean to nurses when taking care of patients?" Was used to generate views regarding eHealth services.

 Probing questions such as "can you give more details about..." or "what do you mean by ..." among other probing questions were used to elicit much response. According to Merriam & Tisdell (2015, 124-128), Probes are used in situations whereby the researcher needed clarity on specific answer provided by the participant, with a view of gaining deeper understanding.

Leading questions were shunned throughout the interview process, to avoid the researcher bias (Bryman & Cassell 2006, 41-55). During the interview sessions, the researcher disassociated his views and opinions on the research topic. Participants were allowed to freely express their view on nursing competencies, that they felt were needed by nurses to work in the future eHealth nursing

environment. While the researcher remained focused, open minded and without pre-empting or leading the participant's answers. A phenomenon described as bracketing. (Morgan 2011, 14.)

Throughout the interview session, compatability was established, by attentively listening to the participants and engaging them with the questions appropriately. There were no substantive interruptions to be reported, and that the sessions went smoothly. Interviews were conducted until a point where no new ideas were emerging, this signalized saturation (Griffiths 2009, 135.)

The interview sessions, lasted from between 15 minutes to about 20 minutes. The interviews were recorded using two digital recorders that include Olympus LS-10 and Sony ICD-UX533, just to be sure that the interview was well captured in case one of the devices failed. The researcher also took notes during the interviews.

8.4   Data analysis

The analysis adopted inductive content analysis as a tool, for the analysis of the data gathered from the interviews. This was based on the fact this analysis tool, is suitable for summarizing extensive and varied narrative data into categories (Patton 2014, 542; Moretti et al. 2011, 420-428), to establish a clear connection between the research aims and the data accrued from the research (Hsieh & Shannon 2005, 1277-1288).

It is an analysis tool, that grants the researcher, the flexibly to identify, explore and interpret, the underlying meaning of emerging themes from the raw data, that represents the answers to the research question and aims. This is with the view of filling the information void or gap on a phenomenon (Elo & Kyngäs 2008, 107-115; Schreier 2012, 2-7.)

Inductive content analysis is essential in identifying categories or themes from the research data, since these categories are derived from the data itself (Hsieh & Shannon 2005, 1277-1288; Ruusuvuori et.al 2010, 9-36). In this study, it was used to unearth the data or information that is essential in filling in the gap on

information about the eHealth nursing competencies needed by nurses to care for clients today and into the future.

Critics however, argue that this analysis method oversimplifies and distorts the literal meaning of the raw data accrued and that it is tedious and time consuming (Kondracki et.al 2002, 224-230). Hence in this analysis, a systematic approach to achieve a holistic classification and identification of themes, through logical process was embraced, to describe the meaning of the interview data. Qualitative analysis software Nvivo 11, was used to save time in the coding process. (Schreier 2012, 1.)

The Inductive analysis here followed five main key process in analyzing the data. This included data preparation, habitualization or familiarization, coding, creation of categories and refining categories to create themes. The first step involved data preparation or transcription. In this stage the audio interviews, were transcribed into text, using a data analysis software Nvivo11, (QSR International, 2016), based on the quantity of audio data gathered from the interviews.

The process involved, uploading the audio files into the software, and then transcribed into text by a text editor, preciously word for word. Every one of the 15 interviews recorded, were assigned a colour code and a name to differentiate them. The researcher notes taken during the interview sessions were also added at this stage.

The second stage, involved familiarization with the transcribed data. This involved a thorough proofreading of the text and listening to the interview audio, to confirm the content of the data gathered in each interview session was correct. This was also intended to immerse the researcher into the content of the data collected in readiness for the next stage. Editing of the text was also carried at this stage and a backup created.

The third stage was the coding phase. In this stage, NViVo program was used to code the earlier transcribed text. This was achieved by the computer program perusing through all the interview text, line by line, running an inductive coding with set parameters, which were in this case the Nursing competencies and eHealth. This was with a view of identifying sections of the texts that explained

the meanings of the text passages, highlighting them and assigning an open invivo codes, and creating a graphic display of related codes identified in the process. (Hsieh & Shannon 2005, 1277-1288; Griffiths 2009, 137.)

The invivo codes identified, represented the exact words used by the participants, without distortion, and the varied perspectives of the data collected (Given 2008, 72). The focus of the coding process at this stage was to group relevant data for future comparison and identification of contrasts and anomalies. (Saldana 2010, 74).

Stage four, was the creation of sub-categories, or abstraction, which was meant to reduce the data. Paragraphs and sentences that had texts connected to the central focus of the research were then extracted and grouped accordingly under specific codes. Here the codes were then grouped depending on their similarities to create categories or subthemes which represented the different unique skills that nurses should possesses, derived from the phrases from the interview text. (Griffiths 2009, 137.)

According to Schreier (2012, 7), the researcher has the obligation of deciding what categories to form, based on the aims of the study in this analysis, those sections of text that were different, and were not assigned a category, they were re-read and considered irrelevant to the aims of the study. Those texts that had more than one code were further harmonized to find the sub- themes that they were compatible with.

The fifth stage was that of theme creation. Here, the sub-themes or categories were grouped together to identify the patterns of similarities, and differences in meaning and context, using the coding software for exclusivity. Each and every category developed were given names that characterized their content, and referred to the themes identified in the study, that answers the research question (Aveyard 2014, 144- 155.)

With the inductive themes developed, the final step in the analysis was to counter check that the themes developed with the codes, to ascertain that the wording assigned to each theme matched with the codes and contents from the interviews. This was done to avoid mismatch codes. This was important in order to confirm

the credibility of the coding process. Aveyard (2014, 147), describes the counter checking as an important stage of coding, since it gives the researcher the confidence of the process can be reproduced and open to critique.
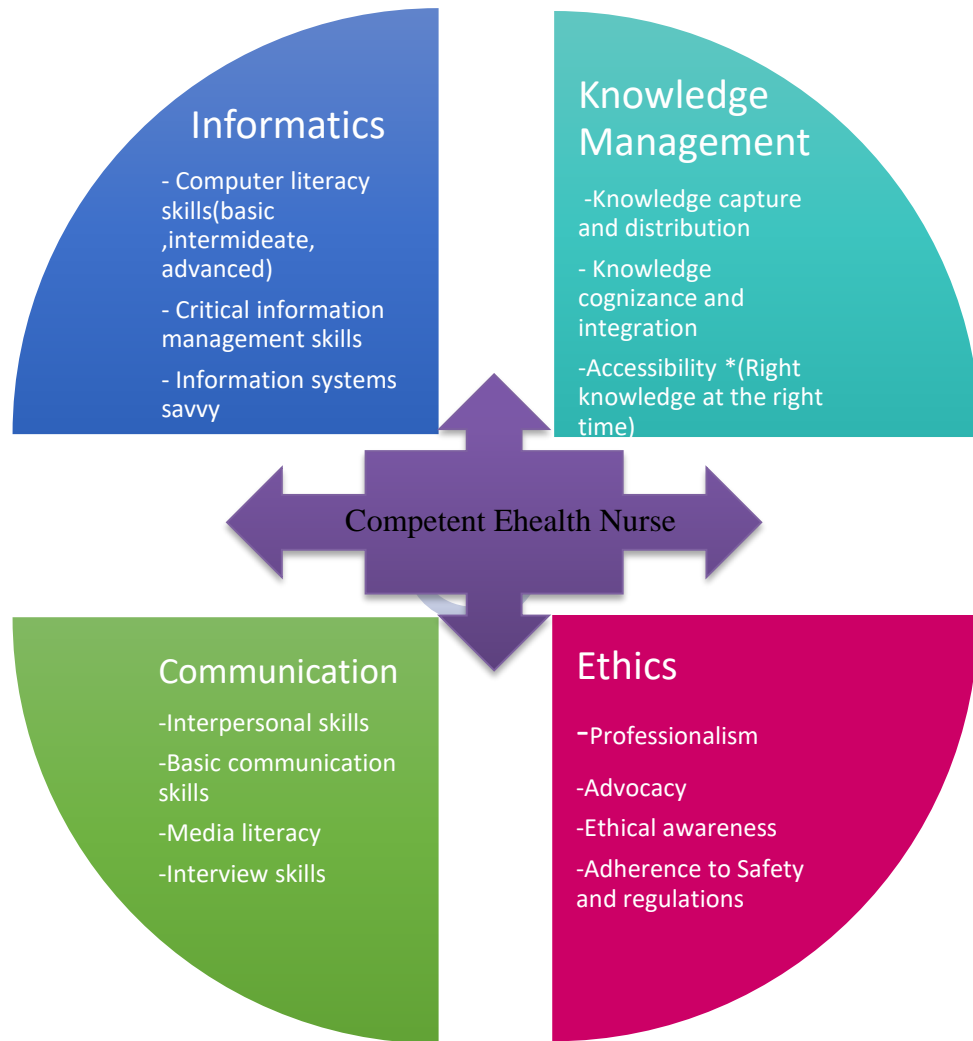
FIGURE 4. Ehealth competencies identified in the study

The analysis process resulted into four main themes. They included informatics, knowledge management, communication and ethics, as shown in figure 4 above. A total number of 14 sub- skills emerged from the analysis as shown in appendix 3. The final analysis process involved the publication of the results of the analysis process, as described in details in the next chapter of findings.

9   KEY THEMES IDENTIFIED IN THE STUDY

9.1   Informatics

After conducting analysis of the data gathered from the participants through interview in this study, participants identified informatics as a core eHealth nursing skill that forms the basis of providing eHealth nursing care today and in the future. Participants echoed a fact that, the genesis and basis of being eHealth competency in nursing, starts with being computer literate and being able to integrate computer, information and communication systems to nursing care. Hence, the need for all nurses today and in the future, to be computer literate.

... All our interactions with patient's information are through the use of computers ... I cannot imagine a nurse providing care today in Finland, who does not have basic computer knowledge and application.

However, participants furthered the argument that, having basic computer skills, in the contemporary and future eHealth settings is not adequate to meet the dynamic challenges of eHealth nursing. That, there is a need for nurses to acquire a higher computer literacy levels, in relation to their field of nursing practice (intermediate or advanced), to provide better care.

In our daily routines, there is always a constant need learn new skills for documentation, information retrieval, archiving and so on,…. I feel like we are turning into robots...

In our work, we learn new techniques every time, and within a short while, new innovative technique come up, and then we have to learn again, to keep up with changes and provide better care as part of our professional growth...

This therefore demands that, eHealth nurses to should be mutative in adapting to changing computer skills. This, with a view of being be able to fluently interact with the eHealth systems, in managing patient's health records, data, and other information and communication technologies, that nurses use in their daily routine in nursing care, to generate, exchange, store and retrieve information.

Furthermore, participants during the interviews, pointed that, nurse's optimum performance in an eHealth environment, is greatly affected by their level of informatics skills, and that in order for nurses to be considered as competent enough, basic computer literacy, should be coupled with clinical and technical knowhow on what information is needed? Where to source the data or information from? And how to apply and assess its effectiveness? Thus, be able to critically manage information in its entirety.

I was trained before the computer era, and using this new computer and information tools are a great challenge in my work, and at times limit what am able to do, since I have to always seek help…

My clinical skills play a greater role, but with less knowledge and on using advanced methods of sourcing information when I need it urgently, I feel incapable…

…having the skills to source right information faster, critically make decision, and give informed advice to patients makes the difference in my work, since I rely on trusted information sources to manage my patients.

Moreover, participants rooted for nurses to have the necessary informatics skills, since the quality and effectiveness of the nursing care is dependent on the information the nurse receive and share with all the stakeholders involved in the care. Respondents voiced the fact that, nursing is an information based career. Hence, nurse's actions and outcomes, are dictated by the nature of the information they have, and are able to access and share when needed.

…We need real time information to be able to make decision on the nursing diagnosis, care plan for our patients, I feel that being able to access real-time secure information is crucial in providing safe and good care now and also in the future ….

Participants pointed out the need for nurses to be able to proficiently use information and communication tools and to develop an understanding of key constituents and concepts of information and communication systems and standards. This, while being able to exploit their potential in providing nursing care.

I feel that in the near future, nurses need to be digital native, adapting to the new care environment, while embracing the information and communications systems... When a client comes to our unit, the efficiency in my skills to use the

necessary gadgets, source and assess information gathered on the client is important...

.....Most of the patients that come to our unit, tend to be informed about their ailments and have read information from the internet and other sources, thus as a nurse I need to stay on top of the game, in accessing right information and providing the needed care.

A number of participants felt that, informatics skills, can be improved if the nurse exhibit innovative approach of working with the myriad of information and communication technologies. This is because, the role of nurses in eHealth era, has changed drastically, from providing patients with all information on managing their health and living healthy, to that of working together, while assisted with the technology, to give the patients the freedom of choice and personalized care.

I feel that our duty now and in the future as nurses, is to assist patients to outsource information and better choices for their health and wellbeing, as a nurse I need the skills to guide them on how to access information and assist them to manage their diseases.

...We need training on how to smoothly handle this changing operating nursing environment, to be able to creatively solve the challenges and apply the technologies proficiently....

Thus, nurses have a role to encourage patients to adopt and use eHealth related technologies and support them in making independent choices, while recognizing the challenges and risks associated with the eHealth systems. This is important in building, personalized nursing information and knowledge base on the patient's status, their need for care, plan and the intended outcome.

The abundance of information improves quality of care, and evidence based practice, through proper information management. Nursing informatics competency therefore is a vital skill, needed by nurses working in an eHealth environment today and in the future.

9.2   Knowledge Management.

Participant in this study identified the ability to manage knowledge, as fundamental skill needed by nurses, working in an eHealth environment now and into the future, to transform the patient care information and experiences into practice. Similarly, the participants pointed out that, nursing care is a knowledge rich and evidence based practice, and that, the care knowledge is gained from the practical experiences, training and research based evidence, and relayed through processes, which forms the basis of professional care.

…. The information and skills that we use to care for our patients, is spread across several sources such as in the electronic health record, which we all can access, and also through our own personal experiences that are not documented….

.. Our job as nurses depend on what we know about the patient, so you have to be professional enough, to have the right information, to know what you are doing.

… Our ability to make nursing care decisions is based on our clinical knowledge, experiences and the information gathered in the initial assessment stage, and that which has been studied and proven to be beneficial...

Knowledge management skills, was argued to be a vital skill that nurses need to harness in order to be able to provide safe and quality care. Nurses working with clients in an eHealth environment should be able to generate, share and integrate knowledge, in all care processes and interventions, whether from the unambiguous coded information from electronic health records, or tacit knowledge from experience.

This, involves knowing how to use information tools to source and share knowledge in intranets and extranets, and many more eHealth systems to come in the near future. Making knowledge readily accessible and available to nurses and other healthcare practitioners, patients, families and all other stakeholders, at right time and place.

…Working as a nurse, I feel that what I know about a patient care is important to the other nurse and for the continuity of care.

..The more information we are able to share, the better the care outcomes….

… When we give reports at the end of our shifts, we convey our knowhow, since not all we know is usually documented in the electronic health records. Everyday, we are bombarded with information about our patients….

…nurses need to have the expertise to work with tools or systems that will provide them, with the right information that they can turn into action whenever they need it……

In addition to that, participant argued that nurses who are able to manage knowledge effectively, are able to reduce and even eliminate medical or nursing errors and near misses that are common occurrence in nursing care interventions. These errors are attributed to lack of right knowledge at the right time, when making important decision. This can be prevented through managing knowledge appropriately. The application of information and communication in healthcare (eHealth) aids in managing knowledge, however it is the nurse's responsibility to make informed decisions based on proven knowledge, to improve quality and safety of care.

… Since the introduction of Haipro systems, we have been able to report electronically, the medical and nursing errors, and be able to learn from them. This has gone a long way to improve the safety of care...

In my unit where we perform specialized care, readily available information is critical when performing an intervention….

As a nurse, I know my limitations, hence daily, I try to update my knowledge base, so that I am able to discharge my duties effectively… whenever I have a problem I seek help from colleagues who know it better and have experience.

The capability of a nurse to manage knowledge in nursing care in eHealth environment, involves skills in generation, retrieval and sharing of knowledge and evidence based practice. This is essential in enabling the patients to achieve better, safer, quality care, with reduced adverse effects caused by human errors, a guaranteed continuity, innovation, and collaboration, amongst all stakeholders involved in the care process.

Hence, with adequate knowledge management skills, nurses today and in the future, will be able to make informed decisions and take actions based on proven knowledge. To generate and distribute knowledge in future requires proper communication skills, which is going to be explored in the next sub-chapter.

9.3   Communication

Communication was identified by the participants, as one of the central skills that every nurse working in the contemporary eHealth environment, and in the future care setting, require so as to provide effective and safe nursing care. Communication was reported to have a direct bearing on nurse's decision making capabilities, and the respective nursing care outcomes. The quantity of information exchange in hospital settings is vast and thus, the need for proper and effective communication skills.

EHealth nursing according to me is about communication and access to information in the right place and right time…

…for me, it is about knowing how to exchange information between nurse, knowing when to talk, listen and be understood.

Furthermore the participants, alluded to the view that, working in an eHealth environment, demands that nurse demonstrate an array of communication skills. These skills, ranges from the basic skills such as writing and oral skills, to having the right interpersonal skills, being literate enough to operate communication and media gadgets. These skills are crucial in creating a nursing relationship and building trust with the clients, cooperating and working together to manage their medical conditions, and assist clients who may be disadvantaged or unable to use eHealth services.

When providing consultations through the phone or video call, I always try to have a friendly and calming voice, listen and show empathy through my tone, to gain clients trust to talk about their fears and challenges about their ailments…..

I think nurses should be able to make sure that the client is able to communicate effectively, without feeling isolated, exploited or misunderstood. Having the skills to use media effectively is important.

..We need to use technology to build hope to the patients and enable them manage their ailments and suffering by effective use of technology….

Reflecting on their own experiences, participants expressed the view that, nurses need to be equipped with good interviewing skills in order to be able to conduct appropriate nursing assessment, when using eHealth tools such as telephone, video chats among others devices. The interviewing skills includes both graphical

and nongraphic skills (such as tone, breathing, as in the case telephone conversation), listening skills and enquiry skills.

Nursing care is based on the nursing assessment, good assessment results into a good care plan and implementation, for better nursing outcome. Additionally, participants further stated that, having the right interviewing skill alone was not enough to communicate in the future eHealth settings, but also coupled with solid clinical skills and experience, to make quick informed decisions.

..The way we nurses present ourselves on the phone or in camera, show the kind of feelings we have about the patient or situation…. it is important to be professional and let the patients know that we are there for them and establish care relationship behind technology.

Likewise, participants reported that nurses communicating with clients in an eHealth environment should always have a positive approach to clients and issues, thus it is essential to be able to communicate effectively, to provide a good assessment and appropriate triage for patients. Nonetheless, the communication jargons used during conversations between nurses and patients have a greater bearing to the nursing outcomes, which can either be positive or negative. These conversations are always not sufficient enough, due to open ended questions that characterize these encounters. Hence, insufficient communication risks patient safety.

..Having the right clinical skill goes a long way, but the conversations with clients are hindered sometimes by the difference in professional language we use….

..It is stressing to make nursing assessment through telenursing devices, for example a phone call, we mostly use open ended questions and thus this usually results into inadequate exploration and understanding in the patient assessment….

Proper communication skills in nursing care, according to the participants, demands that the nurse should be able to document the care processes and interventions in a way that the data is easily retrievable, up-to-date and easy to understand, using the eHealth technologies. This demands that the nurses need to be skilled on how to use all the different forms of communication and information technologies employed in the healthcare delivery today and in the future. In addition to that, clinical skills and experience is essential tool that go hand in hand with communication in nursing care.

As a nurse conducting assessment, I need some small but very important details of the patient that I am assessing through video or telephone consultation, such as skin tone, that can indicate a lot about the patient health status. Wrong equipment's might interfere with the assessment.

If the phone connection is not of good quality, it is stressing for both the patients and nurse, technologies sometimes fail…

Therefore, nurses working with patients in an eHealth environment should be skilled in using appropriate language, media literacy and information sources, for effective communication. This helps to reduce communication breakdowns and be able to provide guidance to patients on sources for relevant care information. EHealth as a tool in providing care should be used by nurses to improve communication with the patients, and enable them to get personalized care, through efficient information exchanges that results into better outcome.

Hence the goal for good communication skills for nurses working in an eHealth environment now and in the future, is to improve the patient safety. This, by avoiding communication breakdown which is a common cause of medical errors and near misses, guarantee a smooth continuity of care based on a smooth flow of communication through proper channel and media in a timely manner, and improved individualized patient care.

9.4   Ethics

Participants in this study, voiced ethics as a key skill for all nurses working in the contemporary and in the future eHealth nursing era. Reflecting on their own experiences, they pointed out that, nursing care is a practice grounded on the fundamentals of respect for human dignity, autonomy and independence. This is in line with core nursing values and human rights, hence ethical practice is paramount.

…I feel that the patient privacy should not be interfered with, we should always be able to honour their dignity as we provide care, based on the nursing ethics and code of conduct ….

... I think that these new technologies, predisposes patient to rights violation, hence nurses should stand firm to advocate for the patients….

Participants reported that, nurses working with patients in an eHealth environment, need to observe patients privacy strictly, while dealing with patient information or data , since the patients have right to protect their personal information and only through consent, can they grant nurses and other healthcare practitioners, the access, and expect nurses to keep confidentiality and advocate for patient rights. Therefore, nurses need to abide by the data protection statutes accordingly.

.. We have the responsibility to maintain our client's discretion, all the time we need consent to be able to access their electronic health records, so the client have control over their information and we are custodian of their trust...

As nurses, I think we should keep the patient's informed of their rights and advocate for high professional standards in providing care, and keep them informed of possible breaches in privacy.

Nurses are bound by the virtue of their professional obligation and ethics, to provide personal care and assist patients no matter the patient's competency level to use information and communication technologies. This is intended to guarantee those patients, whom could have otherwise missed care, the equal opportunity to access similar care.

Nurses operating in an eHealth environment now and in the future are expected to encourage ethical practices through building trust with the patients. Nurses should be able to be transparent in dealing with patient data, making them accountable to their actions, and making access to information secured and following laid down protocols, while gaining consent from patients when accessing their personal data.

.. I feel that nurse should always access patient's information that is needed to make decision at the moment of care, and not any other unnecessary information...

..As a nurses, I always explain to the patients about possible breach of privacy on phone calls or other modes of relaying information and follow protocol…

...Identify system errors and report security risks, is a primary goal for nurses...

In addition to issues of trust and confidentiality, participants in this study, brought about an interesting view on patient data ownership in the wake multiple data sources, in an era bound by frequent violation of patient confidentiality and trust. However, there was a convergent view that, patients own their personal information and that the nurses and other healthcare practitioners are custodians entrusted to keep information and that they both share the responsibility for its safety. Hence, openness to clients about possible data breaches, policy changes and protocols, should be key in future ethical practice in eHealth nursing care.

When our clients give consent to use their information, the usually choose where it can be used and which organizations can access it….

…thanks to e-archive system used today, they can always request for their personal data to be corrected whenever there is a wrong entry or breach….

We cannot pretend that the patient information will be fully secure, there are instance in our daily activities that exposes patient information to risks…… all we need is to accept and talk about it openly with our clients….

Protecting the patient information has been challenging, since their information is usually held by many other organizations….

Likewise, the nurses in the interviews suggested that, use of eHealth technologies, needs to be applied in a balanced manner where the patient's privacy and health needs, are in sync with eHealth systems demands, without risking either. Nurses need to have the skill to recognize the ethical dilemmas that exists between keeping the ethical principles and incorporating eHealth technologies in nursing care delivery.

Nevertheless, there was a voiced a concern that, nurses need to observe the legal and policy demands, in their practice. This is because it is part and parcel of the providing ethical practice within the organizations they work with. Professional ethical practice should be adhered to, throughout all nursing interventions, decisions, assessments, at all time. Nurses providing care assisted by the eHealth technologies, must be aware of the legal implications of their action.

…Nurses need to safeguard ethical virtue, be transparent in all their nursing care processes, to instill trust in their relationship with the patients…

As a nurse, I might be excellent in discharging clinical nursing care… but if I do not operate in line with the nursing ethical codes, then my actions can be seen as risking patient safety...

Moreover, participants explained that, nurses working with clients in an eHealth environment, are expected to be accountable and responsible for their actions and decisions, and be able to practice safely within the legal and ethical parameters, guaranteeing safe, secure and ethical nursing care and be able to amicably solve conflicts and ethical dilemmas that come with the incorporation of information and communication technologies in nursing.

10 DISCUSSION

10.1 Discussion of the results of the study

This study is part of a curriculum development process, that was set to explore the experiences of nurses working in Finland, in the contemporary eHealth settings, with the view of identify nursing competencies, which can developed by nurses through a higher educational training, to enable nurses to provide nursing care effectively to patients, today and in the future. This while at the same time, generating new knowledge and practical applications for the development of the new curriculum in eHealth at Lahti University of Applied Sciences.

The results of this study has demonstrated that, informatics, knowledge management, communication and ethics are fundamental nursing competencies needed by nurses to provide care today and in the future eHealth environment. This can be can be attributed to the fact that the participants in this study, considered these skills as being vital in every nursing care process, and that they have a greater bearing towards nurses performance and the care outcomes. This knowledge therefore, will be important in the curriculum development process, by offering a benchmark on what competencies, should be considered and emphasized when developing modules that are critical in generating specific skills which targets the key areas that nurses need to develop to be competent eHealth nurses.

Evidence from this study, has brought into focus the current competency levels of nurses working in eHealth environment in Finland. Participants reported to have had inadequate skills in areas such as computer literacy, information management skills and media literacy, which limited their ability to provide nursing care effectively. This is a fact that has also been supported by Finnish Nurses Association (2015, 4-7) and Rajalahti & Saranto (2016, 2), as a stumbling block, for nurses to embrace and realize the full potential of eHealth in nursing in Finland. This has serious consequences on the nurse's performance and care outcome. Having right eHealth nursing competencies has a positive impact on nurse performance and care outcomes.

The vacuum of knowledge and skills on eHealth demonstrated by this study, can be attributed to two main factors that the paricipants pointed out in the study. This include the background training and working experience as a nurse before the advent of eHealth technologies in nursing care processes, and the other one being the piecemeal professional studies that the nurses recieve as part of proffessional development, whenever a new system or product is introduced in the nursing care process. Hence nurses working in future eHealth environments, will require a wholistic training curriculum that not only offers piecemeal courses whenever need arises, but rather a well developed curriculum that is dedicated to instilling the neccessary holistic eHealth nursing compitencies.

The findings of this study therefore, has further supported in strong terms need for nursing educators to urgently introduce and nuture the skills and knowledge on eHealth compitencies for nurses, by introducing curriculums at higher educational institutions. This will translate into a wave of transformation throughout Finlnd , capable of delivering high quality care and services, improving patient safety, costs and nursing satisfction and performance.

The absence of a curriculum tailor made to specifically educate nurses on eHealth competencies, is seen as a major hindrance to ensuring effective and efficient safe care. This is because the traditional nursing curriculums in Finland, have not always provide the desired training to gain the competence to use eHealth appropriately. This is a trend that has to change based on this study.

Previous studies and literature on eHealth nursing (Norwegian Nurses Organisation, 2013, 15-16; Barakat et.al 2013, 1; Doswel et.al 2013, 103-107; vanHouwelingen et.al 2015; Finnish Nurses Association 2015, 4-5; Alpo et.al 2016, 127-136.), had raised questions on the need for nurses to gain key skills needed to operate as a competent eHealth nurse. This formed the stimulus and the starting point for exploration in this study.

The findings of this study, paints a new outlook on nurses roles and meaning of being a competent eHealth nurse for the future. It depicts a competent nurse as one who exhibit an array of practical skills and knowledge, in operating and managing information and communication systems, which are essential in

providing care in an eHealth environment, while, grounded on clinical nursing skills. This can be accredited to the fact that, Nursing is an information based career, where timely information is crucial in decision making (Vinson et.al 2011, 265-275). While on the other hand, well informed patients feel empowered and independent to manage their conditions and reduce complications and adhere to care. (Bastable 2006, 11-154).

EHealth nursing competencies just like any other nursing competencies, should have a holistic approach that encompasses the nurse abilities, knowledge and principles in providing care (Cowan et al (2005, 355-362). The findings of this study further depicts a competent ehealth nurse as being information systems savvy, able to manage vast patient information and data whether big or small data.

Similarly, they have advanced computer skills and are media literate capable of operating information and communication systems, applications and gadgets. Furthermore, be good communicator, but still be able to carry out nursing assessment and intervention in a compassionate and humane manner. These findings correlate to the traditional and information competencies described by Norman & Skinner (2006 b), in their Lily model, as being essential for eHealth literacy.

Moreover, the findings further portrays a future competent eHealth nurse, as one who has the ability to mutate and adapt to the dynamic new roles, far much demanding and complex, than those in the contemporary care settings, which requires further education. The changing of roles for future nurses in eHealth care settings that has been identified in this study has the potential to transform the qualifications for the advanced nurses graduating from the new curriculum to be developed.

This will dictate the advanced nurse's titles and job description, based on their new role. With the constantly shifting nursing roles in the eHealth era (Finnish Nurses Association 2014), nurses are expected to have the right knowledge and skills to provide effective, quality and individualized care (Doswel et.al 2013, 103-107; Finnish Nurses Association 2015, 4-5; Alpo et.al 2016, 127-136).

Similar study conducted by Barakat et.al (2013) and van Houwelingen et.al (2015,50-62) to identify eHealth competencies for nurses, yielded comparable competencies such as information, communication, and ethical skills. However, it is important to note that, this study has expanded the knowledge base on these key skills, by further breaking them down into fourteen constituent skills that the participants in the study, raised as essential in being a competent eHealth nurse. In addition to the above named competencies, this study also identified knowledge management as a vital competency.

Likewise, the findings also mirrors the recommendations by the Finnish Nursing Associations (2015, 7) eHealth strategy 2015-2020 targets, that suggests that nurses need training to acquire the right competencies, in areas of informatics, media literacy. Therefore based on this, it can be reported that the result of this study supports, the existing knowledge on essential eHealth skills and their importance to nurses, while at the same time expanding the knowledge base, for future research and demands.

Weighing on the findings of this study it can be argued that, the results are not only consistent with the findings of the previous studies on the need for nurses to have the essential competencies, but also established a stronger link between these four main competencies (informatics, knowledge management, communication and ethics). This links includes better quality nursing care services, improved patient safety and accessibility of information and services, reduced adverse effects caused by human errors, improved nursing performance and outcomes, a guaranteed continuity of care, innovation, research and collaboration, amongst all stakeholders involved in the care process.

These strong links identified by this study, goes further to strengthen the argument that the new curriculum in eHealth should be expeditiously introduced to improve the quality of nursing care and instill the essential competencies (Sharma & Clarke, 2014, 164; Ahonen et.al 2016, 203-207).EHealth competencies identified in this study, are pegged on the behavioural concept of achieving nursing competency. since they are grounded on skills that can be learnt through training (Watson et al. 2002, 421-431; Meretoja et al. 2004, 329–336.; Cowan et.al 2005, 355-362; Anema & McCoy 2009, 6; Garside & Nhemachena 2013, 541–545.)

The effectiveness of eHealth technology in nursing care processes in Finland today and into the future, will be dictated by the ability of nurses, to proficiently operate in an eHealth environment (Finnish Nurses Association 2015, 4-7; Rajalahti & Saranto 2016, 2). This, coupled by the need to constantly acquire new knowledge and skills through training (Booth 2006; Stellefson et.al 2011; Gifford et.al 2012; Sharma & Clarke, 2014, 164; Ahonen et.al 2016, 203-207).

Based on the knowledge of the current literature on eHealth nursing in Finland, it is accurate to report that this is the first study conducted on eHealth nursing competencies in English, which solely concentrated on exploring the nurses' experience in identifying eHealth nursing competencies. Hence, this study has not only identified these eHealth competencies as being key competencies, but also elicited new knowledge, and meaning on the need and importance of developing the new eHealth curriculum for nurses.

This, while contributing to the expansion of eHealth nursing literature in relation to competencies. These results therefore, will have a positive impact on what modules should be introduced in the new curriculum, as will be discussed in the next sub chapter that focuses on the importance of these findings in curriculum development.

What is previously known on eHealth Nursing in Finland

- Nurses need to constantly acquire new competencies through training , to be effective in providing eHealth nursing care
- Nurses working in Finland had inadequate eHealth Skills
- Nursing care is a knowledge and information rich and evidence based practice
- Nursing care has been metamophosized by the introduction of eHealth

New knowledge developed by the study

- Identified in details four fundamental competencies(Informatics, knowledge management, communication and ethics) that are essential and can be taught to nurses, and demonstrated a stronger link between these four main competencies to better quality nursing care services, improved patient safety among other benefits.
- Demonstrated that nurses working today in eHealth environment have inadequate eHealth skills in computer literacy, information management and media literacy skills.
- Clinical nursing skills must be intergrated with information and communication skills inorder to a competent eHealth nurse
- Identified the changing role of nurses in eHealth environment, that demands that nurses exhibit innovative and creative approach of working with the myriad of information and communication technologies and be mutative in adapting to new skills.
- Highlighted the need to break a common trend of piececemeal profesional development courses in gaining eHealth competencies to a more comprehensive and holistic curriculum
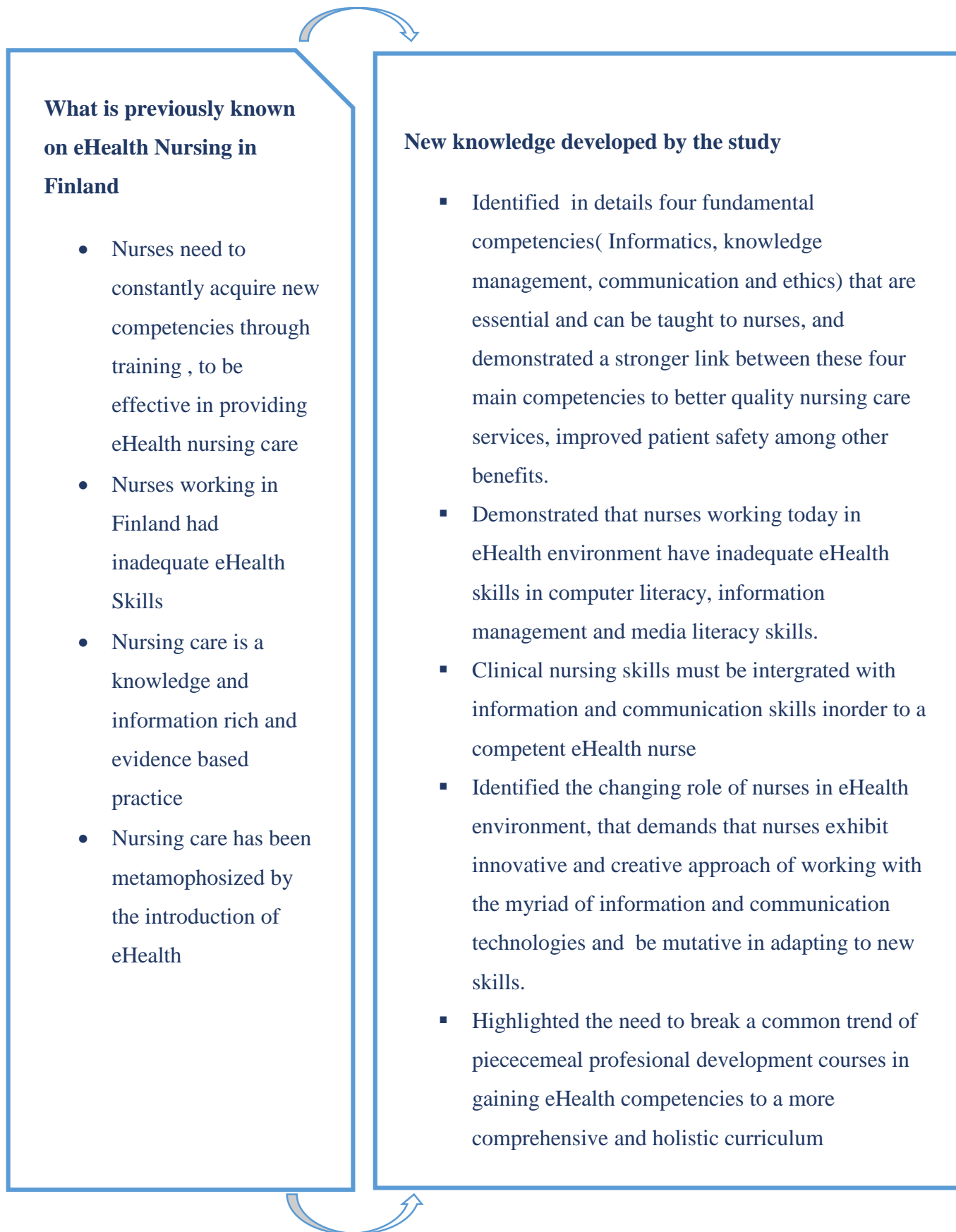
FIGURE 5. Brief summary of new knowledge developed by the study

10.2 Practical implications and future research

This study elicited several new viewpoints and knowledge on the future of eHealth competencies, which have clear implications on the curriculum development process and future studies. Competency based nursing education dictates that, a nursing curriculum should be competent, viable and able to meet the demands of nursing care for patients with complex challenges and a dynamic healthcare system (Candela et.al 2006, 59–66). It should guarantees that the nurse attains the knowledge, skills and mindset, necessary for the role in the working environment and advance academically (Anema & McCoy 2009, 3-5).

First and foremost, the outcomes of this study has demonstrated that nurses working today in eHealth environment have inadequate eHealth skills in areas such as computer literacy, information management skills and media literacy skills. This directly translates into a need for the new curriculum, to develop modules or programmes that will provide nurses with the opportunity to gain advance computer literacy levels, information management skills and media literacy skills. These modules should be tailored to meet the future demands for eHealth nurses, giving them the fluency of providing competent and quality care.

Secondly, in developing the new curriculum, study modules or units should be created that offer nurses with the possibility of acquiring these four main fundamental competencies (informatics, knowledge management, communication and ethics) identified in this study. This will provide the nurses with the foundations of being a competent nurse for the future.

Under each and every one of the key competencies identified in this study, underlying skills for example informatics with a sub-.skill such as information management, should be taught to deepen the understanding, and provide holistic and not piecemeal courses, that would lay strong foundation on eHealth nurse for the future.

Hence, in drawing the new curriculum, emphasis should be focused on developing theoretical modules that will be able to provide nurses with the opportunity to learn and practice, the various competencies identified by the study. Tilley (2007, 285-289), describes competency based education as a tool, that tangles together theory gained through active learning and practical experience.

Thirdly, the new curriculum to be developed, should be able to educate nurses on how to integrate clinical skills and information and communication systems, applications and gadgets. This should also include training on how to practically apply the skills in everyday nursing care process as a unit and not as individual competencies.

This is one critical issue that was voiced by the participants, as being part and parcel of operating as a competent eHealth nurse. The curriculum must therefore provide a climate conducive for instilling these skills, and nurturing innovativeness and creativity, with realistic expectations and targets for nurse to achieve in order to be considered competent in eHealth.

Fourthly, the new curriculum should be developed based on the understanding that, there is a continuous change of nursing roles in an eHealth environment, as highlighted in the study. This changing of roles for future nurses has the potential to transform the qualifications for the advanced nurses graduating from the new curriculum to be developed, thereby dictating their titles and job description.

Hence, the curriculum should be tailored to enable the advanced nurses graduating from this eHealth master's program, to confer to new titles and specializations based on the Finnish law. Nursing students at all levels of studies, should be expected to attain the performance levels stipulated for accreditation by the University and The Finnish National Qualifications Framework NQF.

Last but not least, There is a need for this new curriculum being developed, to break a common trend that has been exposed by this study, that has shown that nurses working in the contemporary eHealth care settings, rely on piecemeal professional development courses that are offered by the organizations the work for as part of advancing eHealth competencies, to a comprehensive training curriculum that is well grounded on the broader need competencies for nursing

for the future and structured to instill the necessary holistic eHealth nursing competencies. Traditional nursing curriculums in Finland, have not always provide the desired training to gain the competencies for nurses to fully exploit the potentials of eHealth in nursing care.

The outcome of this study indicates an initial bearing for further education and assessment of eHealth nursing skills in Finland. Thus, the results of this study, should therefore be considered as pointer for eHealth competency based education and assessment, and a wakeup call for nursing educators in Finland to consider the prospect of introducing eHealth related curriculums nationwide, at higher education institutions.

 Additionally, the role of training of nurses to develop these skills, should not be left entirely on nursing educators, but to all stakeholders including nursing employers, since most of the nurses working today, had their training, before the dawn and expansion of eHealth era, and that both share the responsibility of realising the goal of competent eHealth nurses for the future.

Future research with similar focus in identifying nursing competencies for future eHealth nursing environment, could also be conducted in other languages, based on the suggestion on results and the shortcomings of this study. This is with the view of generating a comparison and rich data on eHealth competencies for nursing care, which cut across the language divide, and has broader view on eHealth nursing skills.

Similarly, future studies should explore the competency levels on nurses working with eHealth systems in in Finland to gauge how competent they are? This will go a long way in determining the needs for future education and the new competencies to be developed. Equally, Future studies should also examine the valuable contribution of individual nursing competencies to team or organization performance. This is important in deducing the wider reaching effects of eHealth skills, have on nurses' performance at both team and organizational level, an interesting area that has not been focused or highlighted in this study.

On the balance of the results obtained, it can be reported that, the study achieved its goals, of identifying eHealth skills and generating new knowledge as shown in brief in figure 5 above and generated practical applications for the curriculum development. It is important to note that these results were achieved in the backdrop of shortcomings in the research processes as discussed in the next sub-chapter.

10.3   Limitations

This study had share of limitations. First and foremost, the results of this study, were based on the opinions of 15 nurses who participated in the interview sessions. This could have consequence on the generalizability of the findings on the broader nursing fraternity in Finland. However, the results of this study, reflects the current reality on the ground on the expected eHealth competencies for nurses. This has been supported by the fact that the findings, mirror similar studies conducted earlier.

The number of participants in this study may have been limited by the inclusion criteria used in the sampling strategy, that targeted participants that had at least one year experience working as nurses in an eHealth environment, and were able to express their views in English. Hence, this might have possibly locked out participants with more or divergent views on eHealth competencies, who could have expressed their views in other languages. Future studies should also be conducted in other languages to enrich knowledge and data on eHealth nursing competencies.

Secondly, English language skills and proficiency of the participants in this study, should also be considered as a standalone limitation, based on the fact that, in this study, all the participants were expected to express their views in English, with no specific requirements on proficiency. This may have resulted to unforeseen effect on the suitability of the jargons used in providing response to the interview questions, where a statement from a participant could be construed to have several meanings.

The study dealt with this challenge by the researcher counter checking and proof reading and comparing the results of the analysis to the transcribed text. Future studies may benefit from a more flexible sampling strategy that might result into larger sample, who are proficient in the language in which the data collection is being conducted, this might generate more views on eHealth competencies.

Thirdly, the data collection method employed in this research was that of semi-structured interview, that was conducted on a face to face basis. Hence, the existence of the researcher was inevitable. The characteristics of the researcher during the interview and those of the participants, such as body language or tone, may have resulted into unprecedented bias. This can be equated to the fact that, the researcher was had no previous training on interviewing skills. This limitation can be avoided in the future, by training researches on interviewing skills prior to conducting the interviews.

Last but not least, one other limitation in the study was the change of the data collection methodology from the initially planned group interviews to individual interviews, based on the unforeseen circumstances from the hospital units where the participants were sourced. This interfered with the time limits initially planned for data collection from two months, to three months. Likewise, this had a bearing on the time taken for transcription, coding and the analysis process. To counter the limitation, the researcher employed the use of a qualitative data analysis software Nvivo 11 to code and transcribe the interviews.

Similarly, after the analysis process the researcher invited participants to counter check the findings of this study, to verify that the results of the interview accurately represented their views. Future results could use more experienced and trained researchers to aid in the analysis, to code the text and identify emerging themes based on interpretation of the text and compare their findings. In order to deal with this limitations, of being one researcher. It can therefore be confirmed that, the results of this study represents the credible representation of the narrative of participant's views, based on their experiences on eHealth nursing competencies.

10.4 Reliability and validity of study

In many literatures and studies conducted on how to measure the reliability and validity of qualitative studies, researcher seems to have agreed, that the practices and the consistency used in measuring the quantitative studies, are not relevant or transferable to qualitative studies. This is based on the fact that they are counter-spontaneous, to the very nature of qualitative research design. (Elo & Kyngäs 2008; Moretti et al. 2011, 420 – 428; Merriam 2014, 209-215; Leung 2015, 324-327; Noble & Smith 2015, 34-35.)

Hence, reliability and validity in a qualitative study, can be demonstrated by four main ways, which includes credibility, transferability, confirmability and dependability of the study result and processes (Leung 2015, 324- 327; Noble & Smith 2015, 34-35). Merriam (2014, 209-215), further states that reliability, is the degree through which the results of this research project can be measured in relation to the research target or question. Therefore, this gives the reviewer, the opportunity, to pass judgement of the validity and reliability of a given research.

In this qualitative study, the goal was set to find, the rich and contextualized data, that provide answers to the research question, on the nursing competencies, needed to be developed by nurses through higher education training, to enable nurses to provide nursing care effectively to patients, working in an eHealth environment today and in the future, based on the nurse's views.

First and foremost, in this study, the credibility of the study result was achieved through the participant's approval of the result of the study. A copy of the findings was emailed to the participants, to approve whether their respective perspectives were represented correctly, since the purpose of this qualitative study, was to describe the phenomena based on their views. Out of the 15 participants interviewed, 13 responded and approved the findings, the other two participants did not respond.

Secondly, transferability in this study was realized through a systematic description of methodologies used in this study right from the design, sampling, data collection, analysis, detailing the steps carried out and criteria used in making decisions and choices. This has critically affirmed and demonstrated the structural

and content validity in this study. This was with a view of making the process transparent and easy to follow and replicate. (Merriam 2014, 209- 220; Saldana 2011, 135.)

Throughout the research process, the illumination of the phenomenon under investigation which is the nursing competencies in eHealth, and the views of the participants in the study were given priority. Hence, to ascertain generalizability of the results of this study, which was not the initial goal of the study a researcher may need conduct a similar study with a different population, employing similar methodologies used to confirm the results.

Thirdly, the dependability of the results of this study can be traced from the various accounts of the dynamic context the study was conducted. Taking into account the changes that occurred throughout the process. For example, the sampling strategy used in the study, the purposive sampling, detailed the characteristics of participants included in the study as outlined in the sampling strategy section. This represented, both the sampling and internal validity of the study, and limits the data clarification to the participants involved in the study. (Moretti et.al 2011, 420 - 428.)

Last but not least, conformability of the study results in this research, which refers to the clear representation of the data provided by the participants and not those of the researcher, outlining clearly the prevailing conditions in the data collection process (Elo & Kyngäs, 2008). This was achieved by clearly including direct quotes from the participants, from the transcribed text, on the various competencies identified in the study. Confirmability was also demonstrated by the documentation of procedures or steps carried out in the study and the active description of possible bias and what counter measures were undertaken to limit them.

10.5 Ethical considerations

Ethical considerations were taken into account, throughout the entire study. Before the data collection process, participants were provided with detailed information on the scope of the study, why the study is important and what it intends to achieve. This was intended to enlighten the participants, to make informed decision while giving their consent for the study.

The participants were then asked individually to give informed consent of their participation in the study, by signing the information and a consent form attached in appendix 2. Since the participants were contacted on individual capacity, there was no need to seek permission from the ethical committees of the units where the nurses worked. (Miller et.al 2012, 60-65; Ritchie et.al 2014, 80-85.).

Participation in the study was voluntary and the participants were not obliged to participate in the interviews, and that the interviews were free from coercion. Confidentiality and anonymity of the participants reigned paramount throughout the process, designed to allow more participation. (Kings & Horrocks 2010, 117; Miller et al. 2012, 60-65.). Privacy as a right was observed, through organizing interview sessions according to the nurse's wishes in private rooms and in ample times to avoid interference.

In the data collection and publication stages, privacy and confidentiality was strictly observed. This was by excluding participants identifying information to create anonymity. Anonymity was further achieved by giving the participants codes and avoiding using names during the interview sessions. (Hill 2005.)

Participants in the study were informed that the data sourced from the study will be used and that at any point thought the study process, were they going to be harmed in anyway as their rights are considered. The interview recordings were kept safe in the computer with a secure password need to access them. After publication of the results, the recording will to be deleted accordingly. (Ritchie et.al 2013, 80-95.)

11 CURRICULUM DEVELOPMENT PROCESS AND WORKING LIFE CONNECTION

Institutions of higher education today are faced with the obligation to prepare graduates to face the demands of the workforce. This lays emphasis on the need for the competencies identified in this study such as informatics, communication, knowledge management and ethics that are considered as desired knowledge and skills for a competent eHealth nurse, to be streamlined into specific actionable statements that spells out the desired outcomes that can be assessed and evaluated, in this curriculum development process.

Based on the findings of this study, it is important to demonstrate how the competencies identified by this study, will translate in the working life for nurses providing care in an eHealth environment. In this curriculum development stage, the focus will be on specific activities that the nurses will be able to perform once they acquire the competencies identified.

To set the ball rolling, the study identified the need for nurses working in an eHealth setting to be competent in informatics. This translates in real working life or practice, to a nurse being able to demonstrate critical skills in computer and computers systems. The nurse is therefore expected to gain advanced computer skills and be able to interact proficiently with computer tools such as the different software and hardware's and cloud systems existing today and in the future including smartphone and computer applications to provide effective and safe care. These critical skills should be able to be measured through nurse performance with patients and the systems, whether through examinations or practical demonstrations.

In addition to that, nurses whom have gained competency in informatics, shall be able to demonstrate the ability to source patient data or information from various systems within the hospitals such as the electronics health records, data banks among other sources. Be able to critically demonstrate how to use the information gathered on patient, and assess its effectiveness to the care situation and decision making. The nurse shall be expected to be able to critically manage information in

its entirety. The assessment of information management skills can be based on the health data obtained and the nursing outcomes.

The other competency was that of knowledge management, in respect to this, nurses gaining competency in knowledge management need to demonstrate that they have develop skills to generate, share and integrate knowledge, in all care processes and interventions, whether from the unambiguous coded information from electronic health records, or tacit knowledge from their experiences. The knowledge learning outcomes can be assessed through the nurse performance and quality of care or service provided to patients. Nurse are able to make informed decisions based on evidence based practice.

Additionally, the study identified competency such as communication. In this case the competent nurse shall be able to critically use both media and communication tools and applications fluently, while demonstrating good interpersonal, interviewing and communication skills. This is essential for free flow of information and data, necessary for making decisions and reducing errors. A typical assessment would be gauging the number errors prevented and the efficiency of the nursing services provided

A competent ethical nurses according to the findings, shall be gauged in the working life as one who is able to professional operate under the nursing code of conduct and data regulation policies, assisting the patients equally without infringing their rights to privacy or confidentiality, while being accountable and responsible for their actions. The success of this competency can be assessed based on number of violations prevented or committed. However this can be tricky to assess it effectively.

Turning to my journey through the curriculum development process, my role as a researcher has been to create a conducive atmosphere, where future students for this new curriculum whom are nurses, have a platform to express their views based on their experiences of what should be include in the new curriculum. This is in terms of drawing precise recommendations for the advancement on the guidelines on teaching, learning process and outcomes. This role has been

important since curriculum development is a process that is meant to focus on the learner.

Summing up my experience throughout the research process, it was interesting to view the curriculum development process from the learner's perspective, whom were the nurses who participated in the study, since the curriculum is being built for them to improve on their eHealth competencies. This was achieved though maintaining a critical and open minded approach in engaging participants in the study, by initially laying the ground for them to understand the importance of the research and their contributions in the development process.

The ultimate goal in the whole curriculum development process, will be to mould a competent eHealth nurse, whom has the vast knowledge and practical skills, with ability to provide competent nursing care, coupled with sound clinical nursing skills, and critical decision making abilities. However, it is important to note that level at which the results of this study will be adapted, depends on the implementation process and time. The various practical examples discussed here, are just apportion of how the competencies adapted to working life may be gauged or assessed.

It is important to note that different types of assessment methods should be initiated that have the capability and scope to measure and aid nurses in the gaining of these essential competencies. Hence, enabling further assessment, research and development of eHealth competencies in nursing and in future curriculum development processes.

12 CONCLUSION

Traditional nursing curriculums in Finland, have not been able to provide the desired training for nurses to gain the competencies needed to fully exploit the potentials of eHealth in nursing care. This research process was initiated to identify eHealth nursing competencies to be developed through higher education and also generate practical applications that could be included in the new eHealth curriculum being developed by the Lahti University of Applied Sciences.

The study was significant in bring forth, four core competencies that includes Informatics, knowledge management, communication and ethics. These competencies, represents the new perspectives on what it means to be a competent eHealth nurse for today and into the future.

Faced with the need to identify eHealth competencies based on the nurse's experiences, the study adopted a qualitative research design, which gave the researcher the opportunity to explore and develop a deeper understanding of the eHealth nursing phenomenon through nurse's experience. This was then coupled by purposive sampling method that allowed variety of participants to participate to air their views in a flexible face to face semi structured interview sessions in which fifteen participants participated.

Then followed by an inductive content analysis process in five stages of data preparation, familiarization, coding, and creation of categories and refining categories to create themes. It can therefore reported that the methodologies employed in this study had a higher success rate, since they demonstrated credibility, transferability, confirmability and dependability of the study result and processes, while considering that there were a number limitations.

The findings of this study, are considered as important, since not only did it identify the four main eHealth competencies and generated practical applications for the development of the new curriculum, but also created new knowledge on eHealth nursing in Finland that included demonstrating stronger link between these four skills identified to better quality and safety nursing care among other benefits, Highlighted the need to break a common trend of piecemeal professional development courses in gaining eHealth competencies to a more comprehensive

and holistic curriculum. It also identified changing nursing roles and their future career prospects, the need to integrate clinical nursing skills and eHealth technologies and the fact that contemporary eHealth nurses have inadequate eHealth skills.

The results of this study, has a broader implication on the curriculum development process. EHealth competencies that have been identified by this study, have the capacity to dictate the future nursing curriculum education. Higher educational institution, are bound to initiate and accelerate at a serious pace, the eHealth nursing curriculum developments, that will cater for the demands for nurses to gain these essential skills. However, it is important to note that there are serious repercussion for nurses if they do not have the right competencies to provide nursing care working in an eHealth environment, which threatens the gains realised by the nurse in being eHealth competent.

Competencies identified in this study, should be acquired and practiced in entirety and not as individual skills, for better nursing care outcome and performance. Based on the results of this study, it is important not to oversimplify the competencies necessary for nursing in an eHealth environment down to these four essential skills, but to view them as the pillars, by which other competencies revolve around. The competencies identified in this study should be rooted with sound clinical nursing skills, in order to mould a competent eHealth nurse, ready to face the dynamic challenges of operating in an eHealth environment. This is because, this study has demonstrated the importance of having the right nursing eHealth skills and putting them into practice when needed.

The prospect of future nursing care in eHealth era, rests upon managing the challenges that befalls it today. The Finnish education and healthcare system, will now and in the future be required to constantly tailor eHealth services and training that meets the needs of the patients and resource. This, while ensuring that nurses have the right competencies needed to deliver effective, safer and quality care, and be able meet the demands of their changing roles. The development of the advanced nursing qualifications for nurses who are competent in eHealth skills, will go a long way in ensuring that the full potential of eHealth services delivery in nursing care is realised.

BIBLIOGRAPHY

Printed Sources

Ahonen, O., Kouri, P., Kinnunen, U., Junttila, K., Liljamo, P., Arifulla, D. &Saranto, K. 2016. The Development Process of eHealth Strategy for Nurses in Finland. Studies in health technology and informatics, IOS Press BV, Amsterdam, Netherlands vol. 225, 203 – 207.

Allison, A. & Smith, R. 2013. Addressing Health Literacy through Patient Literacy. Pelican news. Louisiana State Nurses Association, 14-16

Alpo, V., Rachelle, B., Jean, R., Susan, H., Mary, C., Scott, F., Gora, D., Rachelle, K., Jamie, P., Christina, N., Michelle, D., Nessa, B. & Frank, C.2016. Transatlantic collection of health informatics competencies .Finnish Journal of eHealth and eWelfare, Volume 8, No 2-3, 127-136

American Nurses Association (ANA). 2013. Competency Model. ANA Leadership Institute. American Nurses Association, Silver Spring, Maryland, 240-246.

Anema, M. & McCoy, J. 2009. Competency Based Nursing Education: Guide to Achieving Outstanding Learner Outcomes. Springer Publishing Company. New York, 3-50.

Aveyard, H. 2014. Doing a Literature Review in Health and Social Care: A Practical Guide.3rd Edition. Maidenhead: Open University Press

Bastable, S. 2006. Essentials of patient education. Sudbury: Jones and Bartlett Publishers, 11- 154.

Berg, B. 2009. Qualitative Research Methods for the Social Sciences. Seventh edition. Allyn and Bacon, Boston MA, 101 – 157.

Bowling, A. & Ebrahim, S. 2005. Handbook of Health Research Methods: Investigation, Measurement and Analysis. Open University Press, Berkshire, McGraw-Hill Education, 209 -220.

Bridges, J., Gray, W., Box, G. & Sheelagh, M. 2008. Discovery interviews: a mechanism for user involvement. International Journal of Older People Nursing. Volume 3, Issue 3, 206-210.

Bryman, A. 2012. Social Research Methods. Fourth edition. Oxford University Press, New York, 208 -468.

Bryman, A, & Cassell, C. 2006. The researcher interview: a reflexive perspective. Qualitative Research in Organizations and Management. An International Journal. Volume 1, issue 1, 41-55.

Burton, M. & Ludwig, L. 2014. Study Guide for Fundamentals of Nursing Care: Concepts, Connections, and Skills, 2nd edition. F.A. Davis Publishers. Philadelphia.

Candela, L., Dalley, K. & Benzel-Lindley, J. 2006. A case for learning-centered curricula. Journal of Nursing Education, Volume 45 (2), 59–66

Care, W., Gregory, M. & Chernomas, M. 2010. Nursing, technology, and informatics: Understanding the past and embracing the future. Realities of Canadian nursing: Professional, practice & power issues. Philadelphia, PA: Lippincott, Williams & Wilkins. Third edition, 238-258.

Chang, M. & Kelly, A. 2007. Patient education: Addressing cultural diversity and health literacy issues. Urologic Nursing, 27, 411-417.

Chiarella, M., Thoms, D., Lau C. & McInnes, E. 2008. An overview of the competency movement in nursing and midwifery. Collegian, 15. 45–53

Cowan, D, Norman, I, & Coopamah, V. 2005. Competence in nursing practice: A controversial concept – A focused review of literature. Nurse Education Today, 25(5), 355-362.

DeMarco, J. & Nystrom S. 2009. Expanding education technology to meet the needs of patients, families, and clinicians. Health Promotion Practice. Volume 10, No. 1, 15-23.

DePoy, E. & Gitlin, L. 2015.Introduction to Research: Understanding and Applying Multiple Strategies. Fifth edition. Elsevier Health Sciences. Missouri, 190- 196.

Elo, S. & Kyngäs, H. 2008. The qualitative content analysis process. Journal of Advanced Nursing, Volume 62(1), 107-115.

Fagerström, L. & Glasberg, A. 2011. The first, evaluation of the advanced practice nurse role in Finland - the perspective of nurse leaders. Journal of Nursing Management, Volume 19, 925-932.

Garside, J. & Nhemachena, J. 2013. A concept analysis of competence and its transition in nursing. Nurse Education Today Journal, Volume 33, Issue 5, 541–545

Given, L. 2008. In Vivo Coding. The Sage encyclopedia of qualitative research methods. Los Angeles, California: Sage Publications, 72.

Green, J. & Thorogood, N. 2013. Qualitative Methods for Health Research SAGE publication, London, 22-60.

Griffiths, F. 2009. Research Methods for Health Care Practice. SAGE Publications, 135 -137.

Hill, M. 2005. Ethical considerations in researching children's experiences. London. Sage publications, 61-86.

Hirsjärvi, S. & Hurme, H. 2008. Tutkimushaastattelu - Teemahaastattelun teoria ja käytäntö. Helsinki: Gaudeamus Helsinki University Press, 47.

Holloway, I. & Wheeler, S. 2013. Qualitative Research in Nursing and Healthcare. John Wiley & Sons. West Sussex, 15 -144.

Hsieh, H. & Shannon, S. 2005. Three approaches to qualitative content analysis. Qualitative Health Research, Volume 15 Issue 9, 1277-1288.

Hyppönen, H., Hämäläinen, P. & Reponen, J. 2015. E-health and e-welfare of Finland. Checkpoint 2015. National Institute for Health and Welfare (THL). Helsinki, Finland. Report 18/2015, 132 - 138.

Ironside, P. 2005. Teaching thinking and reaching the limits of memorization: Enacting new pedagogies. Journal of Nursing Education, Volume 44, 441–449.

Jokiniemi, K. 2014. Clinical Nurse Specialist Role in Finnish Health Care. University of Eastern Finland. Juvenes Print – Suomen Yliopistopaino Oy, Tampere, 1-8.

King, N. & Horrocks, C. 2010. Interviews in qualitative research. Los Angeles: Sage publications, 117.

Klenke, K. 2015. Qualitative research in the study of leadership. Bingley, UK: Emerald Group Publication, 131.

Kondracki, N., Wellman, N. & Amundson, D. 2002. Content analysis: Review of methods and their applications in nutrition education. Journal of Nutrition Education and Behavior, 34(4), 224-230.

Lahtinen, P., Leino-Kilpi, H. & Salminen, L. 2014. Nursing education in the European higher education area. Variations in implementation. Nurse Education Today 34 (6), 1040–1047.

Laibhen-Parkes, N. 2014. Evidence-Based Practice Competence: A Concept Analysis. International Journal of Nursing Knowledge, Volume 25, 173-184.

Leininger, M. 1991. Culture care Diversity and Universality: A Theory of Nursing. National League of Nursing Press, New York, 35.

Leung, L. 2015. Validity, reliability, and generalizability in qualitative research. Journal of Family Medicine and Primary Care, 4(3), 324–327.

Lucille, J. 2013. Advanced Practice Nursing: Essentials of Role Development 3rd Edition. Philadelphia, 87.

Meretoja, R., Leino-Kilpi, H. & Kaira, A-M. 2004. Comparison of nurse competence in different hospital work environments. Journal of Nursing Management 12 (5), 329–336.

Merriam, S. 2014. Qualitative Research. A Guide to Design and Implementation. Hoboken: Wiley Publication. San Francisco, 209-215.

Merriam, S. & Tisdell, E. 2015. Qualitative Research: A Guide to Design and Implementation. Fifth Edition, John Wiley & Sons, San Francisco, 111-120.

Miller, C., Hoggan, J., Pringle, S. & West, G. 1988. Credit where credit's due. The report of the accreditation of work-based learning. (SCOTVEC). Scottish Vocational Educational Council.

Miller, T., Birch, M., Mauthner, M. & Jessop, J. 2012. Ethics in Qualitative Research. SAGE publication, London, 60-65.

Monkman, H. & Kushniruk, A. 2015. EHealth literacy issues, constructs, models, and methods for health information technology design and evaluation. Knowledge Management & E-Learning, 7(4), 541–549.

Moretti, F., van Vliet, L., Bensing, J., Deledda, G., Mazzi, M., Rimondini, M., Zimmermann, C., & Fletcher, I. 2011. A standardized approach to qualitative content analysis of focus group discussions from different countries. Patient Education and Counselling, 82(3), 420-428.

Morgan, A. 2011. Investigating our experience in the world: A primer on qualitative inquiry. Knoxville: University of Tennessee Press. 14- 65.

Murray, T., Hagey, J., Willms, D., Shillington, R., Desjardins, R. 2008. Health literacy in Canada: A healthy understanding 2008. Ottawa (ON): Canadian Council on Learning.

Nagel, D., Pomerleau, S. & Penner, J. 2013. Knowing, Caring, and Telehealth Technology: "Going the Distance" in Nursing Practice. Journal of Holistic Nursing, 31:104

Neergaard, H. & John, J. 2007. Qualitative Research Methods in Entrepreneurship. Edward Elgar Publishing. Cheltenham. UK.

Nieminen, A. 2011. Advanced practice nurses' scope of practice: A qualitative study of advanced clinical competencies. Scandinavian Journal of Caring Sciences 25, 661-670.

Noble, H. & Smith, J. 2015. Issues of validity and reliability in qualitative research. Evidence Based Nursing, British Medical Journals. 2015; 18:34-35.

Norman, C., Skinner, H. 2006a. EHEALS: The eHealth Literacy Scale. Journal of Medical Internet Research, 8(4), e27.

Norman, C. & Skinner H. 2006 b. eHealth Literacy: Essential Skills for Consumer Health in a Networked World Journal of Medical Internet Research; 8(2):e9

Palys, T. 2008. Purposive sampling. In L. M. Given (Ed.) the Sage Encyclopaedia of Qualitative Research Methods. (Vol.2). Sage: Los Angeles, 697-698.

Pare, G., Jaana, M. & Sicotte, C. 2007. Systematic review of home telemonitoring for chronic diseases: The evidence base. Journal of the American Medical Informatics Association, 14, 270-275.

Patton, Q. 2014. Qualitative Research & Evaluation Methods: Integrating Theory and Practice 4th Edition. Sage publication. Thousand Oaks, 43 -542.

Perry, G., Greenwood, D., Kim, K., Perez, S., Staggers, N. & Devon, H. 2012. Exploration of the e-patient phenomenon in nursing informatics. Nursing Outlook Journal. Jul-Aug; 60(4):e9-16, 10.

Pirkko, K. 2015. How eHealth is organised in Finland and other Nordic countries. A conference Presentation. CBTMS 2015 - Telehealth for Universal Health Coverage UERJ Campus Maracanã, Rio de Janeiro, Brazil, 7- 11.

Polisena, J., Coyle, D., Coyle, K., & McGill, S. 2009. Home telehealth for chronic disease management: A systematic review and analysis of economic evaluations. International Journal of Technology Assessment in HealthCare, 25, 339-349.

Pulcini, J., Jelic, M., Gul, R. & Loke, A. 2010. An International Survey on Advanced Practice Nursing Education, Practice, and Regulation. Journal of Nursing Scholarship 42, 31-39

Rebholz, M. 2006. A review of methods to assess competency. Journal for Nurses in Staff Development 22, 241-245.

Ritchie, J., Lewis, J., McNaughton, N. & Ormston, R. 2014. Qualitative Research Practice: A Guide for Social Science Students and Researchers. SAGE publication, London, 80-125.

Ruusuvuori, J., Nikander, P.& Hyvärinen, M. 2010.Haastattelun analyysin vaiheet.Tampere, 9-36.

Ryan, F., Coughlan, M. & Cronin, P. 2009. Interviewing in qualitative research: the one-to-one interview. International Journal of Therapy and Rehabilitation.Volume16, issue 6, 309-314.

Saldana, J. 2011. Fundamentals of Qualitative Research. Oxford University Press. 74-135.

Schreier, M. 2012. Qualitative content analysis in practice. Thousand Oaks, CA: Sage publications, 1-7.

Schultze, U. & Avital, M. 2011 .Designing interviews to generate rich data for information systems research. Journal Information and Organization archive. Volume 21 Issue 1, 1-16

Sharma, U. & Clarke, M. 2014. Nurses' and community support workers' experience of telehealth: a longitudinal case study. BMC Health Serv. Res., 14 (1), 164.

Snyder, C. 2012. A case study of a case study: analysis of a robust qualitative research methodology. Qualitative Report 17 (Article 26), 1–21.

Steven, J., DeVault, M. & Bogdan, R. 2015. Introduction to qualitative research methods, 4th Edition: A guidebook and resource. Hoboken, N.J: Wiley, 8-10.

Taylor, J., Bogdan, R. & DeVault, M. 2016. Introduction to qualitative research methods: A guidebook and resource. Hoboken, New Jersey: John Wiley & Sons, Inc, 7-123.

Ten Cate, O. & Scheele, F. 2007. Competency-based postgraduate training: can we bridge the gap between theory and clinical practice? Acad. Med. 82, 542–547

Ten Cate, O. Snell, L. & Carraccio, C. 2010. Medical competence: the interplay between individual ability and the health care environment. Med. Teach., 32, 669–675.

Tilley, D. 2007. Promoting clinical competence using scaffolded instruction for practice-based learning. Journal of Professional Nursing, 23 (5), 285–289.

Tilley, D, 2008. Competency in nursing: a concept analysis .The Journal of Continuing Education in Nursing 29, 58–64.

Van Houwelingen, C. Barakat, A., Best, R., Boot, W., Charness, N. & Kort, H. 2015. Dutch Nurses' Willingness to Use Home Telehealth: Implications for Practice and Education. Journal of Gerontological Nursing. 41(4), 47-56.

Van Houwelingen, C., Moerman, A., Ettema, R., Kort, H., ten Cate, O. 2015. Competencies required for nursing telehealth activities: A Delphi-study. Nurse Education Today, Volume 39, 50 – 62.

Varshney, U. 2014. Mobile health: Four emerging themes of research. Elsevier Journal. Decision Support Systems. Atlanta, Volume 66, 20–35.

Vinson, M., McCallum, R., Thornlow, D. & Champagne, T. 2011. Design, implementation, and evaluation of population-specific telehealth nursing services. Nursing Economics, 29, 265-277.

Walsh, D. & Downe S. 2006. Appraising the quality of qualitative research. Midwifery 22(2), 108–119

Watson, J. 1988. New dimensions of human caring theory. Nursing Science Quarterly. 1(4), 175-181.

Watson, R., Stimpson, A., Topping, A. & Porock, D. 2002. Clinical competence in nursing: a systematic review of the literature. Journal of Advanced Nursing 39: 421-431

Windsor, C., Douglas, C. & Harvey, T. 2012. Nursing and competencies a natural fit: the politics of skill/competency formation in nursing. Nursing. 19. 213–222

Whittaker, M., Nicola H., Renata M. & Anna R. 2015. Preparing for the data revolution: identifying minimum health information competencies among the health workforce. School of Public Health, the University of Queensland, Herston Road, Brisbane, Australia, 2.

Wolfensperger, C. & Shaffer, B. 2012. Assessment of clinical judgement in nursing orientation Journal of Nurses in Staff Development, 28 (2), 62–65.

Xiao, N., Sharman, R., Rao, R. & Upadhyaya, S. 2014. Factors influencing online health information search: An empirical analysis of a national cancer-related survey. Decision. Support System. Elsevier Journal, 57, 417-427.

Digital sources

Association of Finnish Local and regional Authorities (2015). (Retrieved 20 May 2015). Available from:
http://www.localfinland.fi/en/authorities/Pages/default.aspx

Barakat, A. Woolrych, D., Sixsmith, A., Kearns, D. & Kort, H. 2013. eHealth Technology Competencies for Health Professionals Working in Home Care to Support Older Adults to Age in Place: Outcomes of a Two-Day Collaborative Workshop. Medicine 2.0, 2(2), e10. (Retrieved 10 July 2015). Available at:
http://www.medicine20.com/article/viewFile/med20_v2i2e10/2

Booth, R. 2006. Educating the future eHealth professional nurse International Journal of Nursing Education. Scholarship. Volume 3, Issue 1, (Retrieved 23 April 2015). Available from: https://www.ncbi.nlm.nih.gov/pubmed/16646940

Centre for International Mobility (CIMO). 2013. Universities of applied sciences. Study in Finland 2012–2013. (Retrieved 08 October 2015) Available from: http://www.cimo.fi/instancedata/prime_product_julkaisu/cimo/embeds/cimowww structure/30329_Study_in_Finland_20122013_universites_of_applied_sciences.p df

Chang, C. & Kaufman, D. 2011. A Framework for characterizing eHealth Literacy Demands and Barriers. Journal of Medical Internet Research. (Retrieved 20 April 2015). Available at: https://www.jmir.org/2011/4/e94/#Introduction

Delamaire, M. & Lafortune, G. 2010. Nurses in Advanced Roles. A Description and Evaluation of Experiences in 12 Developed Countries. OECD Health Working Papers. OECD (Retrieved 05 April 2015). Available from: http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DELSA /HEA/WD/HWP(2010)5&doclanguage=en

Doctagon. 2016. EHealth. (Retrieved 08 May 2015) Available from https://www.doctagon.fi/en/municipalities/ehealth/

Doswell, W., Braxter, B., DeVito, D., Nilsen, W. & Klem, M. 2013. MHealth: Technology for nursing practice, education, and research. Journal of Nursing Education and Practice, Vol. 3, No. 10. Pittsburgh. (Retrieved 20 June 2015) Available from: http://www.sciedu.ca/journal/index.php/jnep/article/view/2180/1495

EHoiva, 2016. A cost-effective and versatile solution for control of home-care operations. (Retrieved 10 January 2016. Available from: http://www.ehoiva.fi/in-english/

Finnish National Board of Education. 2016. Higher education (Retrieved 20 January 2016). Available from: http://www.oph.fi/english/education_system/higher_education

Finnish Nurses Association. 2014. Opportunities and challenges in e-health technologies (Retrieved 25 August 2015). Available from: http://www.nurses.fi/8th-icn-international-nurse-prac/?x154629=202837

Finnish Nurses Association. 2015. EHealth strategy of the Finnish Nurses Association 2015–2020 (Retrieved 01 February 2015). Available from: http://nurses-fi-bin.directo.fi/@Bin/49ee9e9260eb06949c3c98946df4d1ae/1480106307/application/pdf/237208/eHealth_RAPORTTI%20_ENGLANTI.pdf

Gilstad, H. 2014. Toward a Comprehensive Model of eHealth Literacy. Health Informatics Research Group. Department of Neuroscience, Faculty of Medicine. The Norwegian University of Science and Technology (Retrieved 20 May 2015). Available from: http://ceur-ws.org/Vol-1251/paper7.pdf

High-tech Finland. 2015. Taking Telecare to the next level (Retrieved 15 June 2015). Available from: http://www.hightechfinland.com/direct.aspx?area=htf&prm1=1041&prm2=article

Hämäläinen, P., Tenhunen, E., Hyppönen, H. & Pajukoski, M. 2005. Experiences on Implementation of the Act on Experiments with Seamless Service Chains in Social Welfare and Health Care Service. Discussion Papers 5/2005. Stakes. Helsinki, Retrieved (14 March 2015). Available from: http://thl32-kk.lib.helsinki.fi/handle/10024/77462

Hämeenlina City. 2015. Minunterveyteni, (Retrieved 10 December 2015). Available from: http://www.hameenlinna.fi/Palvelut/Terveyspalvelut/English/

International Council of Nurses. 2001 – 2016. Nurse practitioner. Advanced Practice Nursing Network. Definition and Characteristics of the Role, (Retrieved 10 January 2016). Available from: https://international.aanp.org/Practice/APNRoles

Kansallinen Terveysarkisto (Kanta). 2015a. The National Archive of Health Information, (Retrieved 20 May 2015). Available from: http://www.kanta.fi/en/

Kansallinen Terveysarkisto (Kanta). 2015b. Architecture (Retrieved 09 August 2015). Available from:http://www.kanta.fi/documents/12105/3450131/Kanta_ArkkitehtuuriJaAikajana_EN.pdf/d83abeb0-db14-4edf-8877-98b7480e8d59

Karhula, T., Vuorinen, A., Rääpysjärvi, K., Pakanen, M., Itkonen, P., Tepponen, M. & Saranummi, N. 2015. Tele-monitoring and Mobile Phone-Based Health Coaching Among Finnish Diabetic and Heart Disease Patients: Randomized Controlled Trial. Journal of Medical Internet Research, (Retrieved 15 June 2015). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4526947/

Korhonen, M. 2015. How Finland became a leader in eHealth adoption. Ministry of Social Affairs and Health, Finland. Presentation slides, (Retrieved 24 December 2015). Available from: http://healthaffairs.ucd.ie/wpcontent/uploads/2015/09/MarittaKorhonenMSAH.pdf

Lahti University of Applied Sciences (Lamk). 2015. History (Retrieved 15 December 2015). Available from: http://www.lamk.fi/english/about/organisation/history/Sivut/default.aspx

Meedoc. 2016 (Retrieved 21 October 2015). Available from: https://fi.meedoc.com/

Ministry of Education. 2009. National Framework for Qualification and Other Learning report. (Retrieved 23 September 2015). Available from: http://www.oph.fi/download/121526_NQF-muistio_EN_02_10.pdf

Ministry of Education. 2011. Degrees of polytechnics (Retrieved 08 October 2015). Available from: http://www.minedu.fi/export/sites/default/OPM/Koulutus/ammattikorkeakoulutus/opiskelu_ja_tutkinnot/YhteenvetoKoulutusohjelmaPaatoksista_amk_2011.pdf

Ministry of Education and Culture. 2016. (Retried 05 January 2016). Available from: http://www.minedu.fi/export/sites/default/OPM/Koulutus/koulutusjaerjestelmae/liitteet/finnish_education.pdf

Ministry of Social Affairs and Health. 2011. Socially Sustainable Finland 2020 Strategy for social and health policy, (Retried 16 May 2015). Available from: https://www.julkari.fi/bitstream/handle/10024/112140/URN%3ANBN%3Afi-fe201504223802.pdf?sequence=1

Ministry of Social Affairs and Health. 2013. EHealth Strategy and Action Plan of Finland in a European Context. Peer Review workshop report (Retrieved 3 May 2015) Available from: https://www.ehtel.eu/references-files/ehtelconnect-support-documentation/EHTELconnect-Finland-PeerReview-Public-Report-RAP2013_11.pdf

Ministry of Social Affairs and Health, and Finnish Local and Regional Authorities. 2015. Information to support well-being and service renewal. EHealth and eSocial Strategy 2020, (Retrieve 20 August).2015. Available from: http://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/74459/URN_ISBN_978-952-00-3575-4.pdf?sequence=1

Norwegian Nurses Organisation.2013. NNO'S Strategy. The Nursing Profession in development through EHealth 2013 -2016, (Retrieved 25 May 2015). Available from: http://www.acendio.net/members/eHealth/eHealth_Norway.pdf

Oxford University Online dictionary. 2016. Oxford University Press, (Retrieved 26 February 2016). Available from: https://en.oxforddictionaries.com/

QSR International Pty Ltd.2016. Nvivo 11 software, (Retrieved 4 April 2016). Available from: http://www.qsrinternational.com/trial-nvivo

Rajalahti, E. & Saranto, K. 2016. Nursing and health informatics in Finland 2015.Technology Informatics Guiding Education Reform. Healthcare Information and Management Systems Society (HIMSS), 2 -4 (Retrived 16 May 2015). Available from:https://www.himss.org/file/1309331/download?token=aYM3IBpz

Smart Ageing Network Finland. 2011. Technology solutions for people's well-being. Promoting elderly's healthy & safe living at home, (Retrieved 15 June 2015). Available from: http://www.grageproject.eu/attachments/article/28/SMART%20AGEING%20NETWORK%20FINLAND.pdf

Statistics Finland. 2015 (Retrieved 4 February 2016). Available from:
http://www.stat.fi/til/vamuu/2015/12/vamuu_2015_12_2016-01-
26_tau_001_en.html

Studyinfo. 2015. Higher education in Finland (Retrieved 20 January 2016).
Available from: https://studyinfo.fi/wp2/en/higher-education/

Studyinfo. 2016. Higher education in Finland (Retrieved 15 March 2016)
Available from: http://www.studyinfinland.fi/where_to_study/polytechnics

The Association of Finnish Local and Regional Authorities. 2016 (Retrieved 25
January 2016). Available from: http://www.localfinland.fi/en/authorities/social-
and-health-services/health services/Pages/default.aspx

Tynkkynen, L. 2010. "Limited right for nurses to prescribe medication". Health
Policy Monitor (Retrieved 14 September 2015). Available from:
http://www.hpm.org/survey/fi/a15/3

World Health Organization. 2016. EHealth. Trade, foreign policy, diplomacy and
health. Glossary of globalization, trade and health terms (Retrieved 05 February
2016). Available from: http://www.who.int/trade/glossary/story021/en/

APPENDIX

APPENDIX 1

INTERVIEW QUESTION GUIDE FOR NURSES ON E-HEALTH COMPETENCIES STUDY

Section A: Background information

Kindly mark the box that best describes you background in each question below.

1. How many years of working experience as a Nurse, do you have?

  ☐ 1- 3 years   ☐ 3- 5 years   ☐ 5- 10 years
  ☐ 10- 30 years   ☐ 30 years +

2. Have you had the experience of working or using any of the e- health services areas mentioned below?

☐ Electronic health records   ☐ E-prescription, e-archive, e-view

☐ Telenursing   ☐ Patient self- remote monitoring systems

☐ Ambient assisted living or smart home system for the elderly or those with physical impairment or disability

3. In which section or department of nursing are you currently working?

☐ Homecare and Nursing homes   ☐ Health Centre, inpatient or outpatient units

☐ Specialised care inpatient or outpatient units in a University or Central hospital

Section B: EHealth Nursing Competencies

4. Can you explain to me, what does the concept of E-health mean to you?

5. Can you tell me, what does eHealth context mean to nurses when taking care of patients?

6. Based on your experience working or using an eHealth services, can you explain, what kind of skills should nurses have to enable them to provide care in an eHealth/eService environment?

7. What competences would you suggest that nurses should to learn further, through higher education, in order to work in an eHealth/eService environment?

LAMK

Lahden ammattikorkeakoulu
Lahti University of Applied Sciences

CONSENT FORM AND LETTER OF INFORMATION

Dear Participant,

Kindly take the time to read carefully the information letter and the consent form below, and feel free to ask questions for further clarification. A copy of this Letter and consent form will be provided to you, once you have provided your consent. Thank you for your participation.

A. LETTER OF INFORMATION

INVITATION TO PARTICIPATE IN THE STUDY

You are being invited to be part of a research study conducted by Ernest Aluoch, a Masters of social and healthcare development and management student, from the faculty of Health Sciences, Lahti University of Applied Sciences. The purpose of this study is to identify the eHealth nursing competencies that are needed to be developed by nurses through a higher educational training, to enable them to provide care and information to patients, in an eHealth environment.

This study, is part of a curriculum development process by Lahti University of Applied Sciences, for a Master's degree in EHealth. The initiation of this study, was based on the need to factor in the views of a key focus group, the nurses, in the development of the new curriculum process. This study therefore, is intended, and structured to provide the nurses with a platform to share their views, and gather their experiences on eHealth competencies. The views gathered, will form a key source for recommendations, for the development of various study units, in the new eHealth curriculum for nurses at the Lahti University of Applied Sciences. The results of this study will be published as a student Master's thesis.

EXPECTED DURATION AND ELIGIBILITY

This study intends to collect views from between 15 – 25 registered nurses, through face to face interviews, which are expected to last a maximum of 45 minutes. The interviews will be conducted between August 2015, and November 2015, at location deemed suitable and agreed upon by both participant and the researcher at an appropriate time. Eligible registered nurses should fulfill the following criteria:-

- ❖ Registered nurses, having more than one year working experience post-registration, since the study intended to gather the nurse's views based on their experience
- ❖ Able to express their views in English, since the interview, analysis and the entire research were to be conducted in English.
- ❖ Presumed to have experience or have encountered one of the various eHealth applications used in healthcare service delivery in Finland today, throughout their career.

BENEFIT AND RISKS OF PARTICIPATION

There is no foreseeable risk in participating in this study. If you find it demanding to talk about some views related to questions, during the interview. Please feel free not to contribute, and only respond to those questions you feel free and comfortable to answer. There will be no monetary compensation for your participation in the interview sessions, but you participation is highly appreciated and honoured, since it will be a contribution for better understanding of eHealth nursing.

CONFIDENTIALITY AND RIGHTS TO WITHDRAW

 Participation in this study is voluntary and at no point intended to waive any legal rights by consenting to participate. You have a right to invoke your participation in the interview at any time and withdraw. All information that is collected in this study will be treated with the uttermost confidentiality. Anonymity will be observed and adhered to throughout the interview sessions and publication of the

results. The interviews will be recorded, and no personal identifiers will be used during the interview, to guarantee anonymity. After publication of the study result in the master's thesis, all data records shall be destroyed.

B. CONSENT FORM

I have read the information letter and I understand what is expected of me as a participant in this study, and the benefit of my contribution to this research. I freely consent to participate.

_____ _____

Name and Signature of the Participant   Date and Place

_____ _____

Name and Signature of the Researcher   Date and Place

For further information, feel free to contact the researcher at ernest.aluoch@student.lamk.fi

Themes and representative quotes on eHealth nursing competencies identified from the analysis

Participants representative quotes/ In vivo codes	Skills demanded / abstraction	Sub-themes	Theme
... All our interactions with patient's information are through the use of computers ... I cannot imagine a nurse providing care today in Finland, who does not have basic computer knowledge and application *In our daily routines, there is always a constant need learn new skills for documentation, information retrieval, archiving and so on,.... I feel like we are turning into robots...* *In our work, we learn new techniques every time, and within a short while, new innovative technique come up, and then we have to learn again, to keep up with changes and provide better care...* *.. I was trained before the computer era, and using this new computer and information tools are a great*	Need to have basic computer skills Need learn continuous learn and gaining advanced computer skills Need to know, what information is needed? Where to source it information from? And how to apply and assess its effectiveness	Computer literacy Information systems savvy	Informatics

challenge in my work, and at times limit what am able to do, since I have to always seek help… *My clinical skills play a greater role, but with less knowledge and skills on using advanced methods of sourcing information when I need it urgently, I feel incapable…* *…having the skills to source right information faster, critically make decision, and give informed advice to patients makes the difference in my work, since I rely on trusted information sources to manage my patients* *I was trained before the computer era, and using this new computer and information tools are a great challenge in my work, and at times limit what am able to do, since I have to always seek help…* *My clinical skills play a greater role, but with less knowledge and skills on using advanced methods of sourcing information when I need it urgently, I feel incapable…* *…We need real time information to be able to make decision on the nursing diagnosis, care plan for our patients, I feel that being able to access real-time secure information is crucial in providing safe and good care now and also in the future ….*	Need for right skills to source up-to-date information to make informed decisions. Need to know how to use information and communication tools and systems	Critically manage information	

I feel that in the near future, nurses need to be digital native, adapting to the changing care environment, while embracing the information and communications systems... *When a client comes to our unit, the efficiency in my skills to use the necessary gadgets, source, implement and evaluate information gathered on the client is important...* *.....Most of the patients that come to our unit, tend to be informed about their ailments and have sourced information from the internet and other sources, thus as a nurse I need to stay on top of the game, in accessing right information and providing the needed care* *I feel that our duty now and in the future as nurses, is to assist patients to outsource information and better choices for their health and wellbeing, as a nurse I need the skills to guide them on how to access information and assist them to manage their diseases.* *...We need training on how to smoothly handle this changing operating nursing environment, to be able to creatively solve the challenges and apply the*			

technologies proficiently, since most of us were not trained in nursing school to use these technologies			
…. the information and skills that we use to care for our patients, is spread across several sources such as in the electronic health record, that we all can access, and also through our own personal experiences that are not documented….	Transforming patient information into practice	Knowledge capture and distribution	
.. our job as nurses depend on what we know about the patient, so you have to be professional enough, to have the right information, to know what you are doing.			
…. our ability to make nursing care decisions is based on our clinical knowledge, experiences and the information gathered in the initial assessment stage, and that which has been studied and proven to be beneficial...	Generate, share and integrate knowledge, in all care processes and interventions,	Knowledge cognizance and integration	Knowledge management
... Since the introduction of Haipro systems, we have been able to report electronically, the medical and nursing errors, and be able to learn from them. This has gone a long way to improve the safety of care...			
.. In future, nurses need to use more technology and share information to eliminate errors.	Right knowledge at the right time, when making important decision.	Accessibility	

In my unit where we perform specialized care, readily available information is critical when performing an intervention…. *As a nurse, I know my limitations, hence daily, I try to update my knowledge base, so that I am able to discharge my duties effectively… whenever I have a problem I seek help from colleagues who know it better and have experience.….*			
EHealth nursing according to me, is about communication and access to information in the right place and right time…, *…for me, it is about knowing how to exchange information between nurse, knowing when to talk, listen and be understood* *As a nurse, I know my limitations, hence daily, I try to update my knowledge base, so that I am able to discharge my duties effectively… whenever I have a problem I seek help from colleagues who know it better and have experience stressing for both the patients and nurse, technologies sometimes fail* *When providing consultations through the phone or video call, I always try to have a friendly and calming voice, listen and show empathy through my tone, to gain*	Need to exchange information and make decisions Basic skills such as writing and oral skills Interpersonal skills,	Exchange information Basic communication skills Interpersonal Skills Media literacy Interviewing skills	Communication

clients trust to talk about their fears and challenges about their ailments….. *I think nurses should be able to make sure that the client is able to communicate effectively, without feeling isolated, exploited or misunderstood. Having the skills to use media effectively is important.* *..We need to use technology to build hope to the patients and enable them manage their ailments and suffering by effective use of technology….* *..The way we nurses present ourselves on the phone or in camera, show the kind of feelings we have about the patient or situation…. it is important to be professional and let the patients know that we are there for them and establish care relationship behind technology.*	Being literate enough to operate communication gadgets and media. Good interviewing skills		
…I feel that the patient privacy should not be interfered with, we should always be able to honour their dignity and reputation as we provide care, based on the nursing ethic and code of conduct ….	Uphold nursing code of conduct, ethics, and confidentiality	Professionalism	Ethics

.. We have the responsibility to maintain our client's discretion, all the time we need consent to be able to access their electronic health records, so the client have control over their information and we are custodian of their trust..			
As nurses I think we should keep the patient's informed of their rights and advocate for high professional standards in providing care, and keep them informed of possible breaches in privacy.	Advocacy for patients' rights	Advocacy	
.. I feel that nurse should always access patient's information that is needed to make decision at the moment of care, and not any other unnecessary information...			
..As a nurses always explain to the patients about possible breach of privacy on phone calls or other modes of relaying information and follow protocol...	Abide to data protection statutes	Adhering to regulations and accountability	
...Identify system errors and report security risks, is a primary goal for nurses...			
When our clients give consent to use their information, the usually choose where it can be used and which organizations can access it, thanks to e-archive system	Professional obligation	Ethical awareness	

used today, they can always request for their personal data to be corrected whenever there is a wrong entry…. *We cannot pretend that the patient information will be fully secure, there are instance in our daily activities that exposes patient information to risks…… all we need is to accept and talk about it openly with our clients….* *Protecting the patient information has been challenging, since their information is usually held by many other organizations….* *…Nurses need to safeguard ethical virtue, be transparent in all their nursing care processes, to instill trust in their relationship with the patients…* *As a nurse, I might be excellent in discharging clinical nursing care… but if I do not operate in line with the nursing ethical codes, then my actions can be seen as risking patient safety...*	Securing patient information	Safety	