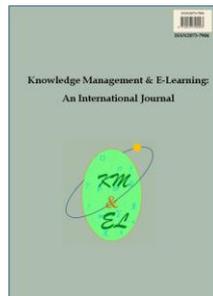


Knowledge Management & E-Learning, Vol.7, No.4, Dec 2015

Knowledge Management & E-Learning



ISSN 2073-7904

Empowering learners: Using a triad model to promote eHealth literacy and transform learning at point of care

Carey Mather
Elizabeth Cummings
The University of Tasmania, Australia

Recommended citation:

Mather, C., & Cummings, E. (2015). Empowering learners: Using a triad model to promote eHealth literacy and transform learning at point of care. *Knowledge Management & E-Learning*, 7(4), 629–645.

Empowering learners: Using a triad model to promote eHealth literacy and transform learning at point of care

Carey Mather*

School of Health Sciences
Faculty of Health
The University of Tasmania, Australia
E-mail: Carey.Mather@utas.edu.au

Elizabeth Cummings

School of Health Sciences
Faculty of Health
The University of Tasmania, Australia
E-mail: Elizabeth.Cummings@utas.edu.au

*Corresponding author

Abstract: The implementation of health technology and informatics into healthcare environments has enabled new opportunities for developing patient-centred approaches to care. The emergence of mobile learning as a new pedagogy for learning and teaching of undergraduate nurses and for continuing professional development can be used to strengthen the nurse-patient relationship. Incorporation of eHealth literacy education and health promotion by nurses, using digital technology tools and resources, will assist with empowering patients to access information and options for managing their own health. These developments provide opportunities for embracing a learning triad with patient, student, and nurse supervisor using digital technology at *point of care*. This triad should be embedded as a partnership to enable promotion of eHealth literacy *in situ*. A use case scenario is provided to demonstrate the potential of advancing eHealth literacy of patients in healthcare environments using the triad model. Collaboration and sharing information using this new method of learning has the potential to promote eHealth literacy and transform the nurse-patient relationship.

Keywords: eHealth literacy; Mobile learning; Patient-centred care; Triad model; Nurse-patient relationship

Biographical notes: Carey Mather, is a lecturer and PhD candidate in the School of Health Sciences (Nursing) at the University of Tasmania. She has worked in the health sector for 29 years in various capacities and settings including the acute, palliative, health promotion and community environments. During 2010, as part of her role as the Teaching Fellow, Emerging Technologies she investigated innovative technologies to facilitate the learning and teaching of undergraduate students. Recently she has been involved with facilitating high quality work integrated learning experiences for students. Part of this work has focussed on the needs of patients, students and nurse supervisors and the development of salient mobile learning strategies.

Dr. Elizabeth Cummings, is currently a Senior Lecturer and Graduate Research Coordinator in the School of Health Sciences (Nursing) at the University of

Tasmania. She is a registered Nurse and Midwife with 35 years experience in the health sector including acute and primary care, administration and education and significant experience in eHealth implementation and evaluation has worked in the area of health informatics for over 12 years. She has significant experience in a diverse range of research relating to ICTs in health and ageing, patient-centred chronic disease self-management and the use of qualitative methods for evaluation of health information systems. She has been involved in a European Commission funded project on ICT and ageing.

1. Introduction

The emergence of digital technologies has provided unparalleled opportunities for empowering mobile learners to promote both health and eHealth literacy *in situ* at *point of care*. Importantly, as nurses are well-placed to be frontline in progressing eHealth literacy of patients, use of *point of care* digital technologies by nurses for educational purposes must be embraced as a legitimate nursing function. Collaboration and sharing of information using mobile learning tools and resources has the potential to transform the nurse-patient relationship. Incorporating eHealth literacy education and health promotion by nurses and nursing students will assist in empowering patients to access information and opportunities for managing their own health and well-being. The increase in prevalence of chronic diseases provides impetus to improve health outcomes and reduce costs (Kanj & Mitic, 2009). Improving health literacy and eHealth literacy has the potential to ameliorate poor health outcomes and promote patient-centred care (Kanj & Mitic, 2009) by enabling patients to learn about, and manage their own care.

Nurses are central to care service provision and are well-positioned to develop rapport, create trust, learn about, and from their patients, whilst enabling opportunities to assist with assessing and the development of eHealth literacy of their clients. This relationship can be augmented using a triad model (Fig. 1) comprised of patient or client (patient), student, and nurse supervisor that is based on the mutuality of intent to communicate, create trust and commitment to improve health and well-being (Zeffane, Tipu, & Ryan, 2011).

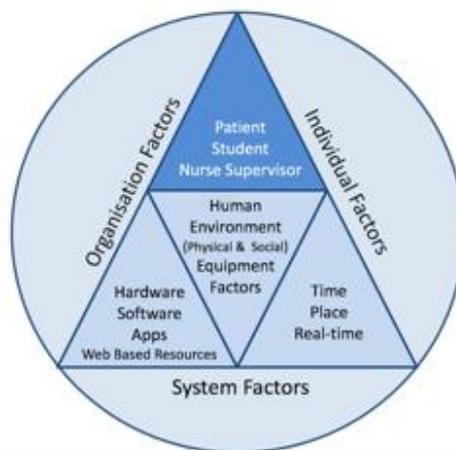


Fig. 1. The triad model

The triad model operates within the complex of system, organisation and individual factors, and optimal effect is achieved when supported by the human, environment (physical and social) and equipment factors. The evolution or maturation of the patient, student, and nurse supervisor relationship has the potential to increase understanding and learning for the patient and student (Manninen, Henriksson, Scheja, & Silen, 2014). Nurse supervisors, who are both educators and clinicians, guide and support the learning of undergraduate students while undertaking work integrated learning. Nurse supervisors are also responsible for ensuring that patients receive appropriate information while interacting with students. It is becoming increasingly important to harness the learning triad (Plack, 2008), to improve health outcomes of patients, enable self-management, and promote patient-centred care. The deployment of mobile learning into healthcare environments has been slow (Mather & Cummings, 2015) resulting in arrested opportunities for promoting eHealth literacy of patients by nurses and their students at *point of care*. Additionally, a range of barriers, challenges, risks and benefits of using health technology and informatics in healthcare settings have been identified. These include human, equipment and environment factors at individual, organisation and systems levels that have also hindered the advancement of promoting eHealth literacy by end-users (Kemppainen, Tossavainen, & Turunen, 2013; Martyn, Larkin, Sander, Yuginovich, & Jamieson-Proctor, 2014; Mather, Marlow, & Cummings, 2013; Moyer, 2013; Prgomet, Georgiou, & Westbrook, 2009).

This paper describes the complex matrix of knowledge, skills, attitudes and behaviour employed by the triad model of patient, student, and nurse supervisor (human context) at *point of care* to enable a supportive (physical and social) environment promoting eHealth literacy assessment and development.

2. Systems level considerations for understanding eHealth literacy in Australia

There has been considerable debate defining and conceptualising literacy (UNESCO, 2006). It can be viewed as an autonomous set of skills; applied, practised and situated; be a learning process; and be text (UNESCO, 2006). During the last 60 years there has been international policy development on literacy that has influenced current understandings of the term. Previously, functional literacy has dominated the field because criteria for demonstrating technical skills are easier to identify than conceptual literacies (Jochelson, 2008). More recently, literacy has evolved to become learner-centred, with a focus on collaboration and social practices to enable learners to engage and build their learning through interaction in their socio-cultural settings (UNESCO, 2006). This development has led to an understanding that literacy is no longer understood “as an individual transformation, but as a contextual and societal one” (UNESCO, 2006, p. 159). Using the triad model this paper builds on current understandings of literacy and harnesses the concept of critical literacy and empowerment as it is central to this learning process through exploring, investigating, interpreting, reflecting, theorising engagement with the context (UNESCO, 2006).

2.1. Health literacy

Nutbeam (2008) discussed the development of the concept of health literacy from two differing perspectives. He framed the evolution of the concept from the clinical domain as ‘risk’ because it was recognised there was a relationship between poor literacy skills and health status that is apparent within the clinical environment. There has been a shift

in clinical practice and organisation of care to promote health literacy. It focuses on the development of skills and capacities of people to have more control over their health by empowering and engaging them in decision-making about their health and communities to develop confidence (self-efficacy) to act on their knowledge. Additionally, the triad model supports and empowers learners to develop skills in discerning credible information and to access tenable resources that can be used to promote health and well-being.

2.2. *eHealth literacy*

In healthcare settings, the computer literacy of health professionals, especially nurses, has been discussed by authors since the 1970s (Armstrong, 1986; Saba, 2001; Schoville & Titler, 2015; Silva, 1973). Silva (1973) described her view of nursing in the computer age and was aware of the educational ramifications of introducing computers and computing into the curriculum for educational and clinical purposes. There was early recognition that technology can assist with transformation of healthcare environments. The role of eHealth literacy is pervasive within healthcare settings and evidence-based practice relies on this concept (Forster, 2015). It is essential the health profession workforce can accommodate implementation of emerging technologies within healthcare settings to promote cost-effective, high quality and safe care (Schoville & Titler, 2015). eHealth literate nurses are key to assisting with guiding health technology implementation and contribute to improve healthcare and health outcomes (Schoville & Titler, 2015). eHealth literacy is a core concept required for improving healthcare delivery and for communication with patients to promote health.

3. **Human context considerations for understanding health literacy in healthcare environments**

3.1. *Health professions*

Health promotion at an individual level and as a public health approach by health professionals with patients is well documented (Burgess, Bruns, & Hjort, 2013; Kemppainen, Tossavainen, & Turunen, 2013; Nutbeam, 2000). Patient education, including health promotion, is a fundamental competency undertaken by health professionals, especially nurses, in a range of healthcare environments (Irvine, 2005). Emerging technology has enabled opportunities that were previously unavailable (Estabrooks, Wallin, & Milner, 2003; Mather & Cummings, 2014) and changed expectations of healthcare interactions by patients and health professionals (Illiger, Hupka, von Jan, Wichelhaus, & Albrecht, 2015; Manninen, Henriksson, Scheja, & Silen, 2014). Health literacy (Kanj & Mitic, 2009; Nutbeam, 2008), health technology, and health informatics have also been found to be vital for promoting health and education of patients (Irvine, 2005).

Househ (2013) explored the impacts of social media on healthcare organisations, clinicians and patients. The author found that health professionals engage in social media in a variety of ways such as providing information about health topics relating to education, health promotion using a variety of digital platforms. They concluded all stakeholders have a responsibility to ensure that health information that is transmitted through digital platforms is reliable, credible and trustworthy (Househ, 2013).

Face-to-face interaction between health professionals, community services personnel, and patients, adds an extra layer of complexity to provision of care. Currently a minimum standard of literacy and understanding of health terminology is required to ensure the consistent, high quality and safe service to patients is delivered (Industry Skills Councils Australia, 2011). Additionally, people entering the healthcare sector due to their circumstances may be vulnerable, ill or confused, requiring sensitive and caring responses to meet their needs. Adequate health literacy levels of health professionals is necessary provide high quality care to maximise patient outcomes. Assessment and enabling improvement of health literacy knowledge and skills in a population requires more than the transmission of health information. It requires support to enable promotion of empowerment to facilitate individuals and communities to develop confidence (self-efficacy) and act on their knowledge.

3.2. Nurses and nurse supervisors

Deployment of health information technology in healthcare has been slow. A number of human factors which impact upon the uptake of digital technologies and deployment of mobile learning have been identified; these include work demands, access to computers, educational support and training as well as age and technical expertise (Estabrooks, Wallin, & Milner, 2003; Hegney et al., 2007; Mather, Marlow, & Cummings, 2013). Recent studies of perceptions of nurses using mobile devices for informal learning or continuing professional development indicated that attitudes have become more positive (Fahlman, 2013). Leadership by health professionals, especially nurse supervisors, enabling the use of informal and mobile learning at *point of care*, has the capacity to transform the nurse-patient relationship and promote health and eHealth literacy at the right *time* and *place* in real-time for patients.

An integrative review by Kempainen, Tossavainen, and Turunen (2013) found that nurses were patient-focused health promoters who work from an holistic or patient-oriented theoretical perspective. Nurses use empowerment strategies at an individual level to achieve health promotion of their patients. Knowledge, skills, attitudes, and personal characteristics of nurses were found to impact on their ability to promote healthy behaviours. Communication, collaboration, and advocacy were vital for supporting patients in decision-making. Skill-related competence included time management, searching for information; interpretation and gathering data from a range of sources (Kempainen, Tossavainen, & Turunen, 2013). The nursing workforce can accommodate the implementation of new technologies providing appropriate support and resources are encouraged (Schoville & Titler, 2015).

3.3. Patients

With the increasing incidence of people living with complex chronic conditions or disability, healthcare professionals and patients are looking to technology to assist in developing self-management skills. People with chronic conditions are regularly expected to monitor aspects of their health and to use the data to make decisions about their management (Cummings & Turner, 2007). Understanding the individual patient's capacity and ability to interact with the technologies and how they relate to self-management is extremely challenging (Cummings & Turner, 2010). There appears to be a correlation between health literacy and self-management skills (Cummings, Ellis, & Turner, 2014; Jordan, Briggs, Brand, & Osborne, 2008; Pearce-Brown, Glasgow, Jeon, Jenkins, & Douglas, 2009). The ability to seek, access and use information, and resources

on the Internet can empower patients to learn about their conditions and assist in making healthcare decisions. However, it must be recognised that accessing health-related information and use of social media to discuss healthcare does not imply health or eHealth literacy (Jordan, Buchbinderb, & Osbourne, 2010). It is recognised the people most likely to have chronic conditions tend to be those with lower health literacy, and are less likely to be able to self-manage their conditions (Hawkins, Kantayya, & Sharkey-Asner, 2010; Pearce-Brown et al., 2009).

Schnall, Higgins, Brown, Carballo-Dieiguez, and Bakken (2015) investigated perceptions of trust, risk, ease of use and usefulness of mobile health technology use. Many patients are concerned about security, privacy and storage of information, so whilst they may be keen to use software or apps that are intuitive to use they do not necessarily want to rely on, or trust, Internet connectivity (Cummings, Borycki, & Roehrer, 2013). Researchers and healthcare providers are now suggesting a reasonable degree of scepticism is required in relation to the quality and effectiveness of medical and healthcare apps. It has been identified for patients to successfully use these technologies they require a degree of both health and eHealth literacy (Cummings, Borycki, & Roehrer, 2013; Doughty, 2011).

4. Digital technology considerations for promoting eHealth literacy in healthcare environments

4.1. Ubiquitous computing

The term ubiquitous or pervasive computing is used to describe the integration of computers into everyday activities and life (Weiser, 1991). Whilst the shift to ubiquitous computing and mobile learning for health professionals, especially nurses and patients within healthcare environments, has been limited due to barriers, challenges and risks that have been well documented (Burgess, Oates, & Goulston, 2015; Martyn et al., 2014; Moyer, 2013; Strandell-Laine, Stolt, Leino-Kilpi, & Saarikoski, 2015). Benefits are also being realised. Falling price and increase of choice available of mobile devices to consumers has contributed to the proliferation of ownership to the point where, for many people, mobile devices have acquired the status of basic need rather than luxury gadget (Nair & Bhaskaran, 2014). Competing service providers also offer cheaper data access plans that facilitate encouragement of using mobile devices. The ubiquity of access to mobile technology and health information enables participatory care and increases the onus and expectation that nurse supervisors have the capability to guide students and patients in appropriate access to information or resources (Nair & Bhaskaran, 2014). Having the ability to learn at the right *time* and *place*; in real-time; interact with peers, teachers and experts; and receive information immediately in the learning environment is now possible (Yahya, Ahmed, Jalil, & Mara, 2010). Within healthcare, often the expert is the patient and access to information or resources via a wireless network, offers opportunity to augment formal learning.

4.2. Mobile learning

The evolution of mobile learning has progressed from focusing on the nature of mobile devices to mobility of the technology and now the emphasis is the mobility of the learner and the learning process (Traxler, 2007). Sharples, Taylor, and Vavoula (2005; 2007) focused on the mobility of the learner and proposed a theory of mobile learning that

demonstrated the convergence between learning and technology. Mobile learning is a constructivist approach that is characterised by information transfer which is internalised to create and share meaning. It can be argued that by using mobile and context aware technology, learning can occur through informal knowledge sharing as well as through institutional education. Mobile learning enables opportunities to augment formal learning, promote dialogue, and interactions that were previously unavailable (Mather, Marlow, & Cummings, 2013). Human, equipment, and environment issues including organisational barriers continue to impede implementation of this pedagogical opportunity to promote eHealth literacy *in situ* in healthcare environments (Mather & Cummings, 2015).

5. The nexus between digital technology and learning and teaching for promoting eHealth literacy in Australian healthcare environments

5.1. Health promotion and patient education

Patient-centred care provides opportunities for individualistic health promotion (Casey, 2007; Nutbeam, 2000) and when used in the clinical environment by nurses can promote the nurse-patient relationship (Casey, 2007). The ability to provide health education to patients is valued as an integral competency of nurses (ANMC, 2006) and studies have found that factors influencing patient participation in health promotion depends on the patient and healthcare environment. Where there is a lack of empowerment, time or heavy workload or where routine dominates, there is also a related negative impact on health promotion by nurses (Petit dit Dariel, Wharrad, & Windle, 2012). The ability to develop relationships with patients is more likely when there are resources, training, access to information available and an accepting culture of learning in the workplace (Casey, 2007).

5.2. Learning and teaching

Changes in nursing curricula to include health technology and nursing informatics can guide and promote the development of the use of digital technology by nurses for patient care. This process should include promotion of health education of patients and enable opportunities to assess and promote eHealth literacy. The Australian Commission on Safety and Quality in Health Care (2014) national statement on health literacy is viewed as Australia's national approach to addressing health literacy. This statement acknowledged health literacy's importance for enabling effective partnerships within healthcare, including the patient. It outlined the challenge for safety and quality when only about 40% of adults have the level of individual health literacy needed to meet the complex demands of everyday life. Low health literacy contributes to higher rates of adverse outcomes and lower uptake of health protection and promotion (Australian Commission on Safety and Quality in Health Care, 2014). Additionally, a report advancing eHealth education for the clinical health professions by Gray, Dattakumar, Maeder, Butler-Henderson, and Chenery (2014) acknowledged a lack of systematic approach to designing, teaching, assessing or accrediting eHealth curriculums that needed to be addressed. It provided important information for curriculum design and renewal in eHealth education for undergraduate and postgraduate programs in Australia (Gray et al., 2014).

The introduction of technology into the nursing curriculum is the most significant change since the move to the tertiary education sector (Button, Harrington, & Belan,

2014). However, currently, few nursing courses overtly describe the health informatics competency level expected by their graduates, nor have they developed clear strategies for integrating competencies into their curricula (Borycki, Foster, Sahama, Frisch, & Kushniruk, 2013). Student nurses are graduating without sufficient knowledge of nursing informatics to be able to work effectively and efficiently. Additionally, there has been a lack of investment in developing tools representative of real-world settings that would assist with students developing the underlying theories and principles requisite for being competent at graduation. Embedding informatics into the undergraduate nursing curriculum will be a useful advancement for ensuring nursing students attain competency in health informatics and an understanding of eHealth literacy by graduation that is sufficient to engage patients in their own care (Borycki et al., 2013). Additionally, deployment of this new educational paradigm has partly been made possible by the affordances of digital media (Norén Creutz & Wiklund, 2015) and upskilling of students and educators needs include understanding when it is appropriate to use digital technology within healthcare settings (McBride, LeVasseur, & Li, 2015).

6. The nexus of digital technology and opportunity for learning and teaching to promote eHealth literacy using the triad model

Although the use of the Internet is widespread with 16 million Australians estimated to be online and almost 80% of them seeking health information using this medium, studies in other countries have found that readability of online health information is above the average reading ability of adults (Cheng & Dunn, 2015). In Australia online health information has been found to be written two to four grades higher than the benchmark of grade 8 recommended (Cheng & Dunn, 2015). This finding has serious implications for peoples' understanding and self-management of health conditions. Additionally, reading habits for using the web are different from reading printed material; web users tend to browse web pages before deciding to read on, making rapid decisions about whether the information is useful or difficult to understand and may abandon web pages that are not appealing within the first few paragraphs.

Developing the ability to search the Internet and understand the credibility of information is an element of health and eHealth literacy that should not be underestimated (Jochelson, 2008). Nurses use intuition, quasi-rational cognition and analysis to judge the reliability of information related to practice on the Internet (Cader, Campbell, & Watson, 2009). Importantly, nurses need to be afforded time to access the Internet while at work to enable them to gain confidence and the opportunity to access evidence-based information (Cader, Campbell, & Watson, 2009).

Evidence suggests many students lack important competencies essential for finding and evaluating health information. Ivanitskaya, Hanisko, Garrison, Janson, and Vibbert (2012) identified students' demonstrated difficulty discriminating between primary and secondary sources of information or to discern credible sites by checking trustworthy features. Students' levels of health and eHealth literacy can be improved during professional experience by nurse supervisors prepared to give timely feedback. It is important the nurse supervisors can provide students with suggestions about strategies to improve their eHealth literacy within the practice setting. They may also be required to ensure students know how to access University resources, including library and student services. Students are the next generation of health care providers and it is essential they are adequately prepared to engage with patients, assess and assist with eHealth literacy development at *point of care*.

As previously noted, patients are increasingly able to access vast amounts of health-related information. In most developed countries access to technology has become ubiquitous, but assuming that accessing information equates to understanding is problematic. There has been little direct engagement with patients in assessing and improving their health and eHealth literacy, despite the push towards home self-monitoring and self-management (Cummings, Ellis, & Turner, 2014). Healthcare practitioners can assist their patients improve their health and eHealth literacy through demonstrating their use when explaining conditions and treatments (Cummings, Ellis, & Turner, 2014). By aligning health and eHealth literacy concepts there is now an opportunity to strengthen the triad model of patient, student and nurse supervisor for mutual benefit of learning at the right *time* and *place*, at *point of care*.

In common with most developed countries, in response to the challenges of delivering quality, efficient and effective healthcare the Australian government has committed to introducing the Personally Controlled Electronic Health Record. This health record provides shared access to summary data for both patients and healthcare providers based on shared responsibilities (Almond, Cummings, & Turner, 2013). Patients are provided with their own section in the eHealth record to capture personal information and make notes about their healthcare that can be shared with their healthcare practitioners. This data can be used for patients with chronic conditions to engage in self-monitoring and recording symptoms, as well as goal setting and recording self-management information. However, as with the use of other technologies patients require education and support to maximise the benefits of these advances.

7. Use case scenario

A use case scenario (Fig. 2) has been developed to demonstrate how the learning triad can be used and each member engaged in complementary skills development and education to enhance health and eHealth literacy. The use case scenario shows a learning triad situation where a student nurse and patient recently diagnosed with type 2 diabetes undertake promotion of health and health literacy. The actors are engaged in mutual learning under the guidance of the nurse supervisor. This scenario occurs in the hospital setting where the student nurse uses mobile learning to assist the patient in understanding management of their diabetes. This interaction focuses on enabling the patient to self-manage their condition and access further information when they are at home.

7.1. Use case description

The recently diagnosed type 2 diabetic patient would like to know about what food and beverages they can consume when they return home. The student uses a mobile tablet device to show the patient how to browse for a credible site about this topic. The patient knows how to use a computer for social media, email and browsing using a search engine, but is unsure about checking credibility of the information. The nurse supervisor is present.

Actors

- Student
- Patient
- Nurse supervisor
- Internet / access to web-based resources.

Trigger

The patient indicates they want to understand more about the food and beverages they can consume on return home.

Preconditions

The student has access to a mobile device and wireless Internet at point of care.

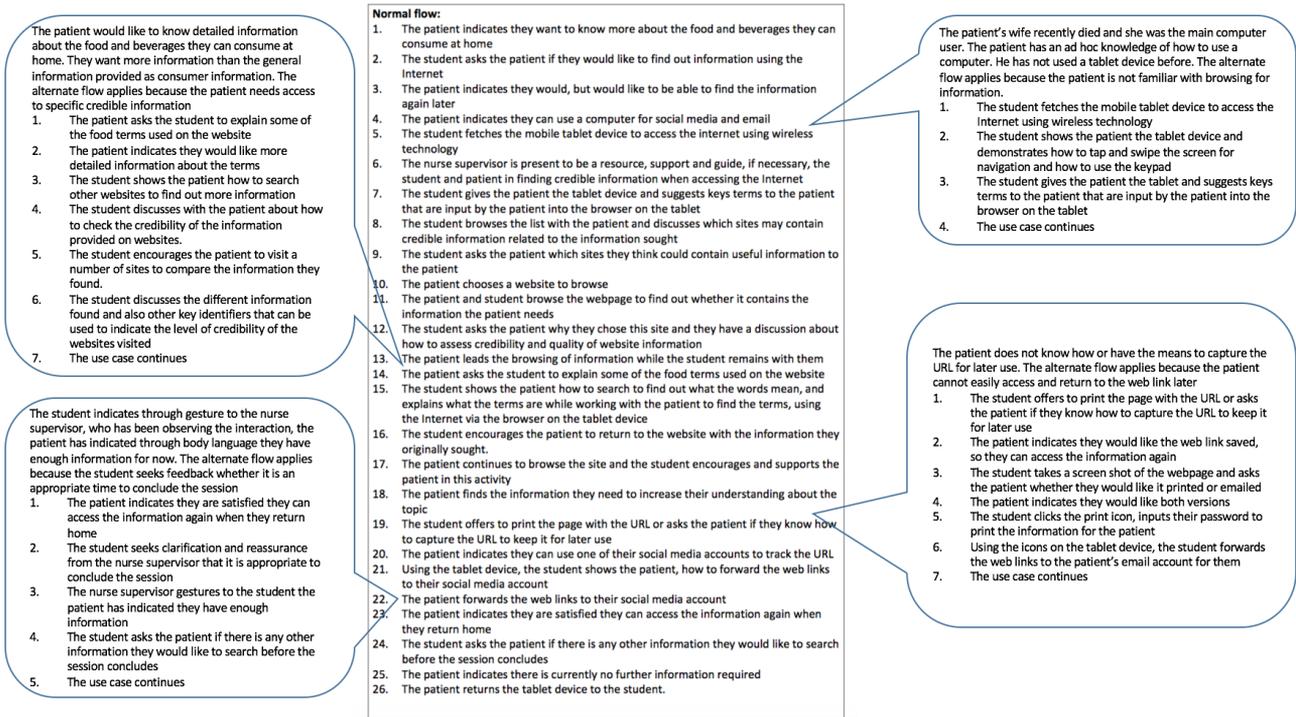


Fig. 2. Use case scenario

Post-conditions

- The patient will know where to find credible information on the internet about what food and beverages they can consume at home
- The student will have enabled eHealth literacy development of the patient by sharing how to discern credible information and showing them how to browse for credible websites on this topic
- The student will have gained an understanding about the lived experience of the patient and their need to know about management of their illness
- The patient and student will have shared understanding about what food and beverages can be consumed by the patient on return home.

Exceptions

This use case scenario relies on the patient having foundation level understanding of information communication technology; willingness to use the Internet to seek

information; willingness to be assisted by a student; and interest in learning how to discern credible information and resources.

This use case scenario assumes the student has sufficient health and eHealth literacy proficiency to be able to communicate with the patient and assist them to find out health information. The student can enable the patient to learn how to seek information, using information communication technology.

8. Discussion

As demonstrated by the use case scenario above (Fig. 2), the emergence of digital technology in healthcare has enabled patient-centred care to be further refined to embrace the opportunity to assist knowledge development of, and with the patient relevant to their health needs, and assist them to understand how to find credible information. This transformation is enabled when health professionals understand the power of mobile learning as a resource that can be used to develop this learning partnership. Literature indicates that students increase their confidence and competence if they are afforded high quality clinical placements. When students develop a respectful rapport with their nurse supervisor the most effective learning occurs (Cooper, Courtney-Pratt, & Fitzgerald, 2015; Kim, Lee, Eudey, & Dea, 2014). A student-centred approach is vital for facilitating student learning during work integrated learning (Newton, Jolly, Ockerby, & Cross, 2012). The learning triad model (Fig. 1) can be used to promote and integrate eHealth literacy into healthcare environments; when working with patients to improve health and well-being, and enabling patients to manage their own care.

In Australian healthcare workplaces, most nurse supervisors have access to web-based materials via mobile or desk-top devices. It is important that these clinicians are confident in their ability to judge the quality and reliability of clinical information used in learning and teaching (Cader, Campbell, & Watson, 2009). Furthermore, nurse supervisors are role models for students who may not have developed competence in making decisions about the quality or reliability of information they find on the Internet. It is important that nurse supervisors have the knowledge and skills to support and guide their students in all aspects of care and so competent use of nursing informatics is part of that process. Nurse supervisors need to be able to demonstrate competence with the retrieval, manipulation and recording of patient data, and to research and critique evidence based clinical information. Moreover they need to be able to support patients in locating or accessing salient health education information (Gray et al., 2014). These leaders in health care are advocates for improving eHealth literacy of their patients regarding their care. Nurse supervisors are educators of much more than students in nursing. They are role models for empowering people to participate in their own care (Casey, 2007).

The burgeoning use of digital platforms also adds another dimension to healthcare that nurse supervisors cannot ignore. Students now have access to mobile health technologies such as laptops, tablets and smart phones. Access to mobile devices increases the ability to retrieve or verify information quickly. Nurse supervisors need to guide their students in appropriate and timely use these devices enable. Access to digital platforms can be used to strengthen eHealth literacy in some target groups. The role of the nurse supervisor is to ensure that students understand the opportunities that are available to patients to engage in personalised health care by using mobile technology and accessing information on the Internet. However, it is important students learn to discern and recommend appropriate and credible sites (Johnson, Rowley, & Sbaffi, 2015).

It is imperative that students also understand the legal and ethical implications of using or recommending specific sites to patients. They also need to be aware of the policies and guidelines of the healthcare setting regarding their use of digital technology (Mather & Cummings, 2015).

Nurse supervisors need to navigate the nexus of their student's and the patients understanding about eHealth literacy. Using the learning triad model, nurse supervisors need to be able to guide students in learning about how to communicate health information to patients in a way the patient can comprehend. Using the lived experience of the patient narrative can enable active learning about the patient, their illnesses, conditions and care, if a partnership of mutual reciprocity is enabled. The partnership of patient, student and nurse supervisor enables the potential for significant learning and legitimate peripheral participation of students (Fink, 2003; Lave, 1991). Students and patients have the opportunity to create meaning from their interactions. Microlearning by students using right *time* and *place* in real-time can be used as an adjunct to construct knowledge or reinforce concepts (Gassler, Hug, & Glahn, 2004). Using mobile learning *in situ* at *point of care* to gather information as part of patient care is an inclusive patient-centred approach. Development and integration of this new pedagogy into healthcare environments has the capacity to transform the nurse-patient relationship. The interactivity and collaboration of the triad model of patient, student and nurse supervisor has the potential to promote health and eHealth literacy in ways that were previously unavailable.

There is a need to add understanding about eHealth literacy concepts into the undergraduate curriculum and then through diffusion of innovation for use at *point of care* for health promotion, information sharing and development of partnerships with patients (Hegney et al., 2007). It is a professionalism and participation issue of stakeholders and a way of legitimising mobile learning as part of nursing care. The increase in patient participation as a right and expectation means that nursing needs to move with the trend. Being able to demonstrate appropriate use by engaging patients will assist in this process (Cummings, Borycki, & Roehrer, 2013).

Whilst nurse supervisors need to be aware of digital reading habits, students need to be aware that eHealth literacy of their patients may vary and accessing credible information may be difficult for some of them. Student nurses need to be aware of their own level of eHealth literacy and Internet proficiency. They need to learn about credible sources prior to entering the clinical practice environment where errors of judgement may have implications for patient health outcomes (Johnson, Rowley, & Sbaffi, 2015). Nurse supervisors can guide students and patients in accessing and comprehending health information and enabling adjunct methods such as video or print material to augment learning. Understanding different learning styles can also assist students and patients to access information. Nurse supervisors play a vital role in enabling students and their patients to access health information and improve their eHealth literacy (Cheng & Dunn, 2015).

8.1. The future

There will be continued growth of social media and healthcare applications to promote health, prevent disease, and manage chronic conditions. The use of telehealth and other media for interaction with healthcare providers in real-time will also continue to increase. Opportunities to access contemporary, evidence-based best practice, appropriate patient information, *in situ* at *point of care*, in real-time could outweigh resistance and negative perceptions. Additionally, through improvements in technology, access at *point of care* to

diagnostic and therapeutic resources; clinical and education information will become seamless. Over time there will be greater acceptance of mobile learning within healthcare organisations that can promote a learning culture and support the triad model of patient, student and nurse supervisor learning at the right *time* and *place* in real-time at *point of care*.

The development of best practice guidelines and policy to support the deployment of mobile learning and emergence of ubiquitous computing within healthcare environments at *point of care* are essential. The promotion of connected health using the triad model of patient, student and nurse supervisor can be employed to advance the development of eHealth literacy of patients. Evaluation of eHealth literacy development using the triad model to promote health and well-being at *point of care* is warranted.

9. Conclusions

Emergence of new technology creates pressure for change, the opportunity to improve eHealth literacy is now. Never before has there been an opportunity to access and harness learning in real-time at *point of care*. The triad model provides guidance from supervisors to students, and with patients. There is opportunity to hone communication skills, develop rapport and promote a mutually beneficial therapeutic relationship. Using mobile technology and mobile learning is essential to ensure patients receive the opportunity to maintain and develop their eHealth literacy. Patients can become empowered to advance their understanding about health, their treatment and assist with improving self-care and health outcomes. Cost containment through time-saving, error reduction and real-time access to information at *point of care* can advance eHealth literacy and transform the nurse-patient relationship. Future-proofing health of patients by improving eHealth literacy *in situ* is an innovation that can no longer be ignored.

References

- Almond, H., Cummings, E., & Turner, P. (2013). Australia's personally controlled electronic health record and primary healthcare: Generating a framework for implementation and evaluation. *Studies in Health Technology and Informatics*, 188, 1–6. doi:10.3233/978-1-61499-266-0-1
- ANMC. (2006). *Australian nursing and midwifery competency standards for nurses and midwives*. Retrieved from <http://www.nursingmidwiferyboard.gov.au/Codes-and-Guidelines.aspx>
- Armstrong, M. L. (1986). Computer competence for nurse educators. *Journal of Nursing Scholarship*, 18(4), 155–160.
- Australian Commission on Safety and Quality in Health Care. (2014). *National statement on health literacy: Taking action to improve safety and quality*. Canberra: Australian Government Press Retrieved from <http://www.safetyandquality.gov.au/wp-content/uploads/2014/08/Health-Literacy-National-Statement.pdf>
- Borycki, E. M., Foster, J., Sahama, T., Frisch, N., & Kushniruk, A. W. (2013). Developing national level informatics competencies for undergraduate nurses: Methodological approaches from Australia and Canada. *Studies in Health Technology and Informatics*, 183, 345–349.
- Burgess, J., Bruns, A., & Hjort, L. (2013). Emerging methods for digital research: An introduction. *Journal of Broadcasting and Electronic Media*, 57(1), 1–3.
- Burgess, A., Oates, K., & Goulston, K. (2015). Role modelling in medical education: The

- importance of teaching skills. *The Clinical Teacher*. doi: 10.1111/tct.12397
- Button, D., Harrington, A., & Belan, I. (2014). E-learning & information communication technology (ICT) in nursing education: A review of the literature. *Nurse Education Today*, 34(10), 1311–1323. doi:10.1016/j.nedt.2013.05.002.
- Cader, R., Campbell, S., & Watson, D. (2009). Judging nursing information on the WWW: A theoretical understanding. *Journal of Advanced Nursing*, 65(9), 1916–1925.
- Casey, D. (2007). Nurses' perceptions, understanding and experiences of health promotion. *Journal of Clinical Nursing*, 16(6), 1039–1049.
- Cheng, C., & Dunn, M. (2015). Health literacy and the Internet: A study on the readability of Australian online health information. *Australian and New Zealand Journal of Public Health*, 39(4), 309–314. doi:10.1111/1753-6405.12341
- Cooper, J., Courtney-Pratt, H., & Fitzgerald, M. (2015). Key influences identified by first year undergraduate nursing students as impacting on the quality of clinical placement: A qualitative study. *Nurse Education today*, 35(9), 1004–1008.
- Cummings, E., Borycki, E. M., & Roehrer, E. (2013). Issues and considerations for healthcare consumers using mobile applications. *Studies in Health Technology and Informatics*, 182, 227–231. doi:10.3233/978-1-61499-203-5-227
- Cummings, E., Ellis, L., & Turner, P. (2014). The past, the present, and the future: examining the role of the “Social” in transforming personal healthcare management of chronic disease. In M. Househ, E. Borycki, & A. Kushniruk (Eds.), *Social Media and Mobile Technologies for Healthcare* (pp. 76–93). United States: IGI Global.
- Cummings, E., & Turner, P. (2007). Considerations for deploying web and mobile technologies to support the building of patient self-efficacy and self-management of chronic illness. In L. Al-Hakim (Ed.), *Web Mobile-Based Applications for Healthcare Management*. United States: IGI Global.
- Cummings, E., & Turner, P. (2010). Patients at the centre: Methodological considerations for evaluating evidence from health interventions involving patients use of web-based information systems. *The Open Medical Informatics Journal*, 4, 188–194.
- Doughty, K. (2011). SPAs (smart phone applications) – A new form of assistive technology. *Journal of Assistive Technologies*, 5(2), 88–94.
- Estabrooks, C. A., Wallin, L., & Milner, M. (2003). Measuring knowledge utilization in health care. *International Journal of Policy Analysis & Evaluation*, 1(1), 3–36.
- Fahlman, D. W. (2013). Examining informal learning using mobile devices in the healthcare workplace. *Canadian Journal of Learning and Technology*, 39(4), 1–21.
- Fink, L. D. (2003). *Creating significant learning experiences: An integrated approach to designing college courses*. San Francisco: Wiley & Sons.
- Forster, M. (2015). Six ways of experiencing information literacy in nursing: The findings of a phenomenographic study. *Nurse Education Today*, 35(1), 195–200.
- Gassler, G., Hug, T., & Glahn, C. (2004). *Integrated micro learning – An outline of the basic method and first results*. Paper presented at the International Conference on Interactive Computer Aided Learning, Villach, Austria.
- Gray, K., Dattakumar, A., Maeder, A., Butler-Henderson, K., & Chenery, H. (2014). *Advancing Ehealth education for the clinical health professions*. Retrieved from https://vtasnetwork.files.wordpress.com/2014/03/pp10_1806_gray_report_2014-1.pdf
- Hawkins, A. O., Kantayya, V. S., & Sharkey-Asner, C. (2010). Health literacy: A potential barrier in caring for underserved populations. *Disease-a-Month*, 56(12), 734–740.
- Hegney, D., Buikstra, E., Eley, R., Fallon, T., Gilmore, V., & Soar, J. (2007). *Nurses and information technology*. Retrieved from http://anmf.org.au/documents/reports/IT_Project.pdf
- Househ, M. (2013). The use of social media in healthcare: Organisational, clinical and patient perspectives. *Studies in Health Technology and Informatics*, 183, 244–248.

- Illiger, K., Hupka, M., von Jan, U., Wichelhaus, D., & Albrecht, U. V. (2015). Mobile technologies: Expectancy, usage, and acceptance of clinical staff and patients at a university medical center. *JMIR mHealth and uHealth*, 2(4): e42.
- Industry Skills Councils Australia. (2011). *No more excuses: An industry response to the language, literacy and numeracy challenge*. Retrieved from http://www.isc.org.au/resources/uploads/pdf/NoMoreExcuses_FINAL%20FINAL%20single%20page.pdf
- Irvine, F. (2005). Exploring district nursing competencies in health promotion: The use of the Delphi technique. *Journal of Clinical Nursing*, 14(8), 965–975.
- Ivanitskaya, L. V., Hanisko, K. A., Garrison, J. A., Janson, S. J., & Vibbert, D. (2012). Developing health information literacy: A needs analysis from the perspective of preprofessional health students. *Journal of the Medical Library Association*, 100(4), 277–283.
- Jochelson, K. (2008). *Health literacy review paper*. National Social Marketing Centre. Retrieved from <http://www.chpcp.org/servicecoord/chronicdisease/HealthLit/Health%20Literacy%20Review%20Paper-%20Dr%20Karen%20Jocelson%202008.pdf>
- Johnson, F., Rowley, J., & Scaffi, L. (2015). Modelling trust formation in health information contexts. *Journal of Information Science* 41(4), 415–429. doi:10.1177/0165551515577914
- Jordan, J. E., Briggs, A. M., Brand, C. A., & Osborne, R. H. (2008). Enhancing patient engagement in chronic disease self management support initiatives in Australia: The need for an integrated approach. *Medical Journal of Australia*, 189(10), S9–S13.
- Jordan, J. E., Buchbinder, R., & Osbourne, R. H. (2010). Conceptualising health literacy from the patient perspective. *Patient Education & Counseling*, 79(1), 36–42.
- Kanj, M., & Mitic, W. (2009). *Promoting health and development: Closing the implementation gap*. Paper presented at the 7th Global Conference on Health Promotion. Nairobi, Kenya. Retrieved from http://www.who.int/healthpromotion/conferences/7gchp/Track1_Inner.pdf
- Kemppainen, V., Tossavainen, K., & Turunen, H. (2013). Nurses' roles in health promotion practice: An integrative review. *Health Promotion International*, 28(4), 490–501.
- Kim, K. H., Lee, A. Y., Eudey, L., & Dea, M. W. (2014). Improving clinical competence and confidence of senior nursing students through clinical preceptorship. *International Journal of nursing*, 1(2), 183–209.
- Lave, J. (1991). Situating learning in communities of practice. In L. B. Resnick, J. M. Levine, & S. D. Teasley (Eds.), *Perspectives on Socially Shared Cognition* (pp. 17–36). Washington, DC: APA.
- Manninen, K., Henriksson, E. W., Scheja, M., & Silen, C. (2014). Patients' approaches to students' learning at a clinical education ward—an ethnographic study. *BMC Medical Education*, 14: 131. doi:10.1186/1472-6920-14-131
- Martyn, J., Larkin, K., Sander, T., Yuginovich, T., & Jamieson-Proctor, R. (2014). Distance and devices — Potential barriers to use of wireless handheld devices. *Nurse Education Today*, 34(3), 457–461. doi:10.1016/j.nedt.2013.04.021
- Mather, C., & Cummings, E. (2014). Mobile learning: A workforce development strategy for nurse supervisors. *Studies in Health Technology and Informatics*, 204, 98–103.
- Mather, C., & Cummings, E. (2015). Unveiling the mobile learning paradox. *Studies in Health Technology and Informatics*, 218, 126–131.
- Mather, C., Marlow, A., & Cummings, E. (2013). Digital communication to support clinical supervision: Considering the human factors. *Studies in Health Technology and Informatics*, 194, 160–165.

- McBride, D., LeVasseur, S. A., & Li, D. (2015). Nursing performance and mobile phone use: Are nurses aware of their performance decrements? *JMIR Human Factors*, 2(1): e6. doi: 10.2196/humanfactors.4070
- Moyer, J. E. (2013). Managing mobile devices in hospitals: A literature review of BYOD policies and usage. *Journal of Hospital Librarianship*, 13(3), 197–208.
- Nair, P., & Bhaskaran, H. (2014). The emerging interface of healthcare system and mobile communication technologies. *Health and Technology*, 4(4), 337–343.
- Newton, J. M., Jolly, B. C., Ockerby, C. M., & Cross, W. M. (2012). Student centredness in clinical learning: the influence of the clinical teacher. *Journal of Advanced Nursing*, 68(10), 2331–2340. doi:10.1111/j.1365-2648.2012.05946.x
- Norén Creutz, I., & Wiklund, M. (2015). Learning paradigms in workplace e-learning research. *Knowledge management & E-learning*, 6(3), 299–315.
- Nutbeam, D. (2000). Health literacy as a public health goal: A challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, 15(3), 259–267.
- Nutbeam, D. (2008). The evolving concept of health literacy. *Social Science & Medicine* 67(12), 2072–2078.
- Pearce-Brown, C., Glasgow, N., Jeon, Y., Jenkins, S., & Douglas, K. (2009). *Health literacy and self management in COPD: The same, different, or misunderstood?* Paper presented at the PHC Research Conference.
- Petit dit Dariel, O., Wharrad, H., & Windle, R. (2012). Exploring the underlying factors influencing e-learning adoption in nurse education. *Journal of Advanced Nursing*, 69(6), 1289–1300. doi:10.1111/j.1365-2648.2012.06120.x
- Plack, M. (2008). The learning triad: Potential barriers and supports to learning in physical therapy clinical environments. *Journal of physical therapy Education* 22(3), 7–18.
- Prgomet, M, Georgiou A, & Westbrook, J. I. (2009). The impact of mobile handheld technology on hospital physicians work practices and patient care: A systematic review. *Journal of the American Medical Informatics Association*, 16(6), 792–801.
- Saba, V. K. (2001). Nursing informatics: Yesterday, today and tomorrow. *International Nursing Review*, 48(3), 177–187. doi:10.1046/j.1466-7657.2001.00064.x
- Schnall, R., Higgins, T., Brown, W., Carballo-Diequez, A., & Bakken, S. (2015). Trust, perceived risk, perceived use, ease of use and perceived usefulness as factors related to mhealth technology use. *Studies in Health Technology and Informatics*, 216, 467–471.
- Schoville, R. R., & Titler, M. G. (2015). Guiding healthcare technology implementation: A new integrated technology implementation model. *CIN: Computers, Informatics, Nursing*, 33(3), 99–107.
- Sharples, M., Taylor, J., & Vavoula, G. (2005). Towards a theory of Mobile learning. In *Proceedings of mLearn 2005 Conference*. Cape Town, South Africa.
- Sharples, M., Taylor, J., & Vavoula, G. (2007). A theory of learning for the mobile age. In R. Andrews & C. Haythornthwaite (Eds.), *The Sage handbook of e-Learning Research* (pp. 221–247). London: Sage.
- Silva, M. C. (1973). Nursing education in the computer age. *Nursing Outlook*, 21(2), 94–98.
- Strandell-Laine, C., Stolt, M., Leino-Kilpi, H., & Saarikoski, M. (2015). Use of mobile devices in nursing student–nurse teacher cooperation during the clinical practicum: An integrative review. *Nurse Education Today*, 35(3), 493–499.
- Traxler, J. (2007). Defining, discussing and evaluating mobile learning: The moving finger writes and having writ. *The international Review of Research in Open and Distance Learning*, 8(2), 67–75.
- UNESCO. (2006). *Education for all global monitoring report 2006* (pp. 159). Paris,

France: UNESCO.

- Weiser, M. (1991). The computer for the 21st century. *Scientific American*, 265(3), 94–104.
- Yahya, S., Ahmed, E. A., Jalil, K. A., & Mara, U. (2010). The definition and characteristics of ubiquitous learning: A discussion. *International Journal of Education and Development using Information and Communication Technology*, 6(1), 1–11.
- Zeffane, R., Tipu, S. A., & Ryan, J. C. (2011). Communication, commitment and trust: Exploring the triad. *Journal of Business and Management*, 6(6), 77–86.