



Embracing healthcare technology – What is the way forward for nurse education?



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ABSTRACT

Digital technology is regarded as increasingly important in the provision of safe, consistent and optimal health care in the future. However considerable challenges exist in relation to how it can best be used and integrated to support, transform and facilitate user engagement and provide individualised care. Many forms of digital health technology exist already that have improved diagnosis and treatment in terms of early diagnosis and treatment. That said, healthcare, and nursing in particular, remains largely at the periphery of the digital technology transformation and as a result is failing to capitalise on its potential for improving health care and services. Awareness of the level of change in terms of professional and cultural ideology is needed when introducing technology in health care. Participation in the introduction, adaptation and acceptance process by all staff using soft and hard data to create a vision, set clear goals and develop a mutually agreed implementation strategy is essential for success. A positive approach by management towards the use and benefits of digital technology for improving and transforming healthcare in conjunction with education support has been effective in some UK and US projects. Education needs to commence at undergraduate level and continue across the nursing career trajectory. This will help nurses to re-conceptualise how both patients and health care professionals can benefit and that technology can serve to enhance and support patient centred communication rather than limit it.

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1. Introduction

Over the past century, digital technology has played a key role in providing safe, consistent and up-to-date health care. As it evolves and develops, so also do the improved health care outcomes for service users due to greater access and efficiency in relation to communication (written and verbal), patient consultation, investigations, diagnosis, and treatment ([Health Information and Quality Authority, 2013](#); [Health Service Executive, 2015](#)).

2. Healthcare technology

Recent focus in relation to technology in healthcare is on how it can be used to support, transform and facilitate user engagement, thus enabling the provision of technical supports and communication that is personalised and completely relevant to the individual ([EU, 2014](#)). Through a combination of Information

Communication Technology (ICT) solutions, education and self-management; social and eHealth strategies have the potential to limit or possibly prevent a decline in social functioning and reducing demands on families and health care systems/providers. The use of ICT applications can range from data collection on symptom management by the patient at home and subsequent transmission to a health care provider, to supporting and facilitating the patient in changing or adapting bio/psycho/social behaviours towards self-management of personal health in relation to prevention, early detection and taking appropriate action ([EU, 2014](#)). An example of this type of effective technology is telemonitoring for which there is some evidence that it improves outcomes for patients in terms of preventing readmissions and improved self-management of care ([McCabe et al., 2014](#)).

This vision is evident in the dramatic expansion in the number of health and health related apps that are available to download onto smartphones. This is often used in conjunction with other types of technology such as telemonitoring. However, healthcare has been slow overall to use this technology and remains on the periphery of the digital technology transformation ([Graf, 2013](#); [Kellermann and Jones, 2013](#)). Consequently, the expected

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improvements in outcomes in terms of self-management of chronic illness and reduced admissions/readmissions to acute care services are not evident. However it is clear that nurses often struggle with technology. For some this is because they are simply unfamiliar with it, and without additional education the use of and adaptation to technology can be challenging. Indeed some studies indicate that technology, used for patient records for example, hinders the nurse (Bagnasco et al., 2013). It is also believed that simply implementing and improving technological advances is not the only solution to changing health care practices. Cognisance needs to be taken of the level of change involved and appropriate positive change management approaches that are participatory in nature are essential. Put simply, managers need to work collaboratively with staff using soft and hard data to create a vision, set clear goals and develop an implementation strategy that fosters enthusiasm and supports staff (McSherry et al., 2014). It needs to be borne in mind when developing and implementing new technologies, whether as part of hospital systems or patient support devices, that generational differences, traditional engrained practices and professional boundaries also affect the willingness to change rate of change.

More recently, generation ‘Y’ (those born between 1982 and 2005), effectively the new workforce, are considered more equipped for and skilled with technology (Eckleberry-Hunt and Tucciarone, 2011). Those older generations, which make up a significant proportion of the workforce, are often less adept (Eckleberry-Hunt and Tucciarone, 2011). At the same time younger generations understand less about etiquette and are more likely to use technologies inappropriately, which needs consideration in the health care context. Overall hospital managers and nurse educators ought not to make assumptions, but rather using needs based approach; provide the educational support required to support staff to use new and evolving technologies.

Technologies such as integrated technological record system in hospitals are associated with considerable benefits for patient care and communication (Callen et al., 2013), such as a recent move in the UK towards a paperless patient record system (Vezyridis et al., 2011). Similarly, Hustey and Palmer (2010) US study revealed a greater satisfaction with the use of Internet based documentation. This system was favourably reviewed and appeared to cut down on paperwork (Hustey and Palmer, 2010). A contributory factor to aforementioned successes appears to be the positive approach to management and implementation of change (Vezyridis et al., 2011).

A suitably educated workforce and widespread adoption of such technology, along with appropriate change management supports, would facilitate the expansion of the physical boundaries of health care delivery by use of appropriate technologies. This would also alter the relationship between the care provider and receiver significantly towards a more ‘connected, participatory, person centred and indeed, person led approach (EU, 2014). Although the potential benefits in terms of improved economic and service delivery across the health care ecosystem are self-explanatory, there is another issue with implementation. Health care professionals and indeed the patients are sometimes reluctant to alter the nature of the very traditional doctor/nurse and patient relationship. Although there are reports of successful online and virtual education and health supports for both patients and health care staff, technology is not regarded as embedded in health care provision and its potential benefits, although evident, is not used to its full potential (McCabe et al., 2014). There is a great deal more that needs to be done to address this and like everything, it starts with education.

3. Nurse education and healthcare technology

Changing the behaviour of both health care professionals and

patients towards freely adopting technology for establishing and sustaining self-management but also ensuring connection with health care professionals is challenging. Education, theoretical and applied, is essential and should commence at undergraduate level and continue across the career trajectory. Health care professionals, particularly nurses, will need to re-conceptualise how patients can be educated, supported and encouraged using technology in a way that is safe, efficient, effective and economical. It is quite a seismic shift in thinking about how care is delivered. One of the issues that may be an obstacle is fear of losing the personal connection between patients and health care staff. However, technology can be utilised as an adjunct and facilitator of contact rather than a replacement to human contact. Both patients and health care staff need to understand and experience how this can happen. Huston (2013) identifies four distinct challenges for nursing leaders and educators. These are; balancing the human element of nursing with technology; balancing the cost and benefits of technology; training a technology enabled and sympathetic nursing workforce and assuring ongoing competency; and finally, ensuring that technology use is ethical.

Health care technology is fast becoming the foundation for the sustained advancement of quality in healthcare and all health and allied health professionals play a key role in its success. The way in which nurses perceive healthcare information technology systems and their usefulness or relevance to improving care delivery will significantly influence its usage (Piscotty et al., 2015). Nurses have the most contact with patients and this will continue whether it is at the bedside or remotely, therefore, it is imperative that not only do they embrace the use of technology in healthcare but also participate fully in its design, development and implementation. Otherwise, the technology may be underutilised as nurses feel ill prepared on its use or feel that it does not meet either their needs of those of the patient (Piscotty et al., 2015). The all too common result of this is abandonment of the technology. Participation and education for nurses and indeed all other health care staff is essential for its success.

Current strategies for undergraduate learning about technology includes lectures, simulations and clinical practice. However, the focus of teaching is generally limited to how technology assists in assessment and monitoring of patients in health care situations with some experience of self-monitoring of patients, for example, recording blood sugars and telemonitoring. To expand this learning, and facilitate a greater understanding of the importance of nurses participating in designing and developing technology for helping users, nursing students at undergraduate and postgraduate level, need to become involved in collaborative projects between service users, design engineers and industry in order to bring about a fundamental change in how health care technology is conceptualised and used.

A needs analysis is essential with programmes and systems that facilitate learning about technological modalities firmly in place within nurse education curricula and settings. This may include a range of pedagogical approaches including online learning tools, simulation and practical skills training. Nurse educators have a responsibility to provide future nurses with the knowledge, skills, motivation and confidence to contribute meaningfully to the development and use of nursing and health care technologies. Given their close position to the patient in healthcare settings, nurses are often best placed to provide care supported by these technologies but also to contribute to future technology development by coordination with service users and industry.

4. Conclusion

Health care technology has the power to transform the nursing

profession through collecting, synthesising, and analysing data about nursing care in a way that demonstrates its impact in the provision of quality outcomes in health care. (Cipriano, 2011). It is important that nurses take the lead and take expert roles in health care IT and lead the transformation of service delivery models in the future. This requires empowerment at nurse education level, through education and experience in designing, developing and implementing technologies that are effective and assist in nursing care and improving the service to patients. It is important not to assume that just because nursing students are technologically skilled, they are open to not only using technology in all areas of practice, but also are willing to participate in the development and implementation of IT solutions to improve health care services. It is indeed time for nurse educators to debate this issue and establish how best to educate future nurses to embrace and use the potential of healthcare IT for the development of nursing and innovative health care service provision.

References

- Bagnasco, A., Tubino, B., Piccotti, E., Rosa, F., Aleo, G., Di Pietro, P., Sasso, L., 2013. Identifying and correcting communication failures among health professionals working in the emergency department. *Int. Emerg. Nurs.* 21 (3), 168–172.
- Callen, J., Paoloni, R., Li, J., Stewart, M., Gibson, K., Georgiou, A., Braithwaite, J., Westbrook, J., 2013. Perceptions of the effect of information and communication technology on the quality of care delivered in emergency departments: a cross-site qualitative study. *Ann. Emerg. Med.* 61 (2), 131–144.
- Cipriano, P., 2011. The future of nursing and health IT: the quality elixir. *Nurs. Econ.* 29 (5), 286–290.
- Eckleberry-Hunt, J., Tucciarone, J., 2011. The challenges and opportunities of teaching “generation y”. *J. Grad. Med. Educ.* 3 (4), 458–461.
- EU, 2014. Implementation Report on the Commission Communication on a European Initiative on Alzheimer's Disease and Other Dementias (Accessed 14 October 2015). http://ec.europa.eu/health/major_chronic_diseases/docs/2014_implreport_alzheimer_dementias_en.pdf.
- Graf, P.O., 2013. The Health Care Industry's Slow Embrace of Remote Access Technologies. <http://www.ihealthbeat.org/perspectives/2013/the-health-care-industrys-slow-embrace-of-remote-access-technologies>.
- Health Information and Quality Authority, 2013. Overview of Healthcare Interoperability Standards. www.hiqa.ie/system/files/Healthcare-Interoperability-Standards.pdf (Accessed 14 October 2015).
- Health Service Executive, 2015. Knowledge & Information Strategy: Delivering the Benefits of eHealth in Ireland. <http://www.ehealthireland.ie/Knowledge-Information-Plan/Knowledge-and-Information-Plan.pdf> (Accessed 14 October 2015).
- Hustey, F.M., Palmer, R.M., 2010. An internet-based communication network for information transfer during patient transitions from skilled nursing facility to the emergency department. *J. Am. Geriatr. Soc.* 58 (6), 1148–1152.
- Huston, C., 2013. The impact of emerging technology on nursing care: warp speed ahead. *OJIN Online J. Issues Nurs.* 18, 2. Manuscript 1.
- Kellermann, A.L., Jones, S.S., 2013. What it will take to achieve the as-yet-unfulfilled promises of health information technology. *Health Aff.* 32 (1), 63–68. <http://dx.doi.org/10.1377/hlthaff.2012.0693>.
- McCabe, C., Dinsmore, J., Brady, A.M., McKee, G., O'Donnell, S., Prendergast, D., 2014. Using action research and peer perspectives to develop technology that facilitates behavioral change and self-management in COPD. *Int. J. Telemed. Appl.* <http://dx.doi.org/10.1155/2014/380919>. Article ID 380919, 10 pages.
- McSherry, R., Cottis, K., Rapson, T., Stringer, M., 2014. Embracing external scrutiny to build bridges and genuine partnerships between education and clinical practice. *Nurse Educ. Pract.* 15, 149–154.
- Piscotty, R.J., Kalisch, B., Gracey-Thomas, A., 2015. Impact of healthcare information technology on nursing practice. *J. Nurs. Scholarsh.* 47 (4), 287–293.
- Vezyridis, P., Timmons, S., Wharrad, H., 2011. Going paperless at the emergency department: a socio-technical study of an information system for patient tracking. *Int. J. Med. Inf.* 80 (7), 455–465.