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Mapping Skills and Competencies; Providing Access to Knowledge, Tools and Platforms; and Strengthening, Disseminating and Exploiting Success Outcomes for a Skilled Transatlantic eHealth Workforce

Case Study: Educating Undergraduate Nursing Students about Technology Enabled Care in Scotland

School of Health and Social Care, Edinburgh Napier University, Edinburgh, United Kingdom

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TITLE Educating Undergraduate Nursing Students About Technology Enabled Care in Scotland

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ORGANIZATION

Edinburgh Napier is an innovative university based in Scotland, the United Kingdom (UK) that is inspired and deeply connected to the world around it (<http://www.napier.ac.uk/>). It has over 18,000 students, many of which hail from all corners of the globe, and creates and supports personalised learning and research opportunities that nurture talent, build knowledge and shape communities around the world. Its purpose is to deliver high quality education and research to add value to the social, cultural and economic capital of the communities we serve. Edinburgh Napier works at the leading edge of many academic disciplines in research, pedagogy and professional practice, develops highly valued graduates and delivers research outcomes that together transform communities.

The University is rated top in the UK for adding value to students by the Guardian University Guide 2017, receives five stars for teaching, employability and internationalisation from the prestigious QS Stars rankings and enters the Times Higher Education World University Rankings, putting us in the top 5% of universities worldwide. It has a reputation for the diversity of its student community, employability of its graduates, its international reach and engagement with business through research and enterprise.

The School of Health and Social Care at Edinburgh Napier develops graduates with professional knowledge, critical thinking and industry connections to truly make a difference. It provides a vibrant teaching and research environment for over 2,500 students and 130 staff. Its nursing and midwifery graduates qualify with official Nursing and Midwifery Council (NMC) registration and 99.4% of its nursing students go straight into work within six months of graduating. They go prepared with both the skills they need to provide great care and a fantastic work ethic. The school delivers a world class learning experience and undertakes pioneering research with a focus on practical and applied results as it aims to have an enduring global impact on society through the positive influence of its professional and ambitious graduates.

BACKGROUND

In the UK and across the world, the health and social care sector is one of the most rapidly changing and high-profile industries in society. Policy changes alongside financial challenges are putting greater demands on healthcare professionals in terms of knowledge, skills and qualifications. The changing focus of the health and care sector onto patient-centered care, greater choice and control for service users and awareness of the importance of healthy lifestyles have increased the demand for well-trained and multi-skilled people in a wide range of rewarding roles. In particular, knowledge of and skills in informatics are becoming crucial as technology becomes embedded in the infrastructure of healthcare systems in the UK and worldwide.

The Scottish Government and National Health Service (NHS) Scotland have had a national eHealth Strategy [1] in place for many years to support key health policy aims such as improving the quality of care, enabling shared decision making with patients and integrating health and social care (<http://www.ehealth.nhs.scot/>). eHealth plays a pivotal role in evolving the way in which care is delivered

in Scotland, empowering both citizens and professionals through better digital services and information. This will directly improve the outcomes of professional care and, at the same time, essential support for effective self-care and health improvements by people in Scotland. However, there is a lack of education and training for both students and professionals who work in the health service in relation to informatics and the application of technology across a variety of healthcare contexts.

In addition, the UK Department of Health and National Information Boards' Personalising Health and Care 2020 agenda [2] requires health service providers to ensure that everyone working in healthcare be able to learn, work and develop effectively in a digital workplace and society. Health Education England (HEE), working in partnership with the National Information Board, is working to bring about improvements in the digital literacy of healthcare professionals. It recently published a digital literacy framework that is helping shape the education and training needs of the health workforce [3].

STATUS/CURRENT DEVELOPMENTS

A pedagogical eHealth initiative is currently underway at the School of Health and Social Care at Edinburgh Napier University. It aims to improve the digital knowledge and skills of undergraduate nursing students to address the gap in informatics expertise among graduate nurses who practice in the NHS. At present, education policies in Scotland identify health informatics (HI) as an area that needs investment [4] and the professional registration body, the NMC, also advocates for the inclusion of health technology in pre-registration nursing education standards and curricula [5]. It is against this background that a core set of informatics competencies and curricula for undergraduate nursing students is being designed and integrated in a Bachelor of Nursing programme at Edinburgh Napier University. Expertise is also being drawn from international nursing and biomedical informatics education standards [6, 7] and the Technology Informatics Guiding Education Reform (TIGER) Initiative [8]. A Fulbright U.S. Scholar based at the University of Pittsburgh, United States is also lending her expertise to enhance the eHealth training materials under development and evaluate them with nursing students.

ACTIVITIES/MEASURES

Individual eHealth learning units are being designed based on international medical and nursing informatics (NI) education standards and frameworks mentioned above. These cover 6 key foundation areas in informatics:

- 1) Health Service Literacy
- 2) Information and Communication Technology (ICT) Literacy
- 3) Information Management
- 4) Information Systems Literacy
- 5) Information Systems Management
- 6) Patient/Citizen Digital Health Literacy

Each of these areas has a set of informatics competencies aligned to it, from which specific eHealth curricula are being developed and integrated into established nursing curricula. This includes lecture and tutorial materials, online activities and core reading that incorporates exposure to a range of technologies used in NHS Scotland and future trends in informatics.

Learning Unit	Informatics Competency
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Health Service Literacy	Identify the structure and function of the NHS Scotland and how it is organised, funded and delivered.
	Develop an awareness of the basic demographics and determinants of health of the people in Scotland.
	Recognise the clinical, managerial and leadership roles that nurses undertake in the NHS and how they care for and support the health of people in Scotland.
ICT Literacy	Examine the basic concepts and components of ICT and their development over time e.g. hardware, software, computer and communication systems & electronic networks.
	Analyse how ICTs can contribute to care e.g. collecting, storing, processing, managing and sharing information to support decision-making and the delivery of different models of care across a range of settings.

Table 1: Examples of some learning units and associated informatics competencies

This initiative draws its pedagogic framework from the *spiral learning* approach [9] and so informatics competencies are revisited and built on each year to deepen nursing students understanding of eHealth and its application to patient care.

CHANGES

The pedagogical changes on the Bachelor of Nursing (BSN) programme are occurring at a module level, with learning outcomes and teaching and assessment materials being reviewed and adapted where possible to incorporate informatics competencies and their associated curricula. This will complement current nursing education in the 1st, 2nd and 3rd years of the programme and ensure students revisit essential concepts and applications of technology in healthcare throughout their training. This will enable nursing students to graduate with core knowledge in HI required for professional practice and ensure they are competent in delivering technology-enabled care.

RESULTS

The new eHealth curriculum is currently being evaluated with nursing students in 2017/18. It will enable nursing students to gain foundational knowledge in informatics, understand technology and its application to patient care and deliver “technology enabled care” in the health service in Scotland. In addition, the initiative will assist nursing faculty in building their expertise and curricula in HI, which they can share with colleagues locally, nationally and internationally.

OUTLOOK/LESSONS LEARNT

The most important lesson learned is to spend time reviewing the education literature on this topic and ensuring several internationally recognised nursing and medical informatics education frameworks and standards are reviewed. These provide educators with a thorough understanding of the core concepts that need to be delivered to both students and health professionals during their training. A second and equally important lesson learned is to draw on the expertise available both locally, nationally and internationally as many people work in this area of education and have built up expertise and resources they are willing to share with others. This will reduce the amount of time, energy and money required to adapt curricula and educate healthcare students and professionals on informatics. A third lesson learned is to give back to the

educational community by sharing institution case studies of good practice in eHealth education and training so others can learn from the challenges you encountered and what you achieved.

References

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Case Study Checklists

Checklist of eHealth topics (competencies)	Apply? Yes/No	Describe how topic applies to your organization/case study
<i>Role of "Peopleware":</i> human factors, awareness, satisfaction and acceptance of health IT, usability measurements, evaluation of health IT, communication, leadership, change management, ethics and IT and similar topics	Yes & No	Some of these topics, namely electronic communication and ethics, are covered in the pedagogical initiative outlined above. However, other "peopleware" topics are not available at our institution to my knowledge.
<i>Role of inter-professional approaches:</i> inter-professional versus mono-professional training and learning activities. What subjects lend	No	At the moment, we do not provide any interprofessional training but I imagine this will change in the near future as our university

<p>themselves to inter-professional vs. mono-professional classes, learning environments and similar topics</p>		<p>is expanded to train other health and social care professionals.</p>
<p><i>Role of healthcare data sciences:</i> data and information acquisition including documentation, data quality, data, information and knowledge management, data analysis and statistics, clinical decision making instruments, reporting and similar topics</p>	<p>Yes & No</p>	<p>The basics of data quality and data management for clinical decision-making are covered in the pedagogical initiative outlined above. However, more specialist and advanced topics are not available at our institution.</p>
<p><i>Fusion of medical technology & informatics:</i> software as a device, smart devices, automatic data acquisition via devices, risk and safety management</p>	<p>Yes & No</p>	<p>The concept of wearable and smart devices are included in the pedagogical initiative outlined above when patient self-management is discussed with nursing students. However, more specialist and advanced areas of this medical topic are not covered at our university.</p>
<p><i>Role of process and workflow management:</i> clinical and administrative processes, information continuity and information logistics, management of processes, workflow management systems and similar topics</p>	<p>Yes & No</p>	<p>The fundamental components of clinical workflows and technology are addressed in the pedagogical initiative outlined above. However, other more technical areas listed are not available at present.</p>
<p><i>Role of ethics, legal and data protection issues:</i> ethics and IT, legal requirements, data protection and information self-determination, data safety and similar topics</p>	<p>Yes</p>	<p>The core aspects of ethics, data protection and information governance are included in the pedagogical initiative outlined above.</p>
<p><i>Role of learning and teaching:</i> learning techniques (“learn how to learn”), learning and teaching styles (online, blended, face-to-face), learning management, information management for learning and teaching and similar topics</p>	<p>Yes</p>	<p>Our university provides postgraduate training in teaching and learning which covers some of these topics. http://www.napier.ac.uk/courses/pg-cert-learning-teaching-and-assessment-practice-in-the-postgraduate-distance-learning-part-time</p>
<p><i>Role of management related topics in health informatics and IT:</i> principles of management, strategic management, stakeholder and change management, leadership, financial management, risk management, quality and safety</p>	<p>Yes</p>	<p>Our university provides a Masters in Healthcare Management, which includes many of these subjects. http://www.napier.ac.uk/courses/msc-</p>

management, resource planning and management and similar topics		healthcare-management-postgraduate-fulltime
<i>Role of technology:</i> information and communication systems, telemedicine, telematics, assistive technologies, mHealth, life-cycle-management including systems development/engineering	Yes	The core areas of most of these topics (e.g. information & communication systems, telemedicine, mHealth, assistive technologies, etc.) are included in the pedagogical initiative outlined above. However, we do not teach systems development or life-cycle management at present.
<i>Role of consumers and populations:</i> consumer health informatics, public health informatics	Yes	Both of these topics (at a basic/foundational level) are included in the pedagogical initiative outlined above.
<i>Role of Research:</i> information management in research, data analytics	Yes	Our university provides a MSc in Data Science, http://www.napier.ac.uk/courses/msc-data-science-postgraduate-distance-learning
<i>Role of interoperability:</i> systems integration, IT standards, terminologies and classifications	No	

Checklist of eHealth topics (gaps and deficiencies)

Teaching the teachers: Are there any activities in your organisation to teach health IT/eHealth to teachers in healthcare?

No, not to my knowledge.

Supporting participatory design and acceptance testing/research: Are there any educational activities to teach or practice participatory design? Are there any activities including research in user acceptance testing and satisfaction measurement?

No, not to my knowledge.

Integrating eHealth/health informatics into traditional curricula: Are there any activities to include eHealth/health informatics into traditional curricula of physicians, nurses and other health professionals with direct patient care?

Yes, the initiative outlined above is integrating informatics curricula into undergraduate nursing education.

Motivating clinicians and managers: Are there any incentives and opportunities for clinicians and healthcare managers to acquire and update digital eHealth/health informatics skills and knowledge?

Yes, the Nursing, Midwifery and Allied Health Professionals (NMAHP) eHealth Leadership Programme is run each year in NHS Scotland. This supports ambitious, experienced nurses, midwives and allied health professionals to influence eHealth and demonstrate innovation and creativity in leading change for the benefit of patients. <http://www.nes.scot.nhs.uk/newsroom/features-and-articles/join-the-nmahp-ehealth-leadership-programme.aspx>

Engaging women: Are there any activities to attract female students in eHealth/health informatics or employ female health IT staff?

No, not to my knowledge.

Adjusting job descriptions and enable continuing education: Are there any activities to adjust job descriptions, e.g., for clinicians, that include health informatics competencies (also proper use of health IT/eHealth systems) and are there activities to support staff updating and upgrading their health IT related skills and knowledge? This topic is mainly related to provider organisation and IT vendors.

N/A

Updating teaching and learning material: Are there any activities to ensure that the material is up-to-date and of high quality?

At my university, the teaching staff are responsible for ensuring material is up to date and high quality. Curriculum development is usually completed once a year, over the summer period.

Availability of courses including electronic courses: Are there any additional activities to improve the availability of courses such as implementation of new courses, new course formats that recognise previous experiences/training in particular for continuing education?

N/A - not within the scope of my organisation/knowledge.

Informal caregivers: Are there any educational activities to teach health IT usage to informal caregivers, e.g. for assistive technologies?

N/A - not within the scope of my organisation/knowledge.

Shortage of health informatics specialists: Are there any programmes to attract health informatics specialists?

N/A - not within the scope of my organisation/knowledge.

eHealth Budget: Does your organization, area or region have a dedicated budget set aside for eHealth/health informatics training, education or workforce development initiatives?

There are pockets of eHealth education/training available to the workforce in NHS Scotland but I do not know the exact particulars of these budgets and where and how they are spent.



<http://www.knowledge.scot.nhs.uk/recordsmgt/certificate-of-technical-competency/module-1---records-management/the-health-record.aspx>

eHealth Specialty Areas: Does your organization address any of these speciality settings/areas of training or outreach for eHealth education or workforce development: ambulatory care, social medicine, geriatric/ageing medicine, rehabilitation?

N/A - not within the scope of my organisation/knowledge.