Curriculum resource co-design and development for a digital health workforce and digital health ready graduates

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Abstract

Demand for an eHealth capable workforce is highlighting the need for eHealth education and training across tertiary education and workforce professional development contexts. NSW Health and the University of Sydney have collaborated to develop learning resources as a component of a comprehensive Digital Health Curriculum for NSW Health. Learning resource development is guided by the eHealth Capabilities Framework and the NSW Health Analytics Framework, to produce a Massive Open Online Course (MOOC) relevant to the health workforce and health degree graduates. A co-design process, involving broad stakeholder and subject matter expert consultation from across health, education, government and non-government organisations, is being applied to develop quality learning resources. Initial learning opportunities focus on the foundation level digital health capabilities anticipated of the health workforce. In addition, there is a focus on discussions regarding future curriculum development activities at the level of intermediate and advanced level capabilities relevant to workforce in leadership roles or seeking career opportunities specialising in the growing professional fields of digital health and data analytics.

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INTRODUCTION

Digital health is rapidly being realised as the future of healthcare (Consumers Health Forum of Australia 2018). Demand for an eHealth ready and capable workforce (Department of Health and Aging 2011a, 2011b; Health Workforce Australia 2013) is highlighting the need for eHealth education and training across tertiary education (Gray, Dattakumar & Maeder 2014) and workforce professional development contexts (Australian Digital Health Agency 2018). Interactions around health, wellness and healthcare delivery increasingly incorporate digital technologies and systems that:

1. monitor, track and transmit health data, such as wearables and apps

2. support communication and interactions with and between healthcare providers and health consumers, such as telehealth services, and

3. capture, manage and provide access to data to inform quality healthcare, such as electronic medical records (eMR) (Shaw et al. 2017).

Ehealth is recognised as a key element in recent Australian health reforms, with the potential to improve the delivery of quality patient care and achieve better health outcomes (NSW Health 2016). As digital health technologies become more pervasive, health services and universities must consider coordinated approaches to education and training to ensure that the current and future health workforce is suitably prepared to practice within digital environments.

The recently published 'eHealth Capabilities Framework for Graduates and Health Professionals' (Brunner et al. 2018) describes the foundational level eHealth knowledge and skills expected of the current health workforce and of tertiary health degree students at graduation. The framework was developed as a component of the 'eHealthMap' project (McGregor et al. 2017) to guide health curriculum design, and is based on current evidence and qualitative research that identified stakeholder perceptions of eHealth capabilities. Stakeholders involved in this research had expertise or experience in eHealth education, practice, or policy, including widespread representation from NSW Health Organisations, Pillars and Local Health Districts. Adopted by NSW Health as an appropriate representation of the foundation capabilities for the health workforce, the framework outlines four high level capability domains, incorporating:

1. Digital Technologies, Systems and Policies

2. Clinical Practice and Applications

3. Data Analysis and Knowledge Creation, and

4. System and Technology Implementation.

A strategic collaborative project between NSW Health and the University of Sydney is overseeing the development of learning resources as a component of a comprehensive Digital Health Curriculum for NSW Health. The development of learning resources is guided by the eHealth Capabilities Framework and aligns with the

workforce expectations for clinical and non-clinical staff outlined in the NSW Health Analytics Framework (NSW Ministry of Health 2016):

1. Learners can carry out basic interpretation of data (e.g. assess strengths and weaknesses of data assets in the context of service delivery)

2. Learners have a minimum capability level to generate and interpret the specific reports that are required to make evidence-based decisions (e.g. policy, planning or clinical decisions).

Initiated in January 2018, the project is overseen by the NSW Health Workforce Skills and Training Working Group (WSTWG), which is responsible for providing direction, oversight and input into the development, implementation and ongoing review of priority actions allocated by the NSW Health Analytics Steering Committee. A subset of the WSTWG, the Curriculum Development Subgroup, is specifically responsible for providing the direction, review and contribution to curriculum and education resource development. The committee and working group include membership from the NSW Health Local Health Districts, eHealth NSW, Health Education and Training Institute (HETI) and the University of Sydney. As such, the project aligns with priority actions outlined by the NSW Ministry of Health to work with the relevant stakeholders in the health professional education and training sector to strengthen relevant curricula (NSW Ministry of Health 2016). It also contributes to efforts to embed research outcomes into educational practice.

MOOC DESIGN AND DEVELOPMENT

Initial project outputs include the development and delivery of a Massive Open Online Course (MOOC). A MOOC is an open access web-based learning resource aimed at large-scale participation. It has been asserted that online courses, such as MOOCs, can help experienced learners, including health workforce undertaking professional development, to deepen their knowledge and improve skills in a specific area (Harder 2013; Steffens 2015). The importance of self-development and lifelong learning is well acknowledged and learning increasingly takes place in virtual communities (Kesim & Altinpulluk 2015; Steffens 2015), where people can learn in digital networks and using open educational resources (Kop 2011). MOOCs have been situated in a diversity of learning theories (Anders 2015). Siemens (2005) proposed the theory of Connectivism applicable to the digital age, where learning knowledge is transformed and transferred through the interactions of people, especially in a web environment (Kop 2011). Others apply a more content-focused approach, delivering multimedia instructional content, and apply a cognitive-behaviorist or instructivist pedagogical approach (Rodriguez 2012).

Several examples exist where MOOCs have been used in medical and health sciences education (Harder 2013; Swigart & Liang 2016), including instances where MOOCs have been approved for academic credit and certified as eligible for continuing professional development (CPD) credit (Harder 2013). It has been suggested that MOOCs are potentially superior to other forms of distance education, such as

podcasts, because they can enable interaction, such as quiz taking and online discussions, that can reinforce mastery of learning material (Harder 2013). Research indicates that half of MOOC registrants are employed full-time, with a majority already holding a higher education qualification (Glass, Shiokawa-Baklan & Saltarelli 2016), which aligns with the profile of typical health workforce seeking CPD opportunities.

'Using clinical health data for better healthcare' is the second MOOC to be produced by the University of Sydney on the topic of eHealth. The inaugural MOOC, 'eHealth – More than just an electronic record' (Coursera 2018), has to date attracted more than three thousand active learners globally and generated enthusiasm for the development of further learning resources relevant to the NSW Health workforce, showcasing local digital health contexts and health data use.

The aim of 'Using clinical health data for better healthcare' is to enable learners to understand and perform information seeking, knowledge creation and decision making utilising health data contained within digital systems. The course provides insight into the use of healthcare data, including an overview of best practices and the practical realities of obtaining useful information from digital health systems, via the understanding of the fundamental concepts of health data analytics. Learners come to understand why data quality is essential in modern healthcare, as they are guided through various stages of the data life cycle, starting with the generation of quality health data, through to discovering patterns and extracting knowledge from health data using common methodologies and tools in the basic analysis, visualisation and communication of health data. In doing so, learners explore current healthcare delivery contexts, and future and emerging digital health data systems and applications that are rapidly becoming tomorrow's reality.

The MOOC comprises four learning modules targeting the following learning objectives:

1. Identify digital health technologies, health data sources, and the evolving roles of the health workforce in digital health environments

2. Understand key health data concepts and terminology, including the significance of data integrity and stakeholder roles in the data life cycle

3. Use health data and basic data analysis to inform and improve decision making and practice

4. Apply effective methods of communication of health data to facilitate safe and quality care.

Each MOOC module comprises multiple learning objects (LOs). While many definitions have been proposed (Churchill 2007), in simple terms, a LO is described as, 'any reusable digital resource that is encapsulated in a lesson or assemblage of lessons grouped in units, modules, courses, and even programmes' (McGreal 2004). The MOOC contains short videos (a maximum of seven to eight minutes each), which include: mini-lectures, subject matter expert interviews, role plays or animations, practice examples and case studies. Learning activities encourage an enquiry-based learning approach, such as

forums for discussion and debate to actively share knowledge, as well as self-assessments to enhance engagement. Modules contain both practice and graded quizzes, typically presented in multiple-choice question format, and short peer-assessment assignments.

Stakeholders in the design and development of the MOOC include clinical, administration, executive and academic subject matter experts (SMEs), health consumers, educational designers, media producers, library and copyright experts, and project managers. Subject matter experts are pivotal to the development of quality learning resources. This project has involved extensive consultation with SMEs across the health landscape, including NSW Health, universities and other government and non-government organisations. For example, SME consultations have included interviews and collaborative resource development with clinical leaders, information officers, eHealth implementation managers, data analysts and corporate system managers. Their expert subject knowledge and experience contributes to learning object design, scripting, and presentation of the learning content in the production of MOOC videos. This co-design approach ensures the development of relevant learning resources that are pitched at the right level for end users' needs; it is an approach that also addresses challenges commonly experienced in the implementation of online learning resources.

Intended learners include health care professionals, clinical support staff, managers, researchers and student health professionals. While the NSW Health workforce and University of Sydney clinical health degree graduates form the core intended audience, the MOOC will also be potentially relevant to a broader audience as a resource for global learners. Learners typically complete a total of 12–25 self-directed learning hours, comprising approximately three to five hours a week, completed over four to five weeks. Learning is asynchronous, meaning that learners can join the course and participate at any time. Access to the MOOC is free, with learners having the option to purchase a certification of completion. MOOC production is due for completion in early 2019, with a pilot involving NSW Health workforce of up to three of the learning objects anticipated in the first quarter of 2019. The evaluation of these piloted areas will further inform the production of material, both within the MOOC education design and within other online learning contexts.

FUTURE DIRECTIONS AND OPPORTUNITIES

The MOOC presents opportunities to direct learners, via embedded resources, hyperlinks, and reference lists, to existing information and support services produced by stakeholders in digital health and data use, including eHealth NSW and the Australian Digital Health Agency. It also has the scope to direct relevant learners to further learning and development opportunities contained within the NSW Health state-wide Learning Management System, 'My Health Learning' (MHL), such as modules on privacy and the use of health data for analytics purposes, and specific digital health systems training, e.g. the eMR Learning Path.

Pedagogical designs and learning objects are being produced to standards appropriate for the re-use of resources across other learning platforms. This creates opportunities for individual resources to be repurposed across a variety of learning contexts. For example, videos may be used by health staff during in-services and staff orientation, or used by academics during lectures or the creation of online courses. Repurposing opportunities are multiple, including the following:

1. Incorporating materials into a larger national repository of education and training resources coordinated by a central managing body, such as the Digital Health Cooperative Research Centre (Digital Health CRC 2018)

2. Application of course pedagogy to the development of an 'Open Learning Environment' course for University of Sydney students, where learners can gain credit points towards their qualification and course completion appears on their academic transcript, and

3. Development of a learning pathway within the MHL Learning Management System, which would enable tracking of NSW Health staff learner analytics and course completion for continuing professional development (CPD) credit.

The resources will be of potential interest to professional associations, government agencies and other academic and health organisations for integration into workforce development programs.

This project has the potential to influence curricula in health education and professional development for the health workforce and health graduates. In line with the knowledge and skills outlined in the eHealth Capabilities Framework, learning opportunities move beyond a focus on digital and technical skills to consideration of much broader professional competencies and attributes relevant to working in digital health environments, including quality and safety, consumer-centeredness, critical thinking and evidence-based practice. Resources emphasise the ethos of lifelong learning and being improvement minded. They also include consideration of the integration of eHealth into clinical workflows, adopting new models of care, facilitating consumer empowerment, and using data to inform practice. The WSTWG are considering additional learning opportunities relevant to eHealth capability statement four, 'System and Technology Implementation', acknowledging that there are currently training gaps for the health workforce with regards to participation in eHealth implementation, evaluation and change processes.

The MOOC focuses on foundation capabilities. Future curriculum development work will focus on consideration of intermediate and advanced levels of capability, including support and training pathways for workforce members in leadership roles or seeking career opportunities specialising in the growing professional fields of eHealth and data analytics.

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Conflict of Interest

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