Innovate, Educate, Elevate: Empowering Tomorrow's Health Professionals Through a Contemporary Learning Module in Digital Transformation of Health

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Abstract. This manuscript describes the conception and development of a novel, innovative digital health and informatics learning module designed specifically for entry-to-practice physiotherapy university programs. The design process involved consultation with stakeholders, alignment with contemporary digital health competency guidelines for health professional education, and educational design workshopping with faculty to ensure relevance and success. Key curriculum components include modules on health system transformation, design-thinking approaches, solution refinement and innovation pitching in the context of digital health. The subject intended learning outcomes (SILOs) were focused on digital health transformation, addressing the need for a curriculum on digital health transformation. This tertiary module aims to equip university graduates with essential knowledge and skills to thrive in a digitally enabled healthcare system by offering this framework for future health professional education in the digital age.

Keywords. digital health, physiotherapy, health informatics education, learning health system

1. Introduction

The healthcare landscape is changing rapidly, which presents unprecedented challenges yet significant opportunities for both tertiary institutions and future health professionals. It is becoming increasingly apparent that the integration of digital health and informatics learning opportunities and capability into entry-to-practice health professions education (e.g. allied health, nursing, and medicine) is not only a desirable feature but increasingly essential [1, 2]. The COVID-19 pandemic has accelerated the proliferation of digital health practice, including technology to support healthcare delivery, improve patient health outcomes, and streamline clinical workflows [3].

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Multiple challenges face health professional graduates entering a post-pandemic workforce: an escalating burden of chronic disease, an ageing population, dwindling healthcare resources, and a strained healthcare system [4]. These factors underscore the importance and use of digital health and informatics in supporting data-driven decision-making, remote patient monitoring, and virtual care models. This paradigm shift necessitates innovative approaches to future healthcare delivery and, thus, the design of tertiary health professional education [5]. By integrating digital health and informatics into entry-to-practice health curricula and utilising a digital transformation lens, educational institutions can equip future health professionals with the knowledge and skills (competencies) necessary to succeed in a technologically-enabled healthcare system and, in part, overcome contemporary healthcare challenges [5].

This manuscript details the development of a novel, comprehensive digital health and informatics learning module designed to address the challenges of current entry-to-practice health professions education degrees. The framework presented is exemplified in a postgraduate final-year physiotherapy subject. By articulating subject content, instructional strategies, and methodologies, guidance is provided for health professional education in the digital age.

2. Methods

This curriculum is a standalone module within a third (final), year-long (2 semesters), 18.75 credit point subject: 'Health Leadership and Digital Innovation' (135 contact and 135 non-contact hours for subject). Curriculum development was guided by a comprehensive framework that included 1) stakeholder consultation, 2) alignment with key digital health capability and competency guidance relevant to physiotherapy practice, and 3) educational design workshops that were cognisant of best teaching and assessment practices.

2.1 Stakeholder Consultation

Inter-disciplinary stakeholder consultation on curriculum development included health informaticians, clinical partners, educators, practising physiotherapists, and representatives from healthcare organisations. For example, colleagues from the Centre for Digital Transformation of Health (CDTH) contributed digital health expertise and supported learning design and teaching delivery by adapting learning activities from an 'Applied Learning Health System' short course. Student evaluation feedback was also incorporated. This process identified educational needs, priorities, learning design, delivery modes, and expectations related to digital health and informatics curriculum.

2.2 Alignment with Key Digital Health Capability and Competency Guidance Relevant to Physiotherapy Practice

Several key publications guided contemporary content development, including Australian allied health workforce competency standards [1], health and biomedical informatics education guidance by the International Medical Informatics Association (IMIA) [6], and an international meta-synthesis of physiotherapy professional accreditation standards in the context of digital health and informatics [5]. These informed the core curriculum content, ensuring alignment with professional standards.

2.3 Educational Design

The Department of Physiotherapy, within the School of Health Sciences, University of Melbourne, organised and facilitated intra-departmental curriculum planning workshops in 2023. These workshops identified core knowledge and skills, ideated core content, established subject intended learning outcomes (SILOs) relevant to digital health in physiotherapy, and constructively aligned content with SILOs and assessments.

3. Results

3.1 Content

1. *Health System and Physiotherapy Transformation* explored the evolving health system, future physiotherapy profession policy reform [4], health leadership, digital transformation, and the learning health system framework (LHS).
2. *Design-thinking* approaches included exploring problem-based co-design, low-fidelity prototyping, user experience design and implementation science.
3. *Solution refinement and innovation* pitching introduced the students to entrepreneurship and solution pitching concepts.

3.2 Subject Intended Learning Outcomes (SILOs)

Five of the six SILOs (1-5) developed for Health Leadership and Digital Innovation subject related to digital health transformation content:

SILO 1: Apply skills in innovation, business, and entrepreneurship, and relate the purpose and role of digital transformation to answer key questions and solve problems in physiotherapy and healthcare.

SILO 2: Synthesise and appraise evidence about the role and impact of leadership and digital health innovations on health and the quality of healthcare.

SILO 3: Critically reflect on one's own experiences with leadership and digital health technology to improve the health of individuals and/or target populations.

SILO 4: Demonstrate the role of leadership in creating positive change within the wider physiotherapy and healthcare context.

SILO 5: Apply evidence-based frameworks and models when developing solutions and initiatives in business, leadership, management, and digital transformation as relevant to physiotherapy and healthcare

SILO 6: Demonstrate skills in leadership and management, including teamwork, negotiation, conflict resolution and change management.

3.3 Design and Delivery

Education combined asynchronous learning with bi-weekly collaborative learning workshops. Each week, students were given up to two hours of online preparatory material to engage with on their learning management system to support the attainment of intended learning outcomes (e.g. article readings, video, and discussion-based

activities). The subject coordinator and workshop leads curated these. Students' synchronous learning emphasised a social constructivist approach [7] with sessions facilitated and scaffolded by teachers and focused on active learning and knowledge construction and application through social interaction. This was achieved by workshops, including collaborative group-based activities, small and large group break-put activities, interactive large and small group discussions, polling with gamified features, and mini-lectures interspersed throughout.

The digital health-related curriculum was aligned with the CDTH's organising concept for digital health and informatics education, the Learning Health System (LHS) framework. The LHS model applies a data-powered iterative cyclic healthcare improvement process that includes data-to-knowledge (D2K), knowledge-to-practice (K2P) and practice-to-data (P2D), to harness available health data, generate new knowledge and improve healthcare outcomes in near real-time progress [8, 9]. The LHS model was further broken down into academic modules covering (but not limited to the following):

- Health System and Physiotherapy Transformation: For physiotherapy students, an in-depth understanding of the health system and the future strategic and policy environment within which they exist and operate is the first step in establishing a clearer understanding of the role of health information systems in acting to improve how information is leveraged to improve healthcare [4]
- Data, information, and digital transformation of health: Understanding and leveraging the power of health data and information to derive actionable insights within public and private healthcare settings. This can be used to inform decision-making and drive continuous quality improvement in healthcare delivery.
- Co-design and design-thinking: This pays homage to participatory health informatics [10] through its focus on co-developing and designing digital health solutions according to a design-thinking approach, which starts with empathising with the end-user, problem ideation, iterative design-prototyping, implementation and evaluation.
- Innovation and solution pitching: Students complete innovation entrepreneurship workshops that teach them the subtle art of persuasion, branding, how to pitch an idea, and unique challenges and opportunities in the start-up space.

3.4 Assessment

Two major assessment pieces anchor the module - an individual digital health experience report (where students reflect and appraise their own experiences engaging with digital health technology (SILOs 2,3,4)) and a group-based problem-solution innovation pitch (where groups ideate a digital health solution to a complete health challenge (SILOs 1,2,5)).

4. Discussion

This manuscript aims to guide health professional education in the digital age by detailing the development of a novel, comprehensive digital health and informatics learning module designed to address the challenges of current entry-to-practice health professions education degrees [2, 6]. It is not an expectation that entry-to-practice health professions students will exit their pre-registration studies with specialised skills in digital health and health informatics or entrepreneurship. However, in line with current guidance and growing calls for greater attention to digital health and informatics competency in required practice accreditation standards [5], all graduating health professionals will exit their tertiary studies with a baseline level of knowledge and capability to practice in a digitally-enabled health system.

The success of the design and rollout of this module can be attributed to three important factors. Firstly, the subject coordinator, chief investigator and lead author is an internationally recognised digital health and informatics workforce and education expert, Fellow of the Australasian Institute of Digital Health (FAIDH), and Certified Health Informatician Australasia (CHIA). He has recently published academic guidance for both digital health competency guidance of the Australian allied health workforce [1], been part of an international health and biomedical informatics education guidance taskforce through the International Medical Informatics Association (IMIA) [6], and led an international meta-synthesis of physiotherapy professional accreditation standards in the context of digital health and informatics [5]. The second was access to the expertise and contribution of staff at the University of Melbourne's CDTH. This was a key factor when building content for the design-thinking curriculum content. The final factor was a review and redesign of the Doctor of Physiotherapy program that took a future focussed approach and created an opportunity for digital transformation content, SILOs and assessment to sit within a new subject: Health Leadership and Digital Innovation rather than being retrofitted into an existing subject. This redesign process also created space for and included significant stakeholder engagement, content, curriculum, and assessment mapping, which assisted the overall design process.

5. Conclusions

The curriculum presented in this manuscript offers current and future physiotherapy leaders' experience in digital transformation. This exemplar is not intended to be prescriptive, rather it provides the health informatics community with a framework for the contemporary digital transformation of health education that is fit for entry-to-practice health professional academic programs.

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