Reflecting Digital Transformations in Public Health Curricula

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Introduction

Digital technologies promise greater personalisation and precision in public health services, automation of repetitive tasks, and more efficient use of existing resources through rapid management and analysis of big data sets. In order to seize this opportunity, the public health workforce needs to become sufficiently competent to navigate these novel digital technologies and understand how to apply them across the spectrum of essential public health functions. With few exceptions, however, digital skills are not yet systematically incorporated into public health curricula.

The promise and peril of digital transformations in public health

Digital transformation in public health is "a complex and multifaceted process that is disruptive and fundamentally changes the culture, operational models, and goals of public health services, centred on the health needs of the public."[1] Critically, this includes not only the digitisation of existing processes and patient pathways but also devising entirely new ways of working bringing about a cultural transformation.[2]

The widespread adoption of smartphones, wearable technology, and social media platforms since the 2000s was seized as new opportunities for public health interventions, while the COVID-19 pandemic accelerated the uptake of digital technologies within the health sector.[3,4] Sophisticated and technically advanced health information systems require skilled professionals to manage data and public health information efficiently and amplify the potential benefits of digital transformations.[5] On the other hand, the emergence of social media as a dominant source of health (mis)information and the growing role of 'Big Tech' in public health also created new challenges that most public health professionals are ill-equipped to handle promptly and comprehensively.[6] On top of that, the emergence of a range of artificial intelligence technologies has the possibility to redesign and positively augment central tenets of health systems and healthcare delivery, while simultaneously posing a potential risk to public and population health through the spread of misinformation and reinforcement of health-harming behaviours.[2] In order to navigate the complexities of digital transformations in public health, there is an urgent need to upskill the public health workforce.

Existing guidance on relevant competencies

As of May 2024, there are no generally agreed-upon competency frameworks focused on digital transformations in public health. However, sufficient relevant evidence is available to start an initial redesign of public health curricula in anticipation of more comprehensive guidance.

First, we can learn from competency frameworks aimed at healthcare providers. A recent review of educational frameworks identified 28 digital health competency domains, including basic information technology literacy, health information management, digital communication, ethical, legal, or regulatory requirements, and data privacy and security.[7]

Second, ongoing global and Europe-wide initiatives will improve the theoretical and practical basis for training the (public) health workforce. Building on its experience with infodemic management training, the WHO convened a Digital Health Competency Framework Committee in 2023 to develop a framework outlining competencies for digital health policymakers, programme planners or managers, health practitioners, and the general public. Another example is the EU-funded BeWell project (bewell-project.eu), which includes developing a strategy for developing digital and green skills in healthcare and an overview of relevant training programmes.

Finally, currently available resources (e.g. the WHO-ITU Digital Health Platform Handbook)[8] aimed to help professionals navigate and steer digital transformations in health organisations and services are not explicitly aimed at directing public health workforce development, risking the oversight of public health-specific factors. That said, these resources can offer a promising starting point for the augmentation and redesign of public health curricula to include materials on digital transformations.

Recommendations for curriculum redesign

Based on a comprehensive synthesis and expert consensus of priority areas in the digital determinants of health,[2] we identified and described the competency domains for undergraduate and general graduate public health education that are widely accepted as critical to public health in the digital era (Table 1). However, the key challenge is implementing new competency domains in public health curricula that balance well-established public health competencies with the new competencies required by digital transformations. To support schools in navigating this challenge, we provide four guiding principles.

First, integrate relevant competencies throughout the curriculum and avoid creating standalone courses on digital transformations. This allows staff and students to contend with the challenges of digital transformation in the relevant context and avoids counterproductive pigeonholing of digital skills. For example, emerging sources of health data can be studied in the context of an existing course on epidemiology, and digital communication skills can be integrated into existing courses on health promotion.

Table 1. Themes of competence relevant to digital transformations in public health

Theme	**Definition**
Digital literacy	Provide essential public health functions using digital tools (hardware and software) and navigate emerging disruptive technologies, such as artificial intelligence.
Health data collection and analysis	Collate, evaluate, and analyse health data from existing and emerging sources (e.g., electronic health records, social media, wearables, etc.)
Health data management and governance	Organise, manage, and govern health data efficiently following the FAIR principles to support research efficiency
Ethics and regulation of digital transformations in society	Understand and apply ethical frameworks to navigate data privacy, digital and data equity, and other relevant challenges
Infosphere and spread of information over digital networks	Understand the spread of information across digital networks and apply these insights in designing effective communication strategies, including on social media

Second, integrate digital competencies in organisational management and leadership skills. Because digital transformations represent a fundamental process of change in the way public health services are delivered, it is essential to foster literacy in managing organisations and leading organisational change. These themes are already highlighted in the WHO-ASPHER Competency Framework for the Public Health Workforce in the European Region and many schools already provide relevant training.

Third, create an interdisciplinary academic community with a deep understanding of both computer science and public health disciplines. Digital transformations in public health require that the public health workforce be prepared to work closely with other professionals, including employees of social media companies, software developers, and data engineers and scientists. This requires a bidirectional transition to an interdisciplinary curriculum. In one direction, public health education needs to train digital skills in students with backgrounds in medicine or the health sciences. In the other direction, they need to provide training in the principles of public health for computer science and engineering students interested in digital public health. To achieve this, public health schools will need to work collaboratively with faculties of computer science and engineering.

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