A Pan-University Role for the WSI Academic Advisory Board in Digital Education: Observations from the Medical Workforce

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Introduction

The Web Sciences Institute Academic Advisory Board was created in 2017 as a cross institutional catalyst for the discussion and advancement of digital matters of wider interest and significance. It comprises representatives of the University Faculties who have a particular interest in digital innovation as a facilitator for research and for undergraduate and postgraduate education.

In recent discussions, the Board has addressed the importance of preparing the graduating workforce in all subject areas and professional disciplines for a future where digital systems are fit for purpose in all workplace environments, and where individuals can influence the practical development of such systems.

Over the past decade, the UK Government Digital Service (GDS) has brought to prominence the principles of development of "fit for purpose" software systems which are absolutely focussed upon the true needs of the end user. These principles:

- Empower users to make better and more productive use of software systems.

- Help the workforce, employers and the national economy, and advances the reputation of those educational institutions which prepare the digitally advanced workforce.

The Exemplar of Digital Healthcare Education

Healthcare represents a significant component of University teaching, through the Faculties of Health Sciences and Medicine. The observations set out in this section could readily be applied almost all professional and career streams which are taught at the University, both for UK and Overseas students.

The Global Healthcare Workforce is moving towards a wholly digital work environment.

- However, the principles and structures of Healthcare Education are still broadly rooted in historic analogue principles of note taking, record keeping and clinical decision making processes.
- Many of these processes and professional structures have changed little in > 100 years, creating huge and unaddressed inefficiencies in healthcare design and delivery.
- Digital systems are broadly imposed from above upon the healthcare workforce with little robust end user evaluation, creating a "Digital by Diktat" imperative to grudging use, rather than a "Digital by Default" pull through design and implementation excellence
- Ownership of the digital transformation programme has largely been "contracted out" by the healthcare professions to the IT professionals

Health Education England

- Health Education England has set out to "Build a digital ready workforce". This is aspirational but light on detail as to implementation.

The HEE "Health and Care Digital Capabilities Framework" sets out a number of principles to be developed in the workforce. These include:

a. The ability to find, manage, organise, store and share digital information, data and content

b. The ability to understand and act upon appropriate guidelines, protocols, regulations and safeguards in the use of differing media, information, data and content to meet legal, ethical, cultural and security rules, requirements and expectations when working with personal, public, professional and/or confidential information, data and content.

c. The ability to critically analyse, evaluate and/or interpret information, data, content and their sources

d. The ability to understand and adhere to digital copyright, intellectual property and privacy rules and regulations

e. The ability to work with and champion the effective, secure, appropriate and innovative use of information, data and content in order to solve problems, make decisions and to achieve successful outcomes for specific goals and objectives

To these points, we might usefully add:

f. An understanding of the principles of IT system design, agile and iterative development, the life cycle of software, efficient screen and process design, and end user optimisation of computer systems

g. The use of digital systems and data sets for prediction and the application of machine intelligence and "AI".

Lessons from the UK Government Digital Service

The GDS has played a major role in developing digital processes and systems in the UK public sector over the past decade, through a root and branch reform of the way that digital systems are built and implemented from the ground up.

The health professions have much to learn from this approach, and indeed much of the development work in core digital systems at UHS over the past decade has paralleled and mirrored these principles, which include:

- Robust and exhaustive user experience research and discovery

- Fast implementation through Agile, Sprint and "Fail Early, Fail Fast" Methodologies

- In house ownership and development of major systems

- Elimination of Waterfall methodologies

- Digital by Default Design to secure a compelling user experience.

All University staff, students and citizens are now familiar with advanced user experiences within commercial IT systems, as exemplified within mobile phones and social media interfaces.

However, the user experience of many workplace systems and interfaces across the public sector, NHS and University remains dire, with poor usability design leading to professional frustration and loss of productivity.

There is a need to educate the academic and healthcare workforces in the principles of modern software systems design and development; in order:

- to raise expectations and standards of system performance for end users

- to inform debate across the spectrum of digital transformation in the workplace

- to increase the recruitment pool into the developing clinical informatics career streams.

In an article on 9th May 2019 in the New Statesman this year, James Hadlow, Chris Farmer and Chris Holland considered **"How education could lead to a new era of digital healthcare".** They stated:

"A modern healthcare system needs a modern training system. Yet, despite lessons in coding being introduced to primary schools in 2014, the medical training system lags far behind our primary school counterparts….In an already packed curriculum, it is difficult to immediately see where a considerable syllabus for understanding technology data and ethical artificial intelligence could fit…

Defining what an education in digital health should mean

"… the words "artificial intelligence" and "digital health" do not appear as part of the GMC guidance for medical curricula for UK doctors. However, the GMC does specify (PDF) more broadly that doctors should be able to "make effective use of decision making and diagnostic technologies". Given their increasing ubiquity, (familiarisation with) the use of digital healthcare tools should be more explicit…

The term "education in digital health" is vague and the scope of the training required is a matter of discussion. It's unrealistic to expect all doctors to be able to code but should digital health expertise be a specialist interest or is it a core skillset that should be required of future doctors? Is it now time for an undergraduate digital curriculum to be written?

The <u>Faculty of Medical Leadership and Management</u> have developed an agenda for a similar "non-traditional clinical" curriculum, stating….

"We perhaps need to start seeing technology as part of the solution of an under-resourced workforce. Opponents to digital health rightly point out other priorities in healthcare such as understaffing and poor working conditions. It is important therefore to ensure the message regarding digital health is clear: that digital health can help, not by replacing staff, but by facilitating productivity in other areas which allows staff to concentrate on those areas which absolutely require human interaction."

A Digital Curriculum for Southampton Health professionals?

So far as a digital healthcare curriculum is concerned, Southampton is well placed to take a national lead in such a programme. Similar arguments could be developed and deployed for each faculty and School across the University. For example:

- UHS is one of the most forward thinking digital exemplar hospitals in the UK, with an advanced digital infrastructure which permits agile development, experimentation and innovation.
- The University's Faculties of Health Sciences and Medicine also have a history of innovation in the undergraduate curriculum.
- We have a cohort of committed and experienced clinicians and IT specialists from whom to draw expertise.

What would developments look like in the digital healthcare curricula?

Options include:

- An optional digital module within the health undergraduate curricula, permitting experimentation and learning around content and best practice, leading to:
- full implementation within the Southampton undergraduate healthcare curricula in due course, with regulatory agreement,
- and/or co-development of generic healthcare digital modules with the School of Health Sciences and the Faculty of Medicine and the local NHS IT Infrastructure Teams

What might such a course address?

Principles of user centric IT system design:

- Methods for User Research

- Agile and iterative development processes

- The life cycle of software systems

Principles of end user optimisation, data visualisation and system integration

Principles of Digital Transformation

Principles of Digital Teamwork and Digital Change Management

Principles of coding for (health) systems

Principles of infrastructure design and service provision

Understanding Data Storage, including cloud based services

Principles of citizen- centric IT systems

Principles of design for digital security

Awareness of the landscape of commercial and bespoke (Healthcare) systems and providers

Introduction to careers in Digital (Healthcare) systems and management

The role of bioinformatics in Health Data Systems

The application of Predictive Analytics and Artificial Intelligence to (Healthcare) Data

Technology Horizon Scanning and the management of rapid digital technology change

A Practical Strategy for the WSI Board and the University of Southampton

Subject to a detailed survey of the relevant educational landscape, there is as yet there is no obvious educational package which would address the general requirements of an undergraduate digital foundation module, and a course will most probably need to be developed locally.

Debate, Exploration and Leadership in this area provides a practical purpose and direction for the Web Sciences Institute Academic Board, and this brief paper is submitted as a prompt to progress.

The general principles of digital education apply equally across all fields of education and at all aptitude levels, and they present a significant opportunity for the University of Southampton. However, the WSI AAB members are agreed that at present:
- There is no cross-University strategy or coherence in the principles and practice of a digital foundation educational programme:
- Undergraduate education is highly siloed through the Faculty and Department Committee structures
- Undergraduate education is inflexible due to CQA, budget and workload models

We note that there are a number of digitally relevant education and training issues that are being raised externally through the Teaching Excellence Framework, and by employers and the UKRI, in respect of Responsible Research, Employability, the Future of Work, and Citizenship in an AI-enhanced and Digital Nation.

We note also that the WSI is strongly positioned, using its established networks and its knowledge of institutional expertise to draw together inter-disciplinary and inter-faculty research teams in an agile response to emerging digital opportunities.

The Board may now wish to consider the application of this expertise to broaden the education of all students and staff at the University. A common Digital Familiarisation module may better prepare students and staff for more productive and fulfilling work in any walk of life.