



| VIEWPOINT

THE FUTURE OF HEALTH PROFESSIONS

PROFESSOR LAMBERT SCHUWIRTH,

GILLIAN KETTE AND DR JULIE ASH



THIS VIEWPOINT EXPLORES OPPORTUNITIES
FOR REVOLUTIONARY CHANGE IN HEALTHCARE
EDUCATION.

An anonymous Danish politician once said that he would never make predictions, especially not about the future, and yet that is exactly what health professions education and research needs to do. Our first-year students, if we take medicine as an example, will be doctors in 4 to 6 years and will need at least another 5 to 6 years to reach consultant level. By then, it is likely that healthcare will be quite different



from what it is today. Even if we want to avoid calling the changes ‘disruptive’, they will at least be revolutionary. It is salient that while considerable demographic changes are taking place, disease patterns are changing and healthcare technology is evolving rapidly, the backbone of many health professional education programs still is a century old approach - the lecture. The word ‘lecture’ is derived from

the Latin word for reading. The lecturer, or the reader, had access to the book (singular) in the pre-Gutenberg era, and read to the students as the only way to transmit knowledge and understanding. There is nothing intrinsically wrong with the lecture as an educational method. However, it is good to realise that it was developed for students who did not have access to books and that we are still using it for students who have a world of information literally at their fingertips in the form of computers, tablets and smart phones. So, let us take one stance immediately: online lectures are not an educational innovation but merely a century-old educational method in a new guise.

Of course, we recognise we are not the first ones to address the future of higher education. In Australia, several reports have been published making the case that dramatic reforms are needed for higher education (anonymous, 2017; Burt D, Locke M, & Wilosn M, 2018; Cawood R et al., 2018; Orazbayeva B et al., 2019). However, in this article we want to focus more on the implications for health professions education.

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So, what are the likely revolutionary changes to health professions education? To answer that question, there is no need for futuristics thinking and huge conjecture. There are developments currently taking place that are likely to disrupt health professions education even more than Uber did the taxi industry or Amazon the retail industry. In this article, we want to discuss what we see as the most important developments and discuss some possible implications for health professions education.

A shift from ‘knowledge as a possession’ to ‘knowledge as co-creation’

A fundamental shift in thinking about knowledge is taking place. In the past, knowledge was something that the ‘expert’ possessed, and the non-expert did not. The expert was right, and the non-expert was (often) wrong. With respect to education this meant that the expert,

either out of goodwill or for a fee, would be willing to share her or his knowledge with the non-expert. Education of the past was almost exclusively designed as a unidirectional transaction of knowledge from expert to learner.

Nowadays, knowledge and understanding are increasingly seen as something we co-create. Different perspectives do not automatically indicate disagreement where one is right and the other is wrong. They are rather seen as possibly legitimate and complementary perspectives. Of course, not all different perspectives are useful or sufficiently plausible and so knowledge co-creation has to rely on a self-cleansing process, which again is co-created. The most well-known example of knowledge as co-creation is Wikipedia. Ridiculed and derided at first, it has now made almost an entire encyclopedia industry redundant (Anthony, Smith, & Williamson, 2009). As encyclopedias were part of a knowledge industry, it is important to realise that education is also a knowledge industry.

Wikipedia is not the only example though, there are numerous discussion boards at which problems are collaboratively solved, especially with respect to software or repairs. There are also numerous discussion boards on which educational problems are collectively solved. At this moment, ways to 'ghost' during online education or to cheat in examinations with online proctoring feature prominently on such discussion boards. Such co-created knowledge or solutions do not pretend to have one single best answer for all problems, as the single expert would be more inclined to do. Instead, they create multiple solutions and multiple perspectives so that each participant can

take away the best fitting solution for their own situation. Since most of health professional practice problems are more complex, co-created knowledge allowing multiple tailored solutions is likely to become more useful than single expert provided knowledge.

Changes in management of trust

In her book *Who Can You Trust?*, Rachel Botsman describes how trust in transactions has evolved (Botsman, 2017). Initially trust was local, based on whom you knew and what relationship you had with the other. Gradually, trust was also made institutional. Organisations were developed that managed a transaction and the trust in that transaction at the same time. For example, if person A wants to buy a house from person B, they employ a conveyancer, who then ensures the contractual trust in the transaction and at the same time manages the transaction itself. The same is the case with the taxi industry. The transportation and the trust that your driver is not a dangerous person are part of one transaction.

Although institutional management of trust is still very prominent, increasingly another sort of trust is emerging. This is what Botsman calls 'distributed trust'. In distributed trust systems, the transaction and the trust in that transaction do not have to be managed by the same organisation. Uber is therefore not an online taxi company. It is a company that manages trust in the transaction. Through an app or platform the transaction, however, is purely between the person offering a ride and the person needing a ride.

In education, many organisations still often combine the transaction – the educational delivery – and the trust in the transaction. Each health professions course has its own teachers and authenticates and validates only its own processes, typically by assessment. This is a vulnerable situation, as can be learned from how the taxi, the hotel and the retail industry have been disrupted by the platform economy.

Platform economy developments have shown the vulnerability of these industries, and it is a scary thought that a multinational company using a platform economy approach would be able to take health professions education away from universities. Fortunately, university health professions education enjoys a protected status from the government and its regulatory bodies, and it is safe to assume they are probably stronger than they were with the taxi and hotel industry. We argue though that health professions educational development and research must include future scenarios in which that protection no longer holds.

The rise of cognitive surplus

Another important change is in the way we help each other. In the past, somebody who needed help with a problem would have to ask a relative or a friend. If that friend were able and willing to help, the problem could be solved. Nowadays, any person needing help goes onto the internet and 'Googles' the question or the problem. Invariably, he or she will find one or multiple websites with explanations, instruction manuals or even homemade videos with explanations. What is new is that somebody has spent their time and effort on producing such videos without

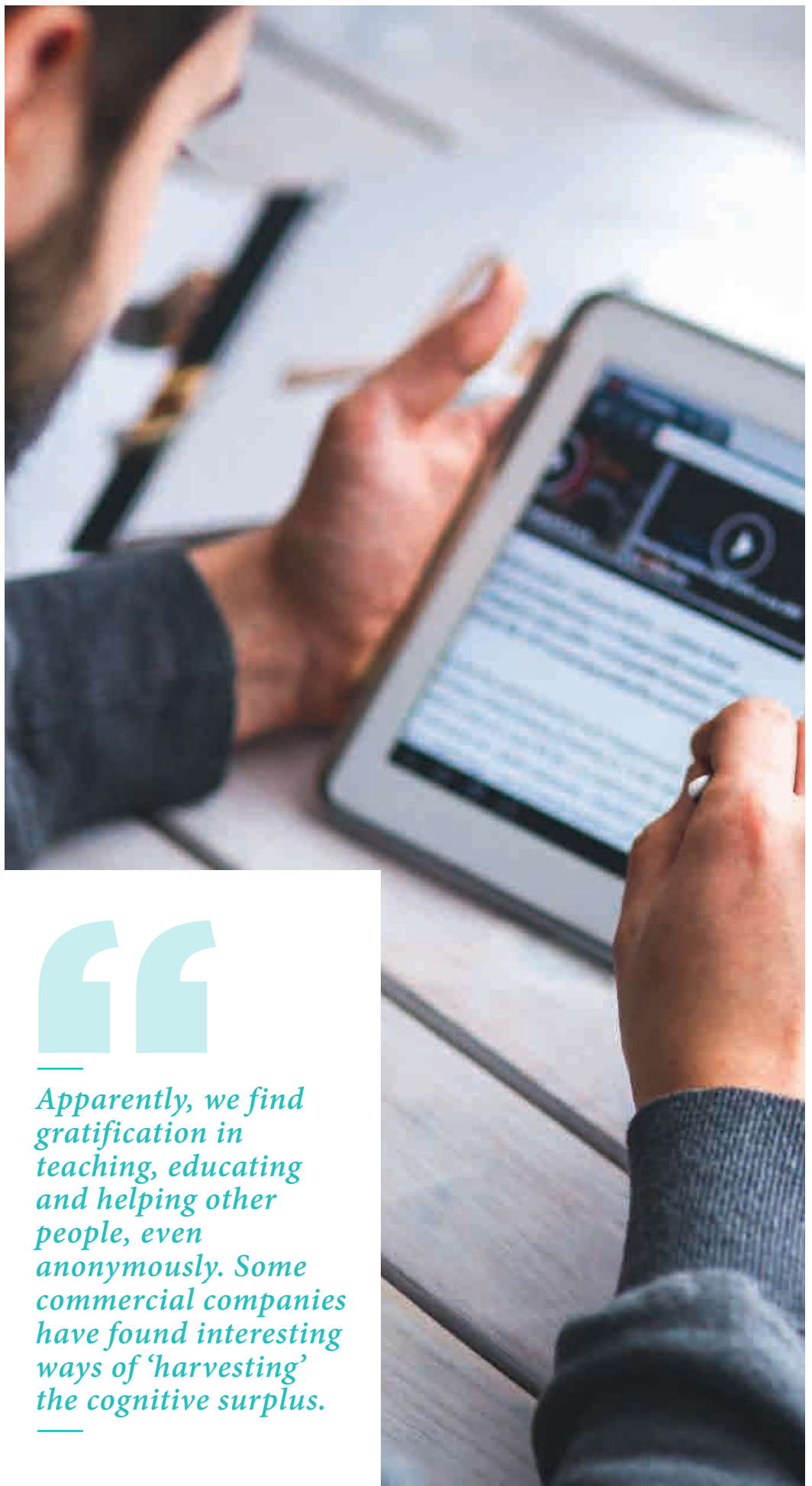
knowing the person with the query, let alone knowing that that person even had a query.

Clay Shirky calls this ‘cognitive surplus’ (Shirky, 2010). Apparently, we find gratification in teaching, educating and helping other people, even anonymously. Some commercial companies have found interesting ways of ‘harvesting’ the cognitive surplus. Thermomix for instance sells a specific type of kitchen appliance. It also supports a lively online Thermomix recipe community, in which many people share (with videos) their ways of preparing all kinds of foods with the help of the appliance.¹ This way the company does not have to invest in producing such recipes to demonstrate the versatility of its appliance; the cognitive surplus does it for free.

Of course, this is not entirely unknown to education. One of the first and most well-known examples is the Khan Academy. The Khan Academy’s wide range of explanatory videos have been used by millions of learners all over the world, including parents helping their children with maths homework. Such cognitive surplus also exists with respect to health professions education. If you search for ‘development of the placenta’, for example, a rich variety of instructional, beautifully animated videos will be found.

Our students are used to having access to this free or very cheap information and are therefore increasingly wondering why they are paying for a lecture if the same information can be freely obtained online. This is not to say that all access to information on the internet is for free. Some is paid for with money or

¹ <https://www.recipecommunity.com.au/>



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with exposure to advertising, or through giving away your personal data. But the 'customer' is free to choose what information they want when using a 'pay-for-what-you-need' principle, rather than having to buy a whole package, such as a 4 to 6 year degree.

The development of open ledger systems

How do you know that a health professions graduate is competent enough for the workforce? When they graduate, a degree is awarded with a transcript. This transcript is a one-page summary of everything the student has achieved, including every progress they have made and every form of feedback, evaluation and assessment they have had. This is important information for future employers. In order to ensure that this transcript is a decent summary and representation of a student's academic career, the course with its education and assessment processes has to be accredited. But if the accreditation system is not trustworthy or if the investment of universities in quality of education and assessment and support for their staff is doubted, the value of the degree may decrease.

This is an issue that has become highly topical within the current pandemic situation. Health professions education programs have had to adapt their processes to comply with physical distancing expectations on the one hand, yet maintain educational quality on the other whilst remaining in compliance with the accreditation agreements. This is no small feat and many health professions programs are doing a stellar job in difficult circumstances.

There are alternatives for this accreditation and academic transcript approach, and they are being explored already. Open ledger principles – well-known from the famous block chain – are most promising (Mikroyannidis, Domingue, Bachler, & Quick, 2018). Open ledger systems are set up in such a way that the information they contain is automatically verifiable because it cannot be altered retrospectively. In its ideal form, a distributed open ledger portfolio would contain all information about a student's achievements, progress and feedback in a possibly searchable file. So, a future employer might have the option to 'interrogate' the whole academic career of a job applicant, to evaluate whether the applicant is a good match for the organisation in a most tailored way. Logically, this would create less of a hit-and-miss situation than having to rely solely on an academic transcript. By using open ledger block chain technology, the information in the dossier/portfolio is automatically verified and may not require extensive external accreditation.

The emergence of machine learning and artificial intelligence

If we focus on medicine, it is safe to say that artificial intelligence (AI) and machine learning (ML) are increasingly augmenting, supporting and, to a certain degree, substituting many of the tasks that were originally the exclusive domain of doctors, namely making a diagnosis and deciding on therapeutic management (Topol, 2019). A significant area of research in health professions education studies development of expertise and problem-solving ability and, of course, how best to teach and assess it. Two findings from that research are relevant for understanding

why AI and ML are on the rise. The first relates to the essential role of knowledge for problem solving, so making a diagnosis or deciding on a therapy without background knowledge is extremely difficult. It may be necessary, but that does not mean that it is sufficient. A second and probably slightly counterintuitive finding is that expert problem solving is largely based on pattern recognition. That can mean recognising the diagnosis as one pattern ("pneumonia") or parts of the problem ("typical infectious disease"). Experts typically recognise more patterns and more correctly. Here is where AI and ML have the potential advantage. They can store more information and they can learn to recognise patterns quicker. This is not to say that AI and ML will completely substitute diagnosing and therapeutic decisions anytime soon, but the trend is there. Also, there have been several instances of AI outperforming humans in various domains sooner than expected. With respect to strategy, this occurred with chess and Go, and in the knowledge domain with quizzes. This is not just a computer technological development.

In healthcare, deciding on and initiating treatment is becoming ever more complex. Pharmacogenomics, for example, allows for increasingly individualised treatments. The myriad of factors that needs to be incorporated to ensure that even straightforward pharmaceutical management of patients is sufficiently bespoke will require decision support systems. It is extremely unlikely that these developments will ever make doctors unnecessary in society, but the core of their role in healthcare will change from purely cure orientated to more care orientated. This inevitably has an impact

on medical education. The so-called ‘soft skills’ or ‘non-technical skills’ such as communication, interprofessional collaboration and empathy, will become more prominent, without losing the ‘hard skills’. The term ‘soft skills’, however, is a misnomer. These are very hard skills to learn that require the healthcare professional to deal with complexity and uncertainty. It is obvious that lectures, online tutorials and the like will not suffice, but guided interactions between teacher and learner will be prominent, supported by integrated and longitudinal assessment and coaching. This will require different capacities of many of our teaching staff, and educational research and development will have to support this.

Consequences

There are many possible consequences of these developments, and they must be included in health professions education development and research

A development that is already taking place is the so-called decrease of expertise asymmetry. Traditionally, it was conceived that a patient went to the doctor with no or very little knowledge while the doctor as the expert had all the knowledge. This was not a level playing field. Nowadays, patients have access to all kinds of information sources which are pitched at all levels of patient understanding. Of course, some information is wrong and some correct information will be interpreted incorrectly by the patient, but consequently the patient will have information, will have their own interpretation and will expect discussion about what they know. Current and future healthcare professionals need to be able

to manage an exchange of knowledge to build shared understanding of the patient’s problems and agreed actions.

But this decrease of expertise asymmetry does not only exist between patients and doctors. It also takes place between students and teachers. Where even two to three decades ago students were not



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able to contradict their teachers because they did not have easy access to much of the literature sources, nowadays they can check their teachers’ information almost in real time. This is because IT has given the students affordances that are

unprecedented (Friedman & Friedman, 2008). Students can communicate with multiple others at the same time, face-to-face and via social media, text or email, thus exchanging information with different communication partners. This means that they can also participate in multiple communities at the same time, for example their face-to-face study group or another online study group connected by social media. Some of these communities will be knowledge co-creation collaboratives, either collaborative learning face-to-face or collaborative learning groups via social media. Even when they go online using a wiki, they are basically entering a knowledge co-creation collaborative. This gives our students access to a wealth of information and information sources, which they can and will all use. Logically, education that is purely focused on a linear transaction of knowledge from teacher to student dramatically fails to do justice to these immense affordances.

The most threatening consequence is that health professions education does not have to be the exclusive domain of medical schools in universities anymore. A combination of co-created and open source knowledge resources, peer-to-peer networks connecting learners from all over the world with the best teachers from all over the world, cognitive surplus and open ledger portfolios and the incorporation of students’ IT affordance in their learning, could replace many existing health professional curricula.² Any organisation that can offer online coaching and micro-credentialing and that could also offer local workplace-based experiences, would

² cf. <https://teachmemedicine.org/about/> (accessed 15 July 2020)

be able to provide high-quality health professions education. The technology is there to prepare graduates for the workforce.

This relates to the final consequence for university health professions education, namely increased attention for the difference between value proposition and process. There is a famous story about companies in the early 20th century that harvested ice blocks from frozen lakes and stored them in highly insulated warehouses. During summer, they sold them to customers who needed them for their ice boxes. With the advent of compressor freon refrigeration, those whose value proposition was “we produce blocks of ice” perished whilst those whose proposition was “we provide refrigeration” were able to adapt. The question for health professions education is: what is our value proposition, whether it is in the order of ‘We teach for the workforce’ or ‘We educate critically thinking professionals’? For health professions education research and development, this is a pivotal question.

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- Lambert Schuwirth MD PhD**, is strategic professor of medical education and director of Flinders Health and Medical Research Institute: Prideaux (FHMRI:Prideaux). His main research is into innovative health professions education assessment.
- Julie Ash** is an Associate Professor in assessment at Adelaide Rural Clinical School, University of Adelaide, and affiliate of FHMRI: Prideaux, supervising PhD and Master students. Her own research focuses on health professions education; assessment and educational change.
- Gillian Kette, BSc, BSc(Hons), PhD** candidate in FHMR: Prideaux. Her research is on aligning modern IT affordances with modern active learning contexts to create innovative learning environments.