

How COVID-19 has pushed us into a medical education revolution

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Abstract

The COVID-19 pandemic has had a profound effect on society and higher education in Australia. In just a few weeks, entire courses have been re-structured and are now delivered online. The need to adapt rapidly has prompted many innovative changes that will ultimately have long-term benefits for medical education in Australia and New Zealand.

Introduction

The COVID-19 pandemic has forced social, educational and physical change on us, more noticeably and rapidly than any other trigger has this century. In the weeks from late February to March 2020, university campuses emptied as courses went online. Academics started working from their home offices; clinical teaching changed dramatically and many of the traditional assessment practices for medical students, such as Objective Structured Clinical Exams (OSCE) were cancelled. Up until now, medical education may have been slow to adapt to a rapidly changing educational environment and to the changing needs of the medical workforce.^{1–3} So, in some ways, COVID-19 has been an enabler of overdue innovation in medical education.⁴ In this article, I highlight some ways in which the COVID-19 pandemic has

changed medical education, particularly pushing us into online delivery for our pre-clinical years.

Although most medical programmes have undergone change over recent decades as they transition to a more learner-centred teaching approach, which incorporates e-learning, simulations and virtual patients, given the rapidity of global change in the way we acquire and use knowledge, these changes may not be significant enough⁵. Over the past few years, the major prompts for curricula change that most medical programmes have been grappling with are:

- 1 Changes in the medical workforce.
- 2 Changes in educational technologies.

Future medical workforce

Whilst this issue pre-dates COVID-19, it is important to mention as a trigger for curricula change. It is somewhat hard to predict the future of medicine, but it is likely that

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the medical workforce of the future will need to be adaptive thinkers with good technological literacy. Doctors will value add through their ability to problem solve in complex situations (where unpredictable human factors must be taken into account), their ability to empathise with patients (and create trust), their ability to form functional inter-professional teams both in hospitals and in the community, their ability to use available technology and data and their ability to work innovatively with patients as partners.³ This means that medical curricula need to develop these skills and challenge students to apply them in clinical practice. Critical thinking, leadership and reflective practice are all complex skills which will benefit from explicit teaching and meaningful assessment.

Educational technology

The COVID-19 pandemic has made many universities achieve in 6 weeks what has been discussed for years, in relation to using flexible and active online learning principles and developing appropriate activities.⁶ In response to the COVID-19 pandemic, Government guidelines and regulations in Australia rapidly changed, with 'social distancing' and 'home isolation' becoming the norm and campus-based teaching being moved online over a matter of weeks. This was relatively easy for activities, such as lectures and small group learning. Educators rapidly upskilled in the use of platforms that enabled recording of and synchronous or asynchronous delivery of lectures. They learned how to use platforms, such as Blackboard Collaborate Ultra, Zoom or Teams to facilitate synchronous small group teaching. This approach allowed more effective 'flipping' of classroom and allowed medical education to leap forward with the utilisation of some advanced learning platforms that were fit for purpose⁷ to enhance medical education using artificial intelligence systems, such as Sophia AI.

The two most problematic areas of teaching to transition online have been science practical classes and clinical skills teaching in the more junior years. The practical classes that were classified as 'dry', for example, histology, pathology, some microbiology pharmacology, physiology and anatomy, have required more complex configuration of online platforms and can be problematic for students with slower internet speeds. 'Wet' practical classes that involve students in learning techniques (such as performing a Gram stain) will resume when possible, but for the most, this has not impacted student progression.

Clinical teaching is the other major area impacted even in junior years of medical programmes, as these student groups could no longer be taught in the clinical environment. Luckily there are several online technologies available to bridge

the gap until actual clinical teaching can resume. These include simulation platforms, such as the OSPIA (Online Simulated Patient Interaction and Assessment) system. For more senior students, taught fully in clinical environments, continuing clinical teaching became more difficult as small groups were banned at many clinical sites and 'social distancing' came into play. Very rapidly, however, many clinical teachers also began to separate students into small groups and use several of the online platforms to enable small group teaching.

Clinical attachments for the more senior medical students have also undergone somewhat of a 'revolution' that will almost certainly result in better educational outcomes. It was rapidly recognised that there was a need for medical students in senior years to continue learning and graduate on time. They are now essentially 'twinned' with a junior medical officer, so that they are fully embedded within clinical teams and actually able to alleviate pressure on the junior medical members.

Assessment

Changing the way in which we assess medical students in Australia has been one of the more problematic areas of the rapid change necessitated by COVID-19. Campus-based examinations were able to be put online, through locked, timed systems. Although invigilation of online exams is still difficult and expensive, to some extent the need for this was reduced by lowering the stakes of these online exams and changing them to pass/fail outcomes. In the clinical years, OSCE are currently not possible and various other online simulated options are being investigated. The major other assessment piece that is gathering momentum is the adaptation of entrustable professional activities or competency assessments, now widely used in the USA. Once again, the adaptation and implementation of these is now likely to occur rapidly and there is a national taskforce addressing this through MDANZ (Medical Deans of Australian and New Zealand). There are also many other aspects of assessments, including multi-source feedback and portfolios.

Consultation and collaboration

Throughout the rapidly changing context of medical education of the past 6 weeks, faculties have been meeting and consulting with medical student representatives frequently (multiple times per week) on all issues, including assessment. This has been necessary both to minimise uncertainty and anxiety (often around assessment) and identify areas requiring increased student support. At a National level, more than ever before, MDANZ has supported medical programmes across

Australia and New Zealand during this period to help share ideas, resources and problems.

Supporting students and the workforce

As mentioned above, the needs of students at each level of the medical programme have been quite different and required different levels of support. One of the most challenging areas of negotiation has been the maintenance of clinical placements in multiple area health services and sites, including multiple rural areas and primary practice placements. In primary care placements and even in hospital placements, fears over personal protective equipment availability were one of the major problems for both students and supervisors over the period between March–May 2020. Risks to medical students and potential of medical students transmitting Sars-CoV-2 were often raised and as a result of this, students were often excluded by individual supervisors, departments and in some cases, even hospitals.

Subsequently, the importance of students continuing through their clinical placements has been endorsed at both state and national government health department levels. It has been recognised that if students do not graduate on time, there will be a shortage of interns in 2021. It has also been recognised that senior medical students may serve a useful function in supplementing the medical workforce, should significant numbers be either infected or affected by the need for isolation. As such, over past weeks, we have been preparing senior students for readiness to become ‘Assistants in Medicine’ and join the paid healthcare workforce, should the need arise. The local health districts have become partners in recognising the need for this initiative.

Evaluation

Ongoing evaluation of curricula change is vital to ensure that the best practices emerge and can be recognised.⁸ The basics of engaging teaching still apply! Evaluating online technologies can be done both informally and formally through simple online tools. Like all aspects of medical education (online or not) standards need to be maintained and the student experience needs to be optimised. An example of a formative impact evaluation is shown below. This was used to evaluate the format of a 2-day online e-workshop for all final year UNSW medicine students. Of 262 students who attended, 90 gave specific feedback (34%) about the pros and cons of online teaching. This was grouped into major themes, in decreasing frequency as summarised in Figure 1. The number of positive responses (pros) outweighed the negative ones (cons) by approximately 3:1, with a high level of overall satisfaction.

The point of including this feedback is to illustrate that when done well, online teaching can be even better than face to face teaching. There are some aspects of medical education that will be very hard to replace, such as learning in the same physical environment with peers, the role modelling and mentoring that traditionally occur in the physical environment. But online teaching has multiple advantages that students embrace, such as convenience, flexibility and enhanced interaction through chat functions. The next steps should be to incorporate other types of online learning into mainstream medical education, such as the use of multiple types of simulation for clinical practice and skills development using three-dimensional platforms and gamification. We are already developing personalised learning dashboards for students and AI enhanced educational support tools that will help them map out their

Pros	Cons
<ul style="list-style-type: none"> • Cuts out travel time/time efficient • Felt more comfortable asking questions using chat function • More comfortable (could walk around/stretch when necessary) • More engaging • More flexible (location/time) • Allows good, consistent organisation • Felt more connected (especially from rural site) • Condensed/intense access to experts • Can reach big audience easily 	<ul style="list-style-type: none"> • Technical issues affect quality • Less engaging than learning in a room with peers • Difficulty in retaining engagement • Can't learn some skills well such as communication • Physically separated from peers • Can't use small 'break out' groups for discussion • Like to separate work from home • Can't develop close bonds with teachers

Figure 1 What are the pros and cons of learning online?

strengths and weaknesses and take responsibility for their own learning journey.

In order to deliver high-quality online educational deliverables, it is likely that the initial costs will be significant and unlikely to result in any reduction in fees for students. New content will need to be created and new formats for teaching will need to be developed. Whilst we may need fewer 'teachers' to deliver online learning, the creation of educational deliverables will no longer be solely the realm of the academic or clinical teacher. Educational development teams will need to include not just the 'teacher', but also software engineers and programmers, as well as educational designers. Eventually, however, we should be able to deliver at scale, high-quality, well calibrated medical education with high-level accessibility for all types of learners in a highly flexible environment.

While there are many social and developmental aspects of the higher education experience that cannot

be found in the online environment, the changes necessitated by the COVID-19 pandemic have forced us to adapt and change medical education rapidly. This gives us a novel opportunity for producing long-term benefits for medical education. Academics have had to learn new skills and ways of teaching. Students have had to adapt to learning online and have become more embedded in clinical teams. We have had to work with our students as partners, share resources nationally (and internationally) and work more closely with our clinical placement providers than ever before. Although this is a work in progress, our educators are now taking risks, testing new activities and re-energising their teaching. Many of the changes that have come about because of the COVID-19 pandemic will make us better educators, better collaborators, better innovators and will improve the integration of medical students into the medical workforce that they will imminently be joining.

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