

COMMENTARY

Innovative strategies implemented by universities to support medical radiation science students during the COVID-19 pandemic

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The global COVID-19 pandemic has impacted all facets of life. In medical radiation science (MRS) education, the effects on continuity of learning were felt by educators, students and clinical supervisors both nationally and internationally. The focus of this commentary is on the common elements that impacted MRS students, specifically related to cancelled clinical placements and the interruption to their academic progress at university. An outline is provided of some innovative strategies implemented by universities and clinical departments to support students' academic progress, continuity of clinical experiences, their transition from students to practitioners and overall strategies to support student wellbeing. The recent published literature illustrates novel responses to shared challenges faced, and an opportunity to learn from collective experiences.

Introduction

For better or worse, the COVID-19 pandemic has had wide-reaching impacts on the Australian university sector.¹ Australian undergraduate students surveyed in the most recent 2020 round of the Student Experience Survey reported a sharp drop in their overall satisfaction with the quality of their entire educational experience, declining from 78% satisfaction in 2019 to 69% in 2020, although encouragingly, student ratings of support have remained steady over the same period and were at all time high of 74%.²

For medical radiation sciences (MRS), the initial impact of the pandemic in early 2020 was uncertainty, as clinical placements were cancelled for an unspecified time. Universities around the world closed their doors, postponed practical classes indefinitely, and converted to e-learning wherever possible. The pandemic brought a sudden change to training with an unknown timeline, and replacement activities were implemented with no time for forward planning.

Clinical placements and practical classes are central to skill development, leading to competency and ultimately registration. An unexpected interruption to training of unknown duration was significant. The effect of the

pandemic on MRS students in our region and elsewhere has been discussed in recent publications, highlighting clinical placements as well as academic progress and wellbeing issues, as common themes.^{1,3–9}

Early in the pandemic, cancelled clinical placements were common, with varied continuation, or return to placement, as the situation evolved.^{3,5} Where placements continued, staff supervision was reduced with changes to shifts and at-risk staff being furloughed.⁶ A reduction in non-urgent cases in some hospitals may have decreased the quantity and variety of cases available for students' experiences.⁸ Where placements were not possible, students were concerned about completing their clinical assessments⁶ and for final year students, the broader concern was about graduation.⁷ The entry of graduates to the MRS professions is critical to workforce planning, especially in consideration of future pandemic management.^{4,6,10} Confounding these are the respective clinical training requirements for registration and achieving these under pandemic conditions.^{5,10}

Academic progress of students was impacted by dramatic changes to teaching delivery as many universities moved into emergency remote teaching.¹ New online platforms for delivery, pre-recorded videos, teaching 'pauses' whilst sessions were converted, internet

connectivity issues, online exams and reduced peer interaction^{3,5,8} were found to be unsettling or challenging for many students.

Adding to the elements mentioned above is student wellbeing which can be affected by a range of issues¹¹ even without the added pressure of a pandemic. Students identified higher levels of stress surrounding COVID-19 impacting family and friends, for example being worried about contracting the virus whilst on or travelling to placement and passing the virus on to family members.^{7,8} Reported anxiety levels were directly related to geographical closeness to the pandemic. Isolation and financial hardship were also cited.⁴ Despite the initial and continuing challenges discussed above, evidence also exists of positive and innovative solutions to student support. The following sections describe these innovations first regarding clinical placements, then students' overall academic progress during the pandemic.

Innovative strategies for supporting student clinical placements

Clinical placements make up a considerable proportion of curriculum in MRS programs and thus are fundamental to student progression. Students perform clinical activities in hospitals, supervised and guided by experienced clinicians to practise the required communication, psychomotor and cognitive skills to be safe and professional practitioners.⁷ Registration requirements vary globally and are often linked to clinical time in hours or blocks of time, or competency outcomes completed.⁵ In Australia graduates must meet the professional capabilities from the Medical Radiation Practice Board of Australia, upon which universities are accredited against.¹² The pandemic situation in many cases halted or reduced the length of clinical placement opportunities and thus the challenge for educators was to ensure competency requirements were met. Many strategies have been explored to adjust, replace or supplement student clinical placements (Table 1). In Singapore, reported strategies for return to placement for medical imaging students were: infection control refreshers, reduction of travel time with site allocation changes, enhanced information packages, removal from emergency and intensive care units and change of assessment mode from summative to multiple formatives.¹³ Strategies in other countries included allowing students to commence clinical work (temporary registration) in the early stages of the pandemic, remote access to computer-based dosimetry software to replace some clinical time as well as simulated learning.^{5,14} In a letter to the editor, three Canadian MRS students discussed the benefits of working as COVID-19 screeners, which allowed them to practise their patient care and communication skills at a time when they were unable

to attend clinical placement.¹⁵ A search of current opportunities on the employment website Seek (www.seek.com.au) shows similar opportunities for MRS and other healthcare students are available across Australia, with no prior experience needed as all required training is provided by the employer.

At our institution, the University of South Australia, clinical placements were prioritised for final year students when students were able to return after the initial lockdown period. This was supported by Clinical Education principles published by Australian Health Practitioner Regulation Agency (AHPRA) stating that one of key eight considerations should be to prioritise '*students closest to graduation [who] can contribute most to patient care*'.¹⁰ To allow all radiation therapy students to complete placement locally as Australian state borders were closed, adjusted hours were implemented over two separate shifts, with no rotation to different treatment units. Thus, all students completed a shortened patient-facing day, minimising student movement and observing distancing requirements. A flow-on effect was year 2 and 3 students forfeiting their scheduled placements, so that year 4 students could complete missed time and graduate.

Radiation therapy students were not able to continue any dosimetry rotations clinically, so clinicians made their time available via Zoom (Zoom Video Communications, Inc.) and evaluated student dosimetry plans through screen-sharing. Final year students achieved dosimetry competencies in this way, interacting with a supervising clinician virtually.

Turning our efforts to developing students with reduced placement time, additional simulated activities were conducted in-person upon reopening of university campuses in South Australia. Clinical replacement weeks were delivered with support from academic and clinical staff, where authentic equipment and software were employed to undertake clinical tasks during mock clinics. Simulated scenarios included computed tomography (CT) sim, cone beam CT (CBCT) image matching, vacbag manufacture, tattooing, personal protective equipment, planning, treatment set up, superficial x-ray treatment set up, full mock clinic schedule and an emergency cord compression patient (Fig 1). Retired clinicians in patient actor roles added a novel element of fidelity. Together, these measures allowed achievement of all clinical placement learning outcomes.

Innovative strategies for supporting students' academic progress

Periods of strict lockdowns as well as social distancing requirements have also impacted students' academic

Table 1. Summary of intervention strategies used to support student learning during COVID-19.

Issue or impact on students	Strategy	Description
Cancellation or reduced duration of clinical placements	Newly developed simulated activities and/or resources for students to replace clinical placement time ^{7,14}	Includes development of information packages, refreshers on infection control and others Simulated activities such as 'mock clinics' with authentic equipment and patient actors
	Care when deciding on placement allocation ⁷	Students allocated to a placement site close to home to minimise travel Placements prioritised for final year students
	Change to placement hours ^{7,14}	Placement hours adjusted with students rostered to shorter shifts to enable more students to access some placement time
	Change to how clinical skills are assessed ^{13,14}	Summative assessment replaced by multiple formative Clinical competencies completed by clinical staff via Zoom
	Opportunity to work as a COVID-19 screener ¹⁵	Students found ways to continue developing communication and patient care skills while also assisting efforts to control pandemic
Replacement of face-to-face classes, practicals, labs with online learning environments	Use of video conferencing platforms ^{3,14}	Conversion of on campus lectures into online content via pre-recorded videos, live streamed lectures, invitation of guest lecturers, patient advocates
	Enabling remote access to software ^{3,16}	Enables students to complete a range of activities while unable to attend University or clinical sites

(Continued)

Table 1. Continued.

Issue or impact on students	Strategy	Description
Introduction of online examinations	Academics exchanging ideas among colleagues ³	Some examples are simulation-based conferences and social media platforms Vendor initiated sharing of online resources
	Use of online platforms for examinations ^{3,5,9,14}	Open book examinations conducted through learning management software, designed with strict time limits and plagiarism detection
Increased stress levels due to isolation from peers, academics, profession	Frequent communication both at local level and University-wide ^{7,8,14,17}	Local: making use of instant messaging tools to enable students to access support from peers and academics University-wide: availability of additional resources such as counselling, financial and other assistance
	Peer Group Supervision tool ¹⁹	Students providing support to peers to help with stress management
	Expressive art therapy workshop ¹⁸	Students provided with art materials and allowed to creatively express their placement experiences
Adjustment to online learning environments	Dedicated mental health support ¹⁸	University psychologists available during student workshop for tailored support
	University-based study support ¹⁴	Students made aware of existing online resources available to help with study strategies
	Flexibility with assessments ⁹	For students completing on campus degrees, allowing time for students to adapt to

(Continued)

Table 1. Continued.

Issue or impact on students	Strategy	Description
Transition from student to practitioner	Fast-tracked registration ^{20,21}	online learning environments Students close to completion of degree able to enter profession early
	Orientation program for new graduates ²²	Clinical departments making new graduates welcome, redesign of an orientation program for hybrid delivery

progress. In particular, the impacts were felt more keenly by students at the start of the degree compared to those in later or final years.⁶ The main sources of stress for students were adapting to new remote learning arrangements,^{3,4,8} online assessments⁵ and ensuring progress in clinical placements as explained above. In-person activities such as lectures, practicals/labs and tutorials were rapidly adapted into simulated or virtual activities. Availability of simulation-based education across MRS disciplines has been gradually increasing and globally, most medical radiation students now receive up to 100 hours of simulation-based education per year.¹⁶ A recent international audit found that simulation-based education includes a wide range of activities, with some requiring dedicated hardware/software (e.g., virtual reality environments, clinical software for image acquisition or treatment planning), other simulation equipment (e.g., decommissioned clinical equipment, mannequins), role plays with clinical/patient actors and conducting simulated activities within real departments.¹⁶ It is likely that the pandemic has accelerated use of simulation-based learning even further. Two examples of creative ways educators across the world have shared resources have been an online conference in 2020 organised by educators in Europe, North America and Australia called ‘*Simulation-Based Education in Radiography/MRS: A Response to COVID-19*’.³ Another is connecting through social media such as LinkedIn and Twitter. Some topical Twitter handles that may be of interest to MRS educators and health professionals are included in Table S1.

The issue of online assessment and academic integrity, for example in online open-book examinations, is an ongoing one,^{3,14} although one evaluation of online examinations in medical imaging concluded that the application of strict time limits for completion coupled with plagiarism detection software indicated no evidence

of academic misconduct.⁵ Further evaluations are needed to determine whether this is the case across the board.

At the University of South Australia, some of the ways we have supported students’ academic progress have included facilitated online guest lectures to supplement existing classes. Tapping into our professional networks, we invited presentations from patient advocates, overseas colleagues, local clinicians, product specialists, among others. These varied perspectives ensured students remained engaged and had regular touch points with academics and peers to ease feelings of isolation. Remote access to simulated software during periods of lockdown has been invaluable, for example, within the radiation therapy stream, remote software access enabled online facilitated tutorials using screen-sharing and remote-control features via Zoom (Zoom Video Conferencing Inc.). Another novel example was global sharing of educational resources using the VERT immersive radiation therapy software (Vertual Ltd.). The vendor invited participating universities to contribute an online resource to a shared collection of resources, which enabled educators and students access to a large suite of resources without duplication of effort.

Student wellbeing

In addition to impacts on student learning, MRS students reported negative impacts on their wellbeing. These were described as feelings of social isolation,^{3,5,6} concerns about contracting COVID-19 while on placement,^{3,6,8} impacts on emotional wellbeing and financial security.⁴ Academic institutions provide comprehensive student support services ranging from study help to wellbeing, counselling, support for international students and financial advice and many implemented online pages dedicated to the evolving COVID-19 situation coupled with regular university communication.

While general up-to-date communication regarding university support is essential, communication at a program level enables students to receive communication directly related to their studies and/or clinical placement. Transparent communication between students and academics helps students to manage stress due to COVID-19 related impacts⁸ and one novel way is to use instant messaging platforms and chat groups (WhatsApp Messenger, Facebook; Teams, Microsoft Corporation etc.) which students readily use to keep connected with peers.^{7,17} Another wellbeing strategy mentioned by students in Singapore was having a mindset that the uncertain time was an opportunity for personal growth and taking a proactive approach in the self-paced nature of online learning was of benefit.⁸ Radiation therapy academics at the University of Alberta, Canada,

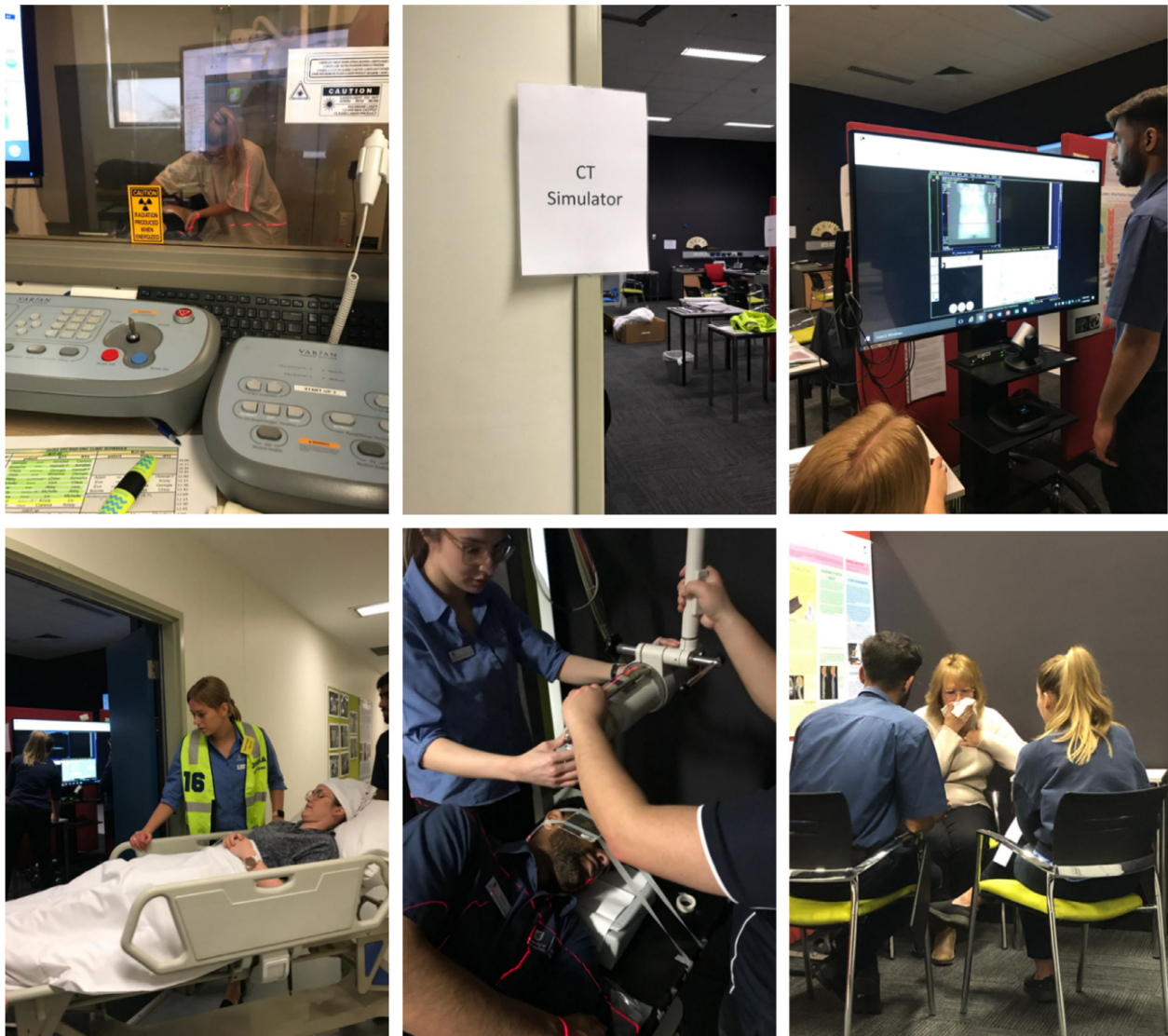


Figure 1. Radiation therapy mock clinic for year 3 students. LinkedIn post by E. Giles: <https://tinyurl.com/5h56zvc4>. Permission was obtained from all people prior to inclusion of images.

introduced mental health sessions delivered by the university’s psychologists and an expressive art therapy workshop, the aim of which was to provide an avenue for students to creatively reflect upon their placement experiences.¹⁸ A novel initiative at the University of Otago, New Zealand, piloted a Peer Group Supervision tool for radiation therapy student support, finding it was beneficial with regard to student stress management, although required participant training for it to be effective.¹⁹ As this study was conducted pre-pandemic, the use of innovative ways such as this one in providing student support is likely to be of even more importance with cohorts beyond 2020.

Transition from student to registered practitioner

The timing of the COVID-19 pandemic was for some MRS students close to the end of their degree. This presented additional challenges in terms of their transition from student to a registered health practitioner. In the rapidly evolving pandemic situation, the Health and Care Professions Council in the United Kingdom established a temporary register for final year MRS students deemed competent by their university academics.^{20,21} The fast-tracked registration posed certain challenges for students, including questioning their

readiness to face psychological, emotional and practical challenges of employment²⁰ and having to adapt to practising with autonomy,²¹ but at the same time, students felt valued for making a contribution to healthcare at such a critical time. This was helped by existing staff making them feel welcomed into the team and receiving support from colleagues.²¹

In Australia, AHPRA recognised the COVID-19 impacts to clinical placement attendance and made recommendations regarding clinical education to be focused on clinical outcomes and competencies instead of hours/weeks completed.¹⁰ However, once registered and employed, additional strategies may be needed to help new graduates to make the transition from being a student to a qualified practitioner. One approach taken at the Radiography Department at Singapore General Hospital was running a 4-day orientation program using a hybrid delivery model incorporating video conferencing and guest facilitators.²² The program, underpinned by Bauer's four levels of onboarding, included aspects related to compliance, clarification, culture, and connection.²³ Feedback from participants showed the program was successful in alleviating anxiety and provided key content to enable them to be prepared for commencing clinical work.²² Given the current pandemic, any support initiatives assisting new graduates to transition from students to qualified practitioners are as important as ever.

Conclusion

The global COVID-19 pandemic has impacted all facets of life. In MRS education, impacts were felt by educators, students and clinical supervisors both locally and internationally. This commentary has outlined some of the innovative and successful strategies used by universities and clinical departments to support students. It is often the case that necessity is the mother of invention. Perhaps, the silver lining of a global pandemic has been the accelerated innovation, creative workarounds and countless examples of clinicians and educators working together to support students in their future careers as MRS practitioners. This is evident from the recent published examples cited.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table S1. Twitter handles related to medical radiation science education topics.