Pediatric Radiology (2020) 50:1055–1058
https://doi.org/10.1007/s00247-020-04728-8

COMMENTARY

Education in the time of COVID-19

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Received: 11 May 2020 / Revised: 11 May 2020 / Accepted: 18 May 2020 / Published online: 28 May 2020

"You must be the change you wish to see in the world."
— Mahatma Gandhi and Arleen Lorrance [1]

In this time of constant change and uncertainty — about how we communicate with one another, how we find sustenance, how we stay safe and survive the COVID-19 pandemic — health care providers have had to rethink how we conduct the business of patient care. Virtual visits, redesigned hospital rooms and a greater appreciation for personal protective equipment are all standard now. But are we remembering to think about our learners, the ones who have entrusted to us their paths toward mastery? What obstacles have we encountered during the COVID-19 pandemic and what strategies have we created or implemented to fill the educational voids left behind in the virus's wake? Here are just a few of the challenges, opportunities and solutions that many have thought about and taken on.

Challenges

The training of diagnostic and interventional radiologists has always been by reading, seeing and doing, meaning that there is an emphasis on the absorption of a significant amount of medical knowledge tied closely to the apprenticeship model of education. In these times of social distancing, we have been able to address the medical knowledge component with a variety of online exams, teaching file cases, modules and presentations accessible to our learners virtually, but what about the hands-on component of our educational mission? Didactic conferences have gone online while face-to-face educational efforts are being replaced by limited resident and fellow on-site work coverage. Multidisciplinary conferences are more limited, done remotely and often canceled, while Accreditation Council for Graduate Medical Education (ACGME) and local medical education requirements are still carefully applied to trainee duty-hour restrictions and personal safety, potentially creating a strain on any educational system utilizing limited onsite staffing and greater remote workforce deployment [2]. Medical schools have removed students from on-site clinical duties and have switched to remote learning for the short term. So how does one teach at the Picture Archiving and Communication System (PACS) and especially in the fluoroscopy or ultrasound suites when the instructor and the learner are not in the same space? The cancellation of local, regional and national meetings, including review courses, means few options for concentrated learning environments that do not adhere to current physical distancing standards. We need to address the effect of postponing scheduling the core examination on residency and elective choices for the upcoming senior residents, as well as any near-future implications to the job market for our trainees.

Those are a few of the overt threats to our educational system. What about the challenges that are less direct? These might include stresses related to daily institutional changes, concerns regarding the welfare and safety of loved ones, and the disruption to self-care: healthy eating, exercise, mental health, and normal workplace socialization. At a time when provider burnout and self-care are hot topics, how do we mitigate the negative effects that this pandemic has brought on our families, communities, patient care activities and, ultimately, our educational mission? Isolation and distancing flatten the curve, but they also challenge our educational goals.

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Opportunities

Many discussions about progress emphasize that embracing the unknown and learning from our failures often bring about needed and effective change. As we have challenged our information technology (IT) departments to create flexible but high-quality remote work environments, as our hospital systems have embraced new conferencing technology with great speed, we can now use these advances to develop high-quality teaching materials that engage and inspire our learners. There is no reason that flipped classrooms and team-based learning cannot be applied to videoconferencing platforms [3].

The ability to pool resources and avoid having to produce a local solution at each training site is a great advantage of online learning. Imagine daily or weekly conferencing that is done by expert faculty from around the country (or the world), directly accessing the strengths of our Society for Pediatric Radiology (SPR) for the benefit of the residents and fellows, and one another. There is proven benefit to clinical quality and patient safety in standardization. We can create a more robust, more interactive community of pediatric radiology faculty to take advantage of both our individual and collective expertise, and in the process model the best of the community of radiologists and allied health care providers we have become. We can inspire colleagues and our trainees with "teach the teacher" programs [4]. We should embrace the use of artificial intelligence (AI) to help develop new ways of teaching clinical decision support, and find ways to incorporate AI into our clinical practices to strengthen resident and fellow development and to enlighten medical students to the fact that machine learning and artificial intelligence are an adjunct to the practice of radiology, not a replacement for it. We have already created a stronger partnership with our IT colleagues at a time of great uncertainty and fear, all for the betterment of our patients and their families; let us leverage these deeper relationships to create a new future for radiology clinical practice and education.

A happy byproduct of this will be the ability to showcase pediatric diagnostic and interventional radiology to our medical students. As we create new and innovative ways to teach, we will become more visible to medical students, showing them the clinical and educational impact we have every day and what a satisfying career the practice of pediatric radiology can be.

The aspiration to a greater inclusion of women in radiology and especially in leadership positions has become a topic of discussion and a point of emphasis in our journals [5, 6]. Although approximately 50% of medical school classes are women, only about one-quarter of radiology residents are women [7]. What better way to inspire female medical students to pursue diagnostic radiology — and pediatric radiology — than through the incredible female leaders of our SPR and the many great educators among our peers? We can virtually reach out and hold "brown bag" sessions with students about our careers and our lasting impact on patients and their families, as well as about our paths to such a rewarding and fulfilling life. Videoconferencing with our interest groups would be a perfect venue for such an approach. Technology does not have to be impersonal. Storytelling is the best way to reach an audience. Reaching out online to interest groups might not persuade everyone to become a pediatric radiologist, but we can at least create future colleagues who look at us as essential partners in their patients' health care and in their own trainees' education.

Solutions

As our departments and hospital infrastructure create new ways for us to share and communicate, let us embrace these technologies, play with them, refine them to our needs, and give it all a try. Getting comfortable with the technology and finding ways to take our current educational materials and transform them into virtual learning is something we can all accomplish together with community support. Many societies such as the Association of University Radiologists have held webinars and created online resource documents for just such a purpose. Having the SPR help us with website support and perhaps a common platform would move all of us more quickly to a desired outcome. There are many in the SPR with significant experience in advanced adult learning techniques who can help. Case of the day and more informal virtual classroom discussions can all be enhanced by a well-supported and improved web presence. Creating a virtual national pediatric radiology curriculum, for example, is clearly possible with current technology. A grassroots effort could create something of substance and great value quickly and effectively. Having our learners work with us in the creation of these new educational tools, soliciting their feedback as we develop new methods of teaching, is vital to this process.

Those who are users of social media can help all of us develop a presence to reach millions worldwide. Perhaps we get away from the @MichiganMedicine, @CHOPRadiology, @TCH and all subscribe to @SPR (with #forthekids, which has a nice ring to it).

We also need to come together to solve the problems arising in our current IT environments and those still associated with audience response technology. A time of crisis often leads to great innovation. Many of our SPR members are nationally recognized leaders in IT solutions; let them help lead the way.

One of our greatest challenges right now is in how to teach the hands-on material that our residents and fellows desperately need. While some trainees will show initiative and take it upon themselves to search out hard copy and online resources (remote review of studies on PACS, teaching files, etc.) during

this time of social distancing and limited patient volumes/contact, how do we create an in-person experience for every learner? For example, it is one thing to understand the theoretics of performing a safe and effective therapeutic enema reduction for intussusception; it is another situation altogether to do it yourself with a live patient. Perhaps augmented reality and avatars are a solution, with a high-fidelity simulation that creates a "live" experience but allows for scheduled lab access to continue social distancing. These simulations can also be augmented with videoconferencing for real-time refinement of techniques. Opportunities such as these allow us to create a hands-on-like environment while still considering resident and fellow safety. Until universal testing for COVID-19, contact tracing, comprehensive patient screening and a vaccine are available, we must look for new and engaging learning opportunities for our learners. It is essential for us to consider this the perfect opportunity to broaden our learning communities, to move beyond our traditional reliance on institution-centric instruction and assessment, and collectively tackle the task of teaching "how I think, and how I approach a problem" — both online and on-site. For many of our trainees, the physical time lost with patients will not be returned. We need out-of-the-box solutions.

We also cannot forget the value of our feedback to the trainees. Physical distancing is expected to continue for a period of time, and we cannot lapse in keeping contact with our trainees during the pandemic. Feedback can take many forms and should include using technology — certainly text, but consider direct audio or video chat if you are interpreting remotely with residents and fellows. Many PACS are equipped with feedback options and these should be explored and utilized. IT solutions need to create seamless videoconferencing abilities on the PACS, so that faculty can review cases with residents and fellows at a distance and allow additional learners, such as elective resident rotators and medical students, to join in. Just-in-time education is not merely about ready access to reference material; it is also about immediate feedback.

Any solution needs to be applied carefully to our medical students. Just as we have showcased our specialty in the past, modeling for medical students how rewarding careers in general diagnostic and pediatric radiology can be and how we as clinical consultants can help them care for their patients in very meaningful ways, we must now do this with even greater energy via online educational platforms. Perhaps there is an opportunity to help our medical schools fill curricular gaps related to the pandemic by reaching out and offering virtual electives, hopefully interacting with even more students than we currently do, and thereby shaping our future.

Most important, we should not lose sight of our community. Staying socially connected to our colleagues and learners is key to our survival and a great example to others of why we chose to be pediatric radiologists. We all spend time learning about our trainees' lives and how this intersects with their training. There is no reason for this to stop now. We have often spent more hours in a day with our medical students, residents and fellows than with our families, and that commitment will not diminish without repercussions. As educators, we have always valued the relationships we build with our medical students, residents and fellows. It is that social connection that brings great energy to the teacher–learner partnership.

As for defining the future of Continuing Medical Education, it would be worthwhile to examine how our traditional model of in-person meetings has relevance in this changing world. Community and socialization in learning are components of live events — should we be able to hold them — that will become their raison d'être. When didactics can be accessed anytime, anyplace in an on-demand virtual educational system, then in-person meetings must emphasize what only face-to-face events can offer: the electricity of real-time idea exchange, the expansion of possibilities that come with open debate, the connectivity of human warmth and emotion.

Conclusion

We are a great community of leaders, health care providers, educators and people. Technology is being updated almost daily in response to the COVID-19 crisis. When this is over, our practice of medicine and medical education will not look like it did before February 2020. Many of the platforms we are now learning to use will become part of daily life and serve as complements to onsite learning, and might actually be better tools for some learning environments. Virtual patient visits and other telehealth programs will thrive and allow us to reach many more lives. Our duty is to embrace the future, adapt it to our specific needs and, most of all, remember that though we might have individual addresses, together we are one solid community of medical educators.

Compliance with ethical standards

Conflicts of interest None

References

1. Quote Investigator (2017) Be the change you wish to see in the world. WordPress. https://quoteinvestigator.com/2017/10/23/be-change/. Accessed 4 May 2020
2. Accreditation Council for Graduate Medical Education (2020) The American Board of Medical Specialties and Accreditation Council for Graduate Medical Education joint principles: physician training during the coronavirus disease 2019 pandemic. ACGME News. https://www.acgme.org/Newsroom/Newsroom-Details/ArticleID/

10192/The-American-Board-of-Medical-Specialties-and-Accreditation-Council-for-Graduate-Medical-Education-Joint-Principles-Physician-Training-During-the-Coronavirus-Disease-2019-Pandemic. Accessed 4 May 2020

3. Chick RC, Clifton GT, Peace KM et al (2020) Using technology to maintain the education of residents during the COVID-19 pandemic. J Surg Educ. https://doi.org/10.1016/j.jsurg.2020.03.018
4. Smith CC, Newman LR, Huang GC (2018) Those who teach, can do: characterizing the relationship between teaching and clinical skills in a residency program. J Grad Med Educ 10:459–463
5. Pfeifer CM, Gokli A, Reid JR (2020) Advancing from gender equity to women in leadership in pediatric radiology. Pediatr Radiol 50: 631–633
6. Joshi A (2020) Gender balance in pediatric radiology: it benefits everyone. Pediatr Radiol 50:634–635
7. Bloom DA (2020) The future is now: insights into finding tomorrow's pediatric radiologists. Pediatr Radiol 50:161–163