Sustainable Global Outreach Through a Holistic Approach to Virtual Learning

Mai Elezaby, MD; Carley Hansen-Prince, MEd, RT (R) (ARRT); Jenna MacLaine, RT(R), CTIC, CAE, BSc

Global healthcare disparities and poor health outcomes in low- and middle-income countries (LMICs) require innovative interventions to bring about health system-wide improvements.[1] A comprehensive approach to upscaling healthcare education is an important way to address these goals.

Indeed, through the macro-level (eg, increasing knowledge of organizational structures, governance, healthcare economics), meso-level (learning innovative strategies for networking, communications and sharing of interdisciplinary knowledge across healthcare systems), and micro-level (increasing medical knowledge, procedural skills and clinical operations for staff at individual sites). The World Health Organization in 2016 called upon the international community to upscale the quantity, quality, and sustainability of healthcare education through innovative teaching and communication strategies.[2] Yet, as of 2022, significant global shortages of healthcare professionals still existed.[3] According to a recent report by Hricak, et al, radiology equipment and workers are in short supply in LMICs, where upscaling has significant potential to improve patient outcomes.[4]

From the oncology perspective alone, simulations show that scaling up imaging for the 11 leading cancers worldwide in LMICs could avert 2.46 million deaths between 2020 and 2030, while upscaling imaging, treatment, and quality of care could avert 9.5 million deaths, saving 232.30 million life-years.[4]

Leveraging education to upscale imaging services globally and domestically is a primary mission of RAD-AID.[5] However, the challenges of collaborating with stakeholders around the world highlight the need for a versatile, web-based platform to facilitate communication and content delivery.

To this end, in 2014, RAD-AID began developing its Online Learning Center (OLC). Learning management systems (LMS) and online education platforms greatly facilitate distance-learning; they provide versatility in content creation and deployment, allowing students to progress at their own pace through material tailored to their individual needs.

The robust tools available on many platforms encompass assignments, quizzes with facilitated grading, and discussion forums allow instructors to monitor students' progress.[6] Learning management systems can be deployed on smartphones, tablets, and laptop computers, facilitating user access to online education, especially in technology-deprived regions of the world.[7] Indeed, LMSs represent an invaluable opportunity for RAD-AID volunteers to sustain healthcare education and maintain connections between outreach trips, as well as during times when travel may be limited.

In RAD-AID's case, several online products were considered; ultimately, Moodle™, an open source LMS was chosen based on such factors as its cost, ease of deployment, maintenance, and user accessibility, as well as its global accessibility, versatility, and wide technical support.[8]

Next, content expert groups, drawn from RAD-AID's vast network of 14,000 volunteers and chapters in 92 ACGME-accredited academic and community-based medical centers in the US and Canada, were formed to collect and author educational materials. Collaborations with and generous donations from several radiological societies and other expert groups facilitated course development.

RAD-AID took a holistic approach to its educational mission. It began

Affiliations: Dr Elezaby is the director; Ms Hansen-Prince the program manager; and Ms MacLaine the associate program manager, of the RAD-AID Learning Center. The authors disclose no conflicts of interest.

The RAD-AID Online Learning Center currently hosts 39 courses for upwards of 1,500 registered users; user engagement and content relevance to partner countries are monitored continuously in collaboration with local stakeholders.

by educating and affirming the expertise of its multidisciplinary team members and volunteers through the Proficiency in Global Health (PGH) Certificate program. The longitudinal, blended curricular program focuses on project planning and implementation to upscale imaging services according to each country's specific public health concerns and health system's capacity and infrastructure.

The PGH certificate program also covers cultural competency, medical ethics, and communications training to prepare global outreach workers for often unfamiliar practice environments. RAD-AID leaders also created a pipeline for future physicians with a passion for global health in radiology with the Medical Students Global Health Radiology Online certificate.[9]

The OLC curriculum for students, meanwhile, addresses multiple areas of training for all healthcare professionals and radiology department staff. For instance, it covers interpretive skills for medical students, radiology residents, and practicing radiologists in all subspecialities, as well as technical instructions for radiologic technologists, radiation therapists, sonographers, physicists, and radiology nurses.

The OLC also covers business development, finance, and even informatics infrastructure. All course materials, moreover, are continuously developed and updated according to sound educational theories and published curricula.[10] The OLC currently hosts 39 courses for upwards of 1,500 registered users; user engagement and content relevance to partner countries are monitored continuously in collaboration with local stakeholders.

The OLC faced one of its first major tests in the midst of the COVID-19 pandemic, when travel restrictions forced many medical specialty groups and nonprofits to suspend their outreach efforts. The OLC helped onsite educational and clinical collaborations quickly pivot to virtual learning, resulting in exponential growth and utilization of the OLC.

Future Directions

Going forward and keeping in line with RAD-AID's philosophy of continuous assessment and self-improvement, the OLC and its curriculum will be expanded and updated as necessary to achieve the highest possible educational outcomes. Importantly, the robust OLC curricula have made it possible to initiate subspecialty fellowships in breast imaging and interventional radiology, as well as the option for certification in sonography proficiency. These initial successes promote high-quality local healthcare workforce development and are setting the stage for additional expansion into other subspecialties and certifications.

References

1) Kruk ME, Gage AD, Arsenault C, et al. High-quality health systems in the sustainable development goals era: time for a revolution. *Lancet Global Health*. 2018;6(11):e1196-e1252. doi: 10.1016/S2214-109X(18)30386-3

2) World Health Organization. Transforming and scaling up health professionals' education and training: World Health Organization guidelines 2013.

3) Global Burden of Disease 2019 Human Resources for Health Collaborators. Measuring the availability of human resources for health and its relationship to universal health coverage: estimates for 204 countries and territories from 1990 to 2019. *The Lancet*. 2022. doi: 10.1016/S0140-6736(22)00532-3

4) Hricak H, Abdel-Wahab M, Atun R, et al. Medical imaging and nuclear medicine: a Lancet Oncology Commission. *The Lancet Oncol*. 2021;22(4):e136-e172. doi: https://doi.org/10.1016/S1470-2045(20)30751-8

5) Mollura DJ, Soroosh G, Culp MP. 2016 RAD-AID Conference on International Radiology for Developing Countries: Gaps, Growth, and United Nations Sustainable Development Goals. *J Am Coll Radiol*. 2017;14(6):841-847. doi: https://doi.org/10.1016/j.jacr.2017.01.049

6) Dziuban C, Graham CR, Moskal PD, Norberg A, Sicilia N. Blended learning: the new normal and emerging technologies. Intl J Educat Tech Higher Ed. 2018;15:1-16.

7) Ghanem S. E-learning in higher education to achieve SDG 4: benefits and challenges. 2020 Second International Sustainability and Resilience Conference: Technology and Innovation in Building Designs(51154) 2020; 1-6.

8) Moodle. https://moodle.org/. Accessed 2023 March 15.

9) England RW, Lugossy A-M, Mollura DJ. Increasing opportunities for trainees to engage in global health radiology: radiology In training. *Radiology*. 2021;300(2):E320-E322. doi: 10.1148/radiol.2021210371

10) Culp MP, Stein-Wexler R, Elezaby M, et al, eds. *Radiology in Global Health: Strategies, Implementation, and Applications.* Cham: Springer International Publishing, 2019; p. 141-153.