

COMMENTARY**A CALL TO BUILDING RESILIENT MEDICAL EDUCATION SYSTEMS IN AFRICA, NOW AND BEYOND
COVID-19****Owolabi J.O^{1,2} and Tijani A.A³**¹Department of Anatomy, University of Global Health Equity, Rwanda²Department of Anatomy, Babcock University, Nigeria³Directorate of Higher Degrees and Research, Kampala International University Western Campus, Uganda**ABSTRACT****Background**

Certain factors have affected medical education significantly most recently. One is the rapidly evolving landscape of medical education, globally. This has created a spectrum of impacts on not just how medical education is being delivered but, on the definitions, and characterizations of competencies required of trained medical practitioners across the globe. The second factor is the event of the Covid-19 pandemic, which has not only affected the methods of delivery of medical education but that has also affected resource allocations.

Proposition

The impacts of these two factors have in most recent time created dynamics that will influence the quality of delivery of medical education in African institutions. Building resilient systems, therefore, becomes vital to sustainability. Resilience becomes associated with not just efforts to keep medical schools open and running but also the extent to which quality can be sustained, with quality prospects for continuous improvement so that Africa can leapfrog in the attempts to increase the quality of medical education. This will translate to improvements in the quality of delivery of care.

Conclusion

This commentary, therefore, considers three major themes that stakeholders must focus on in their efforts to build resilient medical education systems that can withstand the impact of the two main forces that are largely responsible for the current dynamics. The first theme centers on pedagogy and assessment. The second theme emphasizes infrastructure and resources. The third theme considers critically institutional philosophy, the cultures of teaching and learning, and the need to critically rethink medical education on the continent.

Keywords: Pedagogy, Infrastructure, Teaching, Learning, Medical Education***Corresponding Author**

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INTRODUCTION

This article presents a call to building resilient medical education systems in Africa, now and beyond the Covid-19 era, under three major themes. The first theme addresses pedagogy and assessment. The second theme centers on infrastructural setup and resources utilization with emphasis on system thinking. The third theme emphasizes the need to enshrine a culture of teaching, training, and learning that embraces modern perspectives and cutting-edge methods through critical thinking and the use of evidence.

Theme I - Pedagogy and Assessment: Appreciating Diversification and Dynamics

A very important theme that should be considered in the various efforts to build resilient medical education systems in Africa should be the pedagogies and means of delivering medical education. There is the need for a paradigm shift from the well-known conventional or traditional modes of delivering medical education across the three domains including the cognitive, psychomotor, and affective. While there might not be significant fundamental flaws with the traditional methods of teaching and training such as classroom-based lectures, laboratory experimentation, and bedside teaching among others, the evolutions in medical education globally have shaped narratives in different aspects (1). Some of these methods of teaching and training have been significantly reviewed and reformed, and are now significantly aided by innovations and technologies (2). There has been a significant shift in paradigm about matters of training and teaching. African medical educational systems need to key into these changes by modernizing the existing methods particularly by adopting and adapting the newer methods of delivering medical education if the quality of delivery on the continent would catch up with the rest of the world and compete with them favorably. There may also be a need to critically consider continuous efforts in training trainers and the creation of awareness about the rapid evolutions in medical education across the globe. In terms of a paradigm shift in teaching and training methods, it might become important to consider the following amongst several other options that exist:

FC- Flipped Class:

Flipped classes are in line with the andragogy philosophy of learning and when used effectively can significantly enhance student learning in a self-directed manner. It is also a learner-centered approach to learning (3, 4, 5).

TBL- Team-based Learning

TBL has been praised not just for its suitability to encourage participation amongst a team of students and trainees when learning but for the opportunity that it provides them to engage one another and increase their depth of understanding. This promotes learning in the affective domain, in addition to what it could achieve in the cognitive and psychomotor domains. It promotes team spirit and collaborative approaches to solving problems (6).

PBL- Problem based learning

Problem-based learning could help to achieve learning at higher levels, for example, based on Bloom's taxonomy. It also promotes applied learning, hence, helping to improve the depth of understanding (7, 8).

IL- interactive lectures

Interactive lectures typically allude to enhanced approaches to delivering lectures which shifts from one extreme end of the 'sage on the stage to the more interactive end of 'informing, facilitating stimulatory conversations, reflections, engagement and guidance for further self-directed learning' While the *stage* might not have changed between the two paradigms, the philosophy and approach to delivering interactive lectures need to be carefully appreciated by educators towards improving their students learning (9, 10).

CBCL- case-based collaborative learning

Case-based collaborative learning, which is similar to TBL and PBL affords medical students, especially, the opportunity to learn through cases, thereby promoting applied learning that emphasizes learning in all domains with opportunity for reflective practice and self-directed learning (11).

SIM- simulation

Simulation especially when well designed and supported with appropriate technology can greatly enhance learning outcomes. Therefore, institutions should invest not just in the facility and infrastructure setup for simulation but also help educators and learners acquire requisite skills to be able to optimize the use of simulation in medical education (12, 13).

VR- virtual reality

Virtual reality provides the opportunity for students and trainees to appreciate concepts and procedures which otherwise cannot take place or replicated in the physical domain in the virtual domain. These can greatly enhance the conceptualization of ideas, thus helping learners and trainees to make better sense of what they learn in other domains in this regard. It is important to note that conceptualization remains an integral part of learning as depicted by Kolb's learning cycle (14).

AR- Augmented reality

Augmented reality affords educators the opportunity to superimpose a virtual environment onto a physical environment, thereby, creating a more immersive learning environment that could facilitate knowledge acquisition, conceptualizing, demonstrating skills, and integrating processes, thereby enhancing students learning experiences significantly (15).

Reflective Practice

The use of the reflective practice to drive in-depth learning is also in alignment with the tenets of adult learning theories otherwise termed andragogy (16).

Academic Forum

The academic forum provides opportunities for learners to study, reflect and contribute answers to specific questions or problems. This, if done well, it is typically monitored and guided by a faculty or facilitator whose role is to ensure that the contributions and interactions amongst learners on the forum do not just amount to participation but to ultimately address the problems or questions sufficiently. There should also be evidence that the problems have been solved by the collective activities of learners (17).

Special assignments and activities

Special assignments and activities such as a mini-research and fieldwork can be used to drive learning. Observership, in various contexts, might equally be helpful. It would be important, however, that the special activities have clearly set objectives, through which learning can be established or demonstrable to have been achieved.

Action learning

Action learning provides important avenues for learners to learn by solving problems. What is equally important is that an appropriate context should be provided, problems should be clearly defined and quality opportunities to explore and reflect for solutions should be ensured. With quality guidance, action learning can greatly help adult learners especially in a self-directed manner (18).

Others: Educational Technologies and Innovations

There is an array of options when it comes to educational technologies and innovation and in the current tech-driven world, it would be important that educational systems embrace the tech culture there are available to them. Educators and learners should leverage on, and benefit from existing and emerging educational technologies and innovations. It might be advisable that different fields of endeavor make a careful choice of educational technologies and innovation that best suits their purpose and meet their needs (19).

It might be very important to also send a note of warning that no single pedagogical means of delivering medical education might be absolutely sufficient and ultimately superior. Therefore, a careful blend of methods will greatly help. This, therefore, should be the preferred approach.

Theme II - Infrastructure and Resources: Building Systems

Acquiring and Setting up Functional Virtual Learning Environment /Learning Management Systems

It has become quite imperative for every tertiary institution to acquire and set up a functional virtual learning environment. Such a system should be set up to be robust enough to serve as a virtual version of the university or institution. While this allows for effective delivery of teaching and training via the virtual interface, it also provides an opportunity for the university to be dynamic enough to switch conveniently and effectively- as situations might arise, between the physical and space and the virtual learning environment. There are several options; institutions simply need to decide which product works best for them based on their needs and contexts. It might also become very important for the institutions to customize the virtual learning environment in order to best meet their needs (20).

Acquiring and Setting up Functional UMIS

The university management information system serves as a platform for hosting keeping and managing information especially those pertaining to student records, performances and academic records. It will be hard to imagine a modern tertiary institution that will flourish without having a robust and dynamic university management information system. One thing that should be added to this fact is also that this system should be integrated into the entire university infrastructural set up such that the UMIS syncs and works almost seamlessly with other components of the system.

Educational Technology and Innovations

There are several options and types of educational technologies and innovation. While some are produced and made available commercially by reputable educational material designers and producers, educators with expertise, creativity, and ingenuity are also developing specific products to optimally deliver teaching and training. What has become very important, therefore, is that the use of educational technologies and innovation has become very integral to medical education. The use of these educational technologies and innovations, however, must be standardized and adapted to suit systems and programs needs or requirements.

Need for Integration

It is important to integrate the various aspects of institutional infrastructure- both physical and technological. The physical learning environment should be properly integrated with the virtual learning environment. Also, the educational technologies and innovations in use should be integrated into the existing structure to optimally serve their purposes. Other resources, such as physical books and eBooks including software also need to be properly integrated for quality access and optimization in terms of usefulness.

Resources: Appreciating the new Paradigm of Resources, and Diversifying

Educational resources are now quite diverse. Ebooks, for example, are just no more PDFs and other similar versions but are becoming increasingly interactive. Software is also being produced with enhanced interactivity, providing opportunities for information to be provided in different formats including visual, audio, textual, and kinesthetic formats. It would be very important that institutions should procure and curate resources in the best possible way. There might be a need to consider diversity in meeting students' needs. Very importantly, there has to be a paradigm shift that provides room for appreciating the new paradigm of educational resources and their uses (20).

OER and other sharable resources

It might be important to consider resources that come at no or little cost yet with high quality to meet learners' needs. In light of the fact that recent development might have negatively impacted the economy and the capacity of institutions to procure materials for learners, open educational resources, therefore, become very useful, and they are readily available. Institutions should consider curating such materials and making them available to the learners and trainees. Other types of shareable resources such as those made available through efforts of philanthropy and open resource platforms might also be considered. Another important consideration might be collaborations between institutions to co-develop, procure and curate resources such that a conglomerate or group of institutions can

have a pool of resources that could be shared and used, thus reducing costs and preventing restrictions to access by their trainees and learners (20, 21).

Theme III - Culture of Teaching and Learning: Rethinking Education

As already mentioned, there is a need to adequately appreciate the evolving landscape of education. Standard institutional practices, especially with respect to delivery of teaching in the domains of knowledge, skill, and attitude, have significantly changed and the evolution somewhat continues. For example, some schools have now adopted blended learning approaches as well as international and inter-institutional collaborations that enable institutions to structure programs in ways that might be significantly different from the traditional norms yet that are capable of achieving higher quality results based on the objectives of programs. These changes or evolutions, so to say, have significantly influenced the culture of teaching and learning, calling on African medical educators and education stakeholders to start re-thinking education in their climes (21). Critical consideration should be given to how the following methods and means of delivering medical education could be optimized:

Online Learning and Creating of Supportive Environment and Systems

Online learning is becoming increasingly robust and dynamic with different educational tools and platforms being created. These methods have definitely improved and advanced beyond computers merely serving as an interface for communication between teachers and students or trainees; rather, a virtual learning environment somewhat serves as a virtual model of the physical learning environment.

Traditional practices: Physical space learning

While traditional practices of learning within the physical space have ever remained relevant and arguably the most significant means of delivering medical education, there is the need to optimize these approaches and to support physical infrastructures with adequate technologies and innovations. It is also very important to

note that systems need to be restructured or redesigned to support technologies and innovations. Failure to carefully achieve these might make such newly introduced technologies become negatively disruptive (20).

Blended- Synchronous and Asynchronous

Blended approaches to learning need to become more integral as they offer not just the educators but also the learners the opportunity for flexibilities that come with approaches to adult learning otherwise termed andragogy (22, 23).

In conclusion.... A wake-up call

Noting that medical education is not in any way totally shielded from the prevailing circumstances affecting all walks of life across the world, a wakeup call has become quite necessary to ensure that stakeholders in the various domains and aspects of medical education especially in Africa would make concerted effort to build resilient medical education systems. This is because there is no excuse that is tenable for not sustaining and continuously improving the quality of health care delivery that is being made available to citizens in Africa. While not much could currently be done to totally shield institutions that are involved a medical education delivery from the impact of the COVID-19 pandemic and its consequences, rethinking strategies and processes will go a long way in ensuring that the impacts do not significantly compromise educational systems to impair the quality of training.

This article has three main themes or aspects that require serious attention. It is believed that focusing on these three main areas will go a long way in building a resilient medical education system towards ensuring continuous development and improvement of training and consequently the quality of medical services being delivered to African populations. Another important consideration would be the need to invest in cutting-edge research in all relevant domains and to focus on building a knowledge economy through strategic R&D programs. Finally, it has become very important that leadership in medical education systems including other fields of tertiary education must lead with vision, current information, courage, insight, and awareness, in

reference to quality data while employing evidence-based methods and processes. In this regard, competence, character, courage, and compassion are

virtues that should largely define the quality of leadership in medical education systems in Africa, currently, and much more than ever before.

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