Framework for curriculum delivery during COVID-19 pandemic in a health sciences university

Hanan M Al-Kadri[1,2], Mohamed Al Moamary[1,3], Bandar Al Knawy[1,3]

[1]Department of Obstetrics and Gynecology, College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Departments of [2]Obstetrics and Gynecology, [3]Medicine, King Abdulaziz Medical City, Riyadh, Kingdom of Saudi Arabia

Address for correspondence:
Prof. Hanan M. Al-Kadri, College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, PO Box 57374, Riyadh 11574, Riyadh, Kingdom of Saudi Arabia.
E-mail: halkadri@gmail.com

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Abstract:

This article aims to shed light on the management that was taken by the King Saud Bin Abdulaziz University for Health Sciences to accommodate the immediate needs for online curriculum delivery, in response to the total lockdown due to COVID-19 pandemic. We have described the process done, actions implemented, and challenges faced to manage the curriculum delivery during the pandemic and to plan the subsequent year curriculum delivery. Effective management will be enhanced by focused faculty development, curriculum management, assessment planning, and technical support. We believe that the management done can be taken as a model in similar situations where sudden online curriculum delivery is deemed necessary. Further audit on the effectiveness and implication of these actions is required after the end of the pandemic.

Keywords:

Coronavirus disease-2019, curriculum, pandemic, university

The outbreak of coronavirus disease-2019 (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 has rapidly progressed and was announced as a pandemic by the World Health Organization (WHO) on March 11, 2020. The WHO announcement has encouraged governments around the world to take serious actions to contain the infection and stop its spread. These actions have included economic, social, and educational restrictions, resulting from the total lockdown of countries.[1] The global lockdown by governmental authorities led to suspension of academic activities that has prevented millions of students from attending their schools and colleges; therefore, online curriculum delivery became the only available option for these educational organizations to resume their services during the lockdown.[2] The precautionary actions that were taken aiming to stop the spread of the virus had serious implications and posed significant challenges on the educational process in the world. These challenges were even more prominent whenever teaching, and assessment of soft skills was required.[3] The educational process in health science institutions was therefore significantly compromised in the affected countries.[2,4] The aim of this commentary is to highlight the challenges for health science education and the proposed framework to deal with it in the academic year that will commence on the fall of the year 2020.

Challenges for Health Science Education

During the pandemic, health science educational process has faced the following three main challenges.

The first challenge was the ability to maintain and guarantee curriculum delivery integrity, its assessment, educational outcome achievement, and curriculum objective fulfillment.[1,5,6] Due to the total lockdown,

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frequent practical sessions were replaced by online sessions. Teachers were asked abruptly to change their teaching methods and initiate online teaching without previous preparation or orientation.[7] Students, on the other hand, had to cope with these sudden changes in teaching methods, despite the possible connectivity problems, resources constraints, and variations in knowledge and skills related to online learning.[5,8,9] A large proportion of practical curriculum objectives in the curricula of health science colleges that were difficult to be delivered via online tools had made health science students' potential victims of COVID-19 pandemic, due to the interruption of their educational process. Educational administrators had to carefully balance between students' safety, educational standard, and their responsibility toward the community in graduating skilled and safe practitioners.[1,4,10]

The second challenge that had affected health science institutions was the impact of COVID-19 pandemic on the reliability and validity of students' assessment. Health science education requires students' exposure to clinical setup not only for learning but also during assessment.[11,12] Aligning curriculum assessment with its instruction methods is an important and strongly recommended principle.[13,14] Assessment of curriculum portions that were delivered through a real-life setup before COVID-19 pandemic was a major challenge in the presence of the total lockdown.[1] Several teaching hospitals had announced the presence of COVID-19 cases between medical students, resulting in suspending them from attending their clinical training and its related continuous assessment process.[15-17] The prolonged pandemic and the fear of getting students infected with the COVID-19 have restricted exposure to workplace skills, causing an unavoidable effect on examination competency and performance.[17] Moreover, the situation was more complex for those students heading for high stakes examinations and final-year examinations. Those students had lost their last chance for senior-level clinical exposure to real-life clinical situations that could have sharpened their skills and improved their educational outcomes before their final assessment and the subsequent independent practice.[18] As a result, COVID-19 pandemic has affected health science education in two main aspects: (1) difficulty or inappropriate delivery of curriculum objectives that require clinical exposure and (2) difficulty and inappropriate clinical assessment that requires this exposure.

The third challenge was the faculty preparedness to an abrupt shift from traditional campus-based curriculum delivery to exclusively online curriculum delivery. Within days, university faculty had to shift into online education. The variability between universities in information technology infrastructure, experiences, students' preparedness, and facility availability has stood as major struggles.[2,17] A complete online course delivery requires an elaborated structure design, delivery methods and teaching materials, presence of audio and video-designed instructions, and well-trained technology support teams. Due to the sudden emergence of COVID-19 pandemic, most faculty across the world have experienced challenges related to inadequacies in their online curriculum teaching experience, training, and support from educational technology teams.[10]

Following the WHO pandemic announcement and the implementation of the total lockdown in Saudi Arabia, the Ministry of Education (MOE) has announced the need for immediate online delivery in all Saudi Universities on March 9, 2020. MOE has done major efforts to support the universities by online platform, expand its capacity, and facilitate students' online education. Furthermore, MOE took major actions to protect students' education, their future opportunities, and cumulative grade point average.[19] On top of many other decisions, continuous assessment was given heavier weight up to 80% and online assessment was recommended with multiple assessment tools to enhance reliability.[20]

King Saud Bin Abdulaziz University for Health Sciences Framework for Curriculum Delivery during Coronavirus Disease-2019 Pandemic

King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS) is a health science university in Saudi Arabia that has three campuses in Riyadh, Jeddah, and Al-Ahssa. The university has a total of 12 colleges including three Colleges of Nursing, three Colleges of Applied Medical Sciences, two Colleges of Medicine, one College of Pharmacy, one College of Dentistry, one College of Science and Health Profession, one College of Public Health and Health Informatics, and Deanship of Postgraduate Studies. KSAU-HS has six master programs that are closely related to health sciences and is attached to the Health System of the Ministry of National Guard-Health Affairs, one of the largest medical institutions in Saudi Arabia. These clinical institutions are known to host the largest postgraduate center in Saudi Arabia that graduates residents in all the basic clinical specialties and most of the major subspecialties. KSAU-HS has approximately 10,000 undergraduate students and interns, while its health system accommodates approximately 23% of national trainees in more than 150 residency and fellowship academic training programs in Saudi Arabia.

In response to the COVID-19, precautionary actions forced a total lockdown in Saudi Arabia during the second semester of the academic year 2019–2020. This resulted

in an abrupt shift toward online curriculum delivery for all the university programs. The infrastructure of the university and the readiness of its information technology and educational technology departments have eased this immediate shift technically with some minor complications that were tackled individually whenever they occurred. In addition, a retrospective audit of the process of online curriculum delivery through a SWOT (strengths, weaknesses, opportunities, and threats) analysis was done. Several threats were identified and summarized by the end of the academic year with suggested enhancement actions [Table 1].

One of the most important identified threats was the ability to assess the skills and readiness of KSAU-HS faculty to competently deliver online curriculum that includes clinical and practical components. The second threat was the suitability of the university information technology infrastructure for the online curriculum delivery. The third important threat was the availability of suitable software and hardware that facilitate the increased demand on online health science curriculum delivery and assessment. The fourth threat was the ability to accommodate students' fears and anxiety while going through this sudden curriculum management shift and reassure them and reach adequate balance between their health protection and learning. Finally, the threat of being able to reach the minimum requirement of faculty and students training on online teaching and assessment responds to their questions and solve their problems. Similar to various international experiences with COVID-19,[7,15,21] the pandemic has mandated the implementation of major changes in the curriculum delivery, including cancelation of formal clinical teaching, cessation of clinical rotations, and postponing some examinations. Despite the considerable threats, several resourceful suggestions that were implemented in response to these challenges were medical education opportunities that were strongly recommended to persist even after the epidemic. Moreover, KSAU-HS has built on its prior experience in dealing with Middle East syndrome coronavirus (MERS-CoV), an outbreak that occurred in 2015, and led to shut down of King Abdulaziz Medical City-Riyadh, one of the largest health institutes in Saudi Arabia.[22] However, COVID-19 challenge was tougher as there was no total lockdown with MERS-CoV outbreak. The university replaced part of the hospital-based training with the clinical skills center training during this outbreak.

As COVID-19 pandemic is expected to continue during the academic year 2020–2021, KSAU-HS utilized its previous experiences in planning the next year curriculum delivery, taking into consideration the Saudi MOE precautionary guide for the curriculum delivery during the pandemic and the Saudi Ministry of Health precautionary instructions to deal with COVID-19 pandemic. In addition, the time available during summer holiday was utilized to sharpen the skills, expand on the positive obtained outcomes, and overcome obstacles.

A COVID-19 curriculum delivery working group was formulated and assigned the task of planning the curriculum delivery and student assessment for the academic year 2020–2021, keeping in mind students' safety and ensuring optimum curriculum delivery. The group has studied all the available resources and possible needs and challenges. It was agreed to maximize colleges' support and resource exchange to overcome the possible shortage of faculty and space, resulting from accommodating multiple small groups of students during teaching and assessment. The group

Table 1: Strengths, weaknesses, opportunities, and threats analysis of King Saud Bin Abdulaziz University for Health Sciences online curriculum delivery during the second semester of the academic year 2019-2020

Strengths	Weaknesses
Availability of a strong technical infrastructure in the university and colleges	Resistance to teaching and learning through digital platforms
Availability of various digital platforms that ensure the continuation of effective educational process	Time and effort consumed by the university faculty to prepare and deliver curriculum content as required
Availability of qualified faculty members	Clinical and practical skills remote teaching challenges
Quick response and cooperation of faculty members to shift from traditional to online education	Clinical and practical skills remote assessment challenges
Student interaction and attendance of virtual classes	Absence of online teaching and assessment academic regulations
Threats	**Opportunities**
High cost of educational tools when used on large scale	Online workshop/courses delivery among the university program
Technical difficulties faced by some faculty and students resulting from limited experience	Investing on alternative technologies that are suitable to the design of various curricula
Financial constraint and inequality of technical facility for some unfortunate students	Availability of virtual- and visual-reality techniques to teach some practical subject remotely
Difficult or inappropriate online practical skill teaching and assessment	Ability to collaborate with local and international academic programs
Difficult monitoring of educational process	Explore additional online teaching platforms for more innovative and effective educational approaches

has formulated its plan based on three pillars: curriculum delivery, assessment, and faculty skills enhancement.

Curriculum

The university colleges were given the responsibility of implementing several actions in preparation for the academic year 2020–2021 curriculum delivery, taking into consideration the utilization of hybrid delivery method that ensures maximum virtual learning components through innovative approaches that include practical components. Theoretical aspect of the curriculum is planned to be delivered mainly online, while it is strongly recommended to consider hybrid delivery of the practical aspect of the curriculum when were possible. On exceptional basis, a limited number of students will be allowed to attend practical and clinical training while adhering to the approved precautionary guide for students' protection from COVID-19 infection.

An administrative policy and procedure that governs this action was prepared and approved for administrative and students' use.[23,24] Overall, before allowing students to attend the university, the following main principles of precautions were set: to train students in small groups, to maximize simulation training, to expand curriculum delivery daily timing, and to search for suitable online tools to deliver and assess clinical objectives when possible. Mutual agreements between colleges and the counterpart departments in the hospital were executed to allow controlled students' attendance to selected clinical settings with the application of the needed protective measures. The Colleges Curriculum Committees were advised to endorse the detailed curriculum delivery and its assessment conduction plans to the Colleges' Council for approval before the beginning of the academic year to give the process appropriate governance.

Educational technology capacities were enhanced to meet the changes in educational requirements through increasing campuses' intranet speed and the learning management system capacity. As the challenges do extend throughout the world, the colleges were instructed to communicate with national and international universities for possible collaboration and exchange of experiences, taking into consideration students' and faculty feedback during the second semester of the academic year 2019–2020.

Students and faculty orientations on the curriculum delivery, assessment changes, and the precautionary measures to prevent the spread of the virus were planned. An obligatory online basic training program on COVID-19 prevention and precautions was established and located on the university website for all students use.[25]

Assessment

Continuous assessment influences and motivates students' learning. It creates positive competition atmosphere that drives them to study and enhance their education quality.[26,27] Therefore, the working group has decided to assign a proportion of 70% to continuous assessment with flexibility of plus and minus 10% to maximize its benefits. With the implementation of the precautionary steps, the students will be allowed to attend to the campus for the assessment purposes to improve on its objectiveness, while multiple assessment tools will be used to enhance assessment reliability.[28] Faculty training and the utilization of trusted assessment platforms are also available in case an online assessment has to be used.

Faculty development

Following the sudden implementation of online teaching, there was a noticeable gap between teachers' knowledge and skills on online teaching and the expected level of performance for online curriculum delivery.[7] Faculty development on online teaching offers a road map on how to accommodate online educational courses within the pandemic constraints, focusing on the need for innovation, communication, collaboration, and flexibility.[18] The working group has agreed on the need to orient the university faculty on the changes in curriculum and assessment delivery and their goals. Two-hour obligatory training program was designed, and its link was placed on the university website for all the university faculty to enhance their online teaching skills.[29] Series of lectures by international and local experts was planned to be conducted before the beginning of the academic year. The topics are focused on online curriculum delivery, online assessment, and use of educational technology, where faculty members were linked with the needed support to answer their educational faculty consultations.

De-escalation plan

Whenever the COVID-19 pandemic situation improves during the academic year 2020–2021, the de-escalation plan recommends continuing the theoretical component of the curriculum through online delivery. There will be gradual return of in-campus practical component as the situation improves. This gradual approach will allow re-escalation whenever there is a need. The contingency plan during the academic year 2020–2021 will continue till the pandemic status is cleared by the concerned governmental authorities.

Conclusion

COVID-19 pandemic has resulted in many challenges that were not only medical but also educational. The total country lockdown has stimulated a lot of creativity

and resulted in many initiatives that aimed to guide online delivery of health science colleges' curricula with minimum negative influences on educational outcomes and future population safety. The several initial actions that were taken by a specialized health science university administration have proven their effectiveness and have directed the 2020–2021 academic year planning. Further audit on the effectiveness and implication of these actions is required after the end of the pandemic.

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Conflicts of interest
There are no conflicts of interest.

References

1. Farooq F, Rathore FA, Mansoor SN. Challenges of online medical education in Pakistan during COVID-19 pandemic. J Coll Physicians Surg Pak 2020;30:67-9.
2. Ferrel MN, Ryan JJ. The impact of COVID-19 on medical education. Cureus 2020;12:e7492.
3. Al-Kadri HM, Al-Kadi MT, Van Der Vleuten CP. Workplace-based assessment and students' approaches to learning: A qualitative inquiry. Med Teach 2013;35 Suppl 1:S31-8.
4. Raymond-Hayling O. What lies in the year ahead for medical education? A medical student's perspective during the COVID-19 pandemic. Med Educ Online 2020;25:1781749.
5. Arowoshola L. Medical education engagement during the COVID-19 era-A student parents perspective. Med Educ Online 2020;25:1788799.
6. Liesman DR, Pumiglia L, Kemp MT, Alam HB. Perspectives from rising fourth year medical students regarding strategies to counteract the effects of COVID-19 on medical education. J Med Educ Curric Dev 2020;7:2382120520940659.
7. Ahmed H, Allaf M, Elghazaly H. COVID-19 and medical education. Lancet Infect Dis 2020;20:777-8.
8. Duong AT, Van Tassel SH, Alzaga Fernandez AG, Amin A, Chadha N, Dagi Glass LR, *et al*. Medical education and path to residency in ophthalmology in the COVID-19 Era: A perspective from medical student educators. Ophthalmology 2020;S0161-6420:30724-7.
9. Newman NA, Lattouf OM. Response to COVID-19 pandemic: Beyond medical education in Brazil. J Card Surg 2020;35:1176.
10. Bao W. COVID-19 and online teaching in higher education: A case study of Peking University. Hum Behav Emerg Technol 2020;2:113-5.
11. Krawiec C, Myers A. Remote assessment of video-recorded oral presentations centered on a virtual case-based module: A COVID-19 feasibility study. Cureus 2020;12:e8726.
12. Dutta A, Beriwal N, Van Breugel LM, Sachdeva S, Barman B, Saikia H, *et al*. YouTube as a source of medical and epidemiological information during COVID-19 pandemic: A cross-sectional study of content across six languages around the globe. Cureus 2020;12:e8622.
13. Pather N, Blyth P, Chapman JA, Dayal MR, Flack NA, Fogg QA, *et al*. Forced disruption of anatomy education in Australia and New Zealand: An acute response to the COVID-19 pandemic. Anat Sci Educ 2020;13:284-300.
14. Al Kadri HM, Al-Moamary MS, van der Vleuten C. Students' and teachers' perceptions of clinical assessment program: A qualitative study in a PBL curriculum. BMC Res Notes 2009;2:263.
15. Paltiel AD, Zheng A, Walensky RP. Assessment of SARS-CoV-2 screening strategies to permit the safe reopening of college campuses in the United States. JAMA Netw Open 2020;3:e2016818.
16. Wang ZH, Yang HL, Yang YQ, Liu D, Li ZH, Zhang XR, *et al*. Prevalence of anxiety and depression symptom, and the demands for psychological knowledge and interventions in college students during COVID-19 epidemic: A large cross-sectional study. J Affect Disord 2020;275:188-93.
17. Haque A, Mumtaz S, Khattak O, Mumtaz R, Ahmed A. Comparing the preventive behavior of medical students and physicians in the era of COVID-19: Novel medical problems demand novel curricular interventions. Biochem Mol Biol Educ 2020. doi: 10.1002/bmb.21406 [Epub ahead of print].
18. Hall AK, Nousiainen MT, Campisi P, Dagnone JD, Frank JR, Kroeker KI, *et al*. Training disrupted: Practical tips for supporting competency-based medical education during the COVID-19 pandemic. Med Teach 2020;42:756-61.
19. MOE. The Guide for Exam Arrangements, Evaluation and Semester Work for Universities during the Study Suspension Period to Prevent COVID-19 Infection. MOE, Saudi Arabia: MOE, Saudi Arabia; 2020. Available from: https://www.moe.gov.sa/_layouts/15/MOEResp/Guide_Exams_Evaluation_ArrangementsAr.pdf. [Last accessed on 2020 Aug 10].
20. van der Vleuten CP, Schuwirth LW, Driessen EW, Dijkstra J, Tigelaar D, Baartman LK, *et al*. A model for programmatic assessment fit for purpose. Med Teach 2012;34:205-14.
21. Clark J. Fear of SARS thwarts medical education in Toronto. BMJ 2003;326:784.
22. Balkhy HH, Alenazi TH, Alshamrani MM, Baffoe-Bonnie H, Arabi Y, Hijazi R, *et al*. Description of a hospital outbreak of Middle East respiratory syndrome in a large tertiary care hospital in Saudi Arabia. Infect Control Hosp Epidemiol 2016;37:1147-55.
23. Educational-Affair. Academic and Administrative Policy and Procedures for Precautionary Guide for Curricula Delivery during COVID-19 Pandemic. Riyadh, Saudi Arabia: KSAU-HS; 2020. Available from: https://ksau-hs.edu.sa/English/Deanships/Dqm/Documents/PRECAUTIONARY%20GUIDE%20FOR%20CURRICULUM%20DELIVERY%20DURING%20COVID-19%20PANDEMIC.pdf. [Last accessed on 2020 Aug 10].
24. Educational-Affair. Executive Plan for KSAU-HS Curricula Delivery during Academic Year 2020-2021. Riyadh, Saudi Arabia: KSAU-HS; 2020. Available from: https://ksau-hs.edu.sa/English/Deanships/Dqm/Documents/APPROVED%20CURRICULUM%20DELIVERY%20PLAN%20FOR%20AY%2020202021%20.pdf. [Last accessed on 2020 Aug 10].
25. Educational-Affair. Online Courses Platform for Students. COM-J: KSAU-HS; 2020 Available from: https://comj.ksau-hs.edu.sa/announcements/online-courses-platform/. [Last accessed on 2020 Aug 10].
26. Aftab MT, Tariq MH. Continuous assessment as a good motivational tool in medical education. Acta Med Acad 2018;47:76-81.
27. Priya M, Muthu MS, Amarlal D, Thomas E. Continuous assessment of undergraduate students at a dental college in India. J Dent Educ 2012;76:501-8.
28. Al-Kadri HM, Al-Moamary MS, Roberts C, Van der Vleuten CP. Exploring assessment factors contributing to students' study strategies: Literature review. Med Teach 2012;34 Suppl 1:S42-50.
29. Affair E. Online Courses Platform for Faculty. KSAU-HS: KSAU-HS; 2020. Available from: https://www.ksau-hs.edu.sa/Arabic/FacultyAndStaff/Pages/Platform_Faculty.aspx. [Last accessed on 2020 Aug 10].