Original Article

Returning in'new normal'– a thematic analysis of Twitter chat by pharmacy students

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ABSTRACT

This study qualitatively explored pharmacy students' views and concerns related to the return of educational activities with 'new normal' in the coming academic year. A one-hour Twitter chat was scheduled, inviting all pharmacy students in Saudi Arabia to participate. Six questions, following the validation and piloting, related to the pros and cons of online education, suggestions for online education, student support, socially distanced campus, hybrid campus, and long-term impact of online education in 'new normal' were posted during the chat. Following the chat, the responses were downloaded, closely scrutinized to remove any confidential information, and thematically analyzed using the inductive method by two teams of research students independently. During the chat, 162 responses were received. Thematic analysis generated 260 codes that were categorized into 13 subthemes. These subthemes were further broadly categorized into two main themes: 'online education in new normal' and 'hybrid campus in new normal'. The participants highlighted the limitations and advantages of online education they experienced during the lockdown period, which can be translated to the 'new normal' era. They also provided numerous suggestions about improving teaching techniques and restructuring the courses to facilitate better learning and understanding of the content for online education in 'new normal'. The participants also envisaged a hybrid campus with all the precautionary measures for the new academic year in 'new normal'. We expect that our findings and the recommendations will be helpful for pharmacy colleges to reform online education and implement a hybrid campus in the 'new normal' era.

Keywords: COVID-19, Hybrid campus, New normal, Online education, Twitter chat

Introduction

The first case of coronavirus disease 2019 (COVID-19) was reported to the World Health Organization (WHO) on 31st December 2019 by China [1]. In the Kingdom of Saudi Arabia (KSA), the first case was reported by the Ministry of Health on 2nd March 2020 [2]. Before it was declared a pandemic by WHO on 11th March 2020 [3], Ministry of Education in KSA announced the suspension of all educational institutes from 8th March 2020 until further notice to prevent the disease spread. The ministry simultaneously announced that virtual or distance learning should continue during the suspension [4].

COVID-19 is essentially a global health crisis. However, it has impacted all walks of life thus far across the world, including the education sector. In KSA, there was limited to full lockdown in the majority of the cities for approximately three months, which affected the latter half of the second semester of the academic year 2019-2020, followed by the early start of the summer break in Saudi educational institutes. This forced the teaching and assessment to move online. Staff members, whether trained or not, students whether well equipped to adopt the technology or not, were all affected by this unprecedented situation. In

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universities, teaching was continued online using numerous learning management systems. Several original assessment plans were canceled and replaced by new assessment plans. A global survey on the 'impact of COVID-19 on higher education around the world' conducted by the International Association of Universities concluded that there are substantial differences in the way this COVID-19 crisis has affected higher education in different regions of the world [5].

A pharmacy degree is unique in higher education. It demands a variety of teaching and assessment methods, from didactic teaching and tutorials to practicals and workshops to help develop the required skills and competencies in the students [6-8]. It also involves training and assessment of students related to interaction with patients and other healthcare professionals [9]. Not all methods can be easily shifted online – several changes have been adapted in the courses to best meet the learning outcomes and in the best interest of students.

The pandemic has propelled us into the 'new normal' of social distancing, disrupting face-to-face education. COVID-19 may subside or disappear sooner or later. However, the practice of social distancing will remain in place for a few years to prevent subsequent waves of the pandemic. The impact of this shift will have long-term consequences on education. We are currently unsure how the first semester will be conducted in the coming academic year, whether completely online or a hybrid approach will be taken. It is imperative to investigate how pharmacy students perceive their education in the coming academic year as they have already experienced the impact of the suspension of on-campus activities on their learning as well as the practice of social distancing due to the pandemic in the campus may have a long-term effect on their career. This study aimed to qualitatively explore pharmacy students' views and concerns related to the return of educational activities with 'new normal' in the coming academic year.

Materials and Methods

Since Twitter is one of the most popular and widely used social media platforms, especially among the students and the youngsters in KSA [10, 11], we employed qualitative methodology in our study, grounded in the constructivist paradigm [12], utilizing Twitter. We created a specific Twitter account (@TChatResearch) for this purpose and planned a Twitter chat using this account to collect the data from pharmacy students in KSA. This study was reviewed and approved by the Intuitional Review Board (IRB) of our university (Approval number: HAPO-02-K-012-2020-06-400).

Prior to the chat, a team of one academic staff member and six research students developed six questions for the Twitter chat. These questions, presented in **Table 1**, covered a wide range of aspects related to the return of educational activities in the coming academic year, given the social restrictions. The questions were then checked for accuracy and validity by another two academic staff members. The questions were translated from English into the Arabic language, and the translation was checked by another experienced bilingual academic staff member. The questions were piloted with another three students, in both the languages and minor adjustments were made in the wording.

Table 1. Questions Used in the Twitter Chat

Topics	Questions
Pros and cons of online education	1. Do you think online education will still be useful in the future? If YES, how? (what else can be done to improve online education) If NO, why? (what can be done to improve online education)
Suggestions for online education	2. In the next academic year, semester I, if the university still has suspension of on-campus activities, what would you like to keep the same, and what changes would you like to see/make regarding online education?
Student support	3. In the next academic year, semester I, if the university still has suspension of on-campus activities, what support would you like to have from the university and the university doctors regarding online education?
Socially distanced campus	4. In the next academic year, semester I, if the university reopens the campus, how would you like to see the 'socially-distanced campus' (i.e. what changes you would like to see on the campus, in the class and labs, libraries, cafeterias, etc. regarding social distancing and other health protection measures)?
Hybrid campus	5. What is your opinion about 'hybrid campus' (i.e. a mix/blend of online education and on-campus activities)? Anything you would like to suggest to develop a 'hybrid campus'?
Long-term impact	6. Finally, how do you think the global COVID-19 crisis will affect pharmacy education in the long run?

One-hour Twitter chat was announced and promoted on the Twitter account three weeks before the chat, followed by several reminders and retweets. Several pharmacy Twitter accounts, popular among pharmacy students in KSA, were requested for the retweets inviting the Saudi pharmacy students to participate in the chat. To encourage and maximize participation, an incentive of a bookstore voucher worth 100 Saudi Riyal was also announced for one participant to be selected

by draw after the chat. Five days prior to the chat, a link to the 'participation information' sheet was posted on the Twitter account, which contained a summary of the study with the introduction of the researchers; study aim and objectives; how the data would be collected and utilized; who to contact should the participants had any concern about the study. Two days prior to the chat, a set of detailed rules and instructions about how to participate in the chat **(Figure 1)** was posted on the Twitter account and retweeted by several other accounts. To maintain confidentiality, the participants were requested not to identify any individual or specific incident during the chat in any way. The participants also had the choice to reply in the private message or as a direct message (DM) to the Twitter account if they had a concern about disclosing their identity.

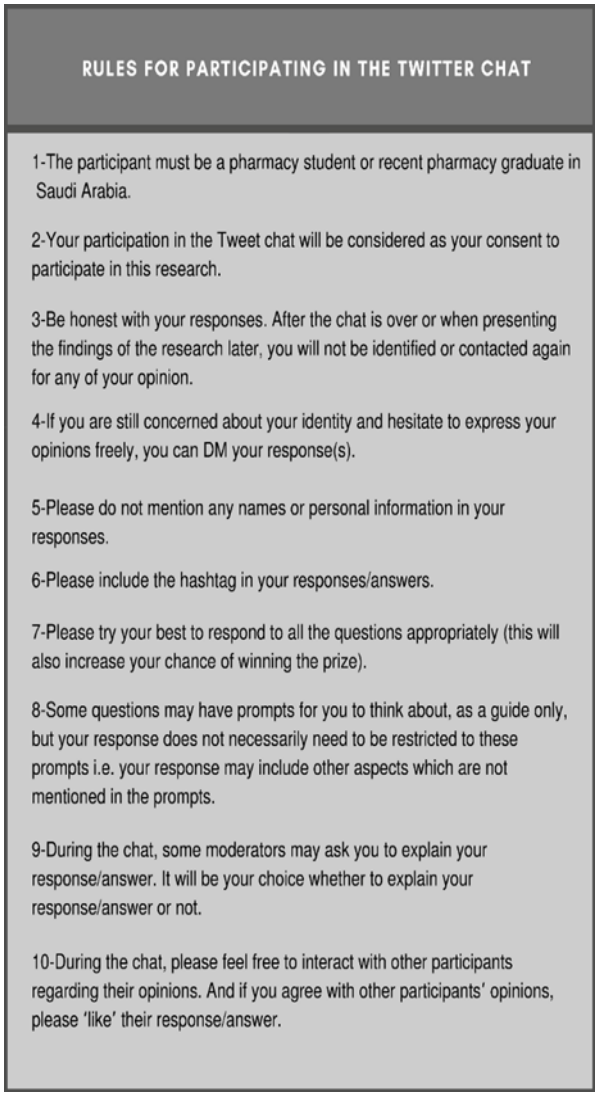

Figure 1. Rules for Students to Participate in the Twitter Chat

The Twitter chat, with a particular hashtag #TCR_LIVE, was conducted on 1st July 2020 at 10 pm. The questions were posted in both languages and the participants had the choice to reply in either of these languages to each question. The chat started with the first question, and the subsequent questions were posted every 10 minutes to allow the participants to tweet their responses. The chat was moderated by two research students who also probed the participants appropriately as required during the chat.

Following the chat, the responses were downloaded as a full transcript for thematic analysis. Participants' identities were removed for anonymity. The transcript was closely scrutinized to remove any confidential information that could be attributed to any particular individual or incident. We also aimed to eliminate irrelevant responses, and wherever there would be a doubt that the respondent was not a pharmacy student from KSA; however, this was not required.

Thematic analysis, using the inductive method, of the data (participants' responses) was conducted independently by two teams of student researchers. The process included familiarization of the data, generation of codes, categorization of codes into subthemes, and then the themes. Any discrepancies were resolved through discussion between the teams. Codes, subthemes, and themes were then further reviewed and modified by the research supervisor in discussion with the teams. Since specific questions were posted by the moderators during the chat, these questions provided 'a priori' subthemes, which further facilitated the process of thematic analysis. Additional subthemes were also identified.

Results and Discussion

During the chat, a total of 162 responses were received. The number of responses received for each question slightly varied and is presented in **Table 2**. The majority of the participants responded in the Arabic language. For each question, approximately less than half of the responses were received as DM to the Twitter account. Thematic analysis generated 260 codes (87 were derived from the responses received as DM), which were categorized into 13 subthemes. These subthemes were further broadly categorized into two main themes namely, 'online education in new normal' and 'hybrid campus in new normal'. These themes with the corresponding subthemes are listed in **Table 3**.

Table 2. Number of Codes Generated and Number of Responses Received for Each Question

Question number [a]	Number of responses	Number of codes generated
Question 1	30	60
Question 2	28	49
Question 3	23	30
Question 4	27	67
Question 5	28	38
Question 6	26	16

[a] Corresponding to the questions presented in **Table 1**

Table 3. Themes and Subthemes (with Number of Corresponding Codes) Derived from Participants' Responses

Themes	Subthemes	Number of related codes
Online education in 'new normal'	Limitations of online education	9
	Advantages of online education	17
	Suggestions for improving teaching techniques	13
	Suggestions for the restructuring of courses	26
	Suggestions for improving the overall online learning experience	26
	Supporting the students in online education	28
	Technical issues	10
	What should continue in 'new normal'	5
	Long-term impact of continued online education	13
Hybrid campus in 'new normal'	Suggestions for hybrid campus education	47
	Precautionary measures for classrooms	15
	General precautionary measures in hybrid campus	46
	Challenges for hybrid campus	5

We color-coded the codes and subthemes for the purpose of data visualization and found no major difference in the codes generated from the responses received as DM and those received in the main thread during the chat. The themes with the corresponding subthemes are discussed in the next section.

Content analysis of tweets has been used in healthcare for research purposes before [13], however, the organization of Twitter chat specifically for the purpose of the research is uncommon [14]. Our study, using the Twitter chat, allowed the pharmacy students to participate from all over the country while partial lockdown was still in place. The students being keen to see how their education will be affected in the 'new normal' were found to be very encouraged to participate eagerly in the chat. 'New normal' is defined by the Urban Dictionary as, *'The current state of being after some dramatic change has transpired. What replaces the expected, usual, typical state after an event occurs. The new normal encourages one to deal with current situations rather than lamenting what could have been'* [15]. In this section, we discuss our findings from the chat in the context of available literature.

The online education in 'new normal'

While the pharmacy colleges are preparing for late-COVID-19 or post-COVID-19 period characterized by 'new normal', it is imperative to capitalize on the lessons we have learned from the early suspension of on-campus activities or lockdown. Several participants in their responses accentuated the limitations and advantages of online education they experienced during the lockdown period, which can be translated to the 'new normal' era. The participants drew attention to the fact that online education is not suitable for healthcare courses that require hands-on practical skills. They also mentioned that face-to-face interaction and discussions could not be equally substituted by online education. This can partly be due to the limitations of and lack of engagement with the learning management system. One participant even commented that 'online lectures are boring and not interactive'. This mainly depends on the teaching method adopted by educators. Moreover, Dumford and Miller reported in the findings of a national survey about student engagement that the students are relatively less engaged in the online environment as compared to the traditional classrooms [16]. Several students also highlighted the technical issues related to learning management systems and poor internet connections, which can disrupt the learning [17]. Many of these limitations and technology issues can be attributed to the lack of preparedness, which caught the education system off guard in the pandemic [18].

The participants highlighted that online education is not only safer due to the pandemic but also time-saving and cost-saving as it saves the traveling to the university campus. The time saved can be wisely spent on concentrating on the studies. The participants mentioned that communication with the academic staff and fellow students is quicker and easier. This can be attributed to technology and widely available communication mobile and computer applications. Since online education relies on technology, the participants highlighted that it significantly improves computer and technical skills. This also strengthens self-learning and self-efficacy in the students [19]. The participants did not mention whether or how online education can impact their knowledge and skills. However, Pei and Wu concluded from their systematic review and meta-analysis that online learning in higher education can significantly improve the knowledge and skills outcomes in undergraduate students as

compared to offline learning [20]. However, this is much dependent on course design and delivery. The participants also acknowledged that despite all the difficulties, the educators made all the efforts to be fair with assessments and modified marks distributions and were successful in creating challenging educational activities that can be continued in 'new normal'. Therefore, despite its limitations that can be overcome by addressing the concerning technical issues, careful designing of the curriculum and courses, and modifying the teaching methods, online education can still offer advantages for students' learning in 'new normal'.

The participants provided specific suggestions about improving teaching techniques to facilitate better learning and understanding of the content for online education in 'new normal'. These included more frequent use of whiteboard feature in LMS, the use of video camera feature to enable visual communication between the students and the academic staff, variation in voice tone during the online lectures, and including small and frequent quizzes within the teaching sessions to enhance student interaction and maintain concentration. They also mentioned that providing references and extra resources for lectures, practicals, and assignments would be very helpful. The widespread availability of technology to the millennial generation of our students has increased their expectations from the academic staff in the context of online teaching in 'new normal'. Although online teaching shares some techniques and features with traditional teaching, it has some unique attributes due to which the academic staff must rethink their roles and teaching techniques in the shifting paradigm of online education [21-25].

The participants also provided numerous suggestions about improving the courses and the overall learning in 'new normal'. They suggested that it would be helpful if the course guides are prepared and made available to students well in advance so that the students can plan their activities. The participants also recommended that lecture timetables and marks distribution should be made clear and adhered to. Avery *et al*. iterated that the 'clear articulation of course mechanics' is one of the best practices for online education [26]. Notably, some participants mentioned that the examinations should be replaced by thought-provoking educational activities and assignments in the courses. The educators, however, must ensure that the critical thinking activities designed to replace the examinations are still able to achieve the course learning outcomes with appropriate pedagogical considerations. This is aligned with the description by Schnetter *et al*. who mentioned that the course development for online education should encompass 'five pillars of online education' identified by Lorenzo and Moore [27, 28]. These pillars include learner effectiveness, student satisfaction, faculty satisfaction, cost-effectiveness, and access. Moreover, Benner *et al*. suggested four features for designing effective learning activities: '(1) build on what has already been learned, (2) guide thinking by posing questions relevant to patient situations, (3) allow for ideas related to approaches and possible complications to be expressed, (4) guide reflection on practice' [27, 29], which can be relevant for redesigning courses in 'new normal'. One of the other suggestions, which were highlighted in the participants' responses for modifying courses in 'new normal' was reducing the content, including the number of lectures and assignments, in the courses. Cahapay argued that it is possible to adopt the integration of content and reduce the number of course hours while still achieving the program outcomes for online education in 'new normal' without compromising the essential learning [2]. Moreover, Fogarty and Stoehr presented a range of integration models in their work that the educators can explore to reduce the curriculum content and thus the stress for students in this unprecedented time [30].

The participants suggested that the overall online education experience in 'new normal' can be greatly enhanced by improving the learning management system (LMS). They also opined that the academic staff as well as the students should be provided with holistic training about how to use an LMS and informed about its limitations. LMS is the core of online learning and courses. No matter how good LMS may be, information about its technical features has an impact on its effective use by the users. It is the effective use of LMS along with sound pedagogy and relevant content that helps the students meet the learning outcomes of the course [31, 32]. It should also be noticed that LMS is only a supplementary tool and not a substitute for good teaching [33]. One participant also mentioned that alternative LMS should also be considered if one LMS does not provide feasible features for a particular learning activity. Online education hinges around good and frequent communication between learners and educators [34]. The participants in our study alluded to the fact that improving communication will be a key feature for online education in 'new normal'. The majority of the participants in our study seemed to favor providing recorded lectures to the students. Some mentioned that 'live' lectures should be recorded, and the recordings should subsequently be available to the students for revision. This certainly is feasible for students and is likely to lead to high student satisfaction with the courses [35]; however, educators should consider this carefully. Leadbeater *et al*. reported in the findings of a survey that this approach is beneficial for students but may affect the attendance in 'live' lectures and encourage 'surface learning' in some students [36].

A critical factor that determines the success of online education is student engagement, which in turn is achieved by support provided to the students [37]. The participants put forward numerous ideas regarding how the students can be better supported in 'new normal' by the university and the academic staff. Improving communication between the students and the academic staff and the teaching techniques were highlighted again in this regard. Additionally, allowing students to raise personal and academic concerns was also echoed in several responses. They also suggested that the academic staff be more flexible and considerate towards the students to ease the pressure on the students. The shift in the education paradigm in the 'new normal' will indeed affect education and training in one way or the other.

The participants raised this concern and mentioned that internships, summer training, practicals, and workshops will never be the same again in 'new normal' and this may have a long-term impact on the competency of the graduates.

The hybrid campus in 'new normal'

Similar to other healthcare curricula, the pharmacy curriculum also relies on face-to-face training, practicals, and workshops for competency development which cannot be easily accommodated by online platforms in many instances. This was echoed in the participants' responses in our study, as mentioned above. Moreover, as we know that COVID-19-induced 'new normal' is characterized by social distancing, the educational activities requiring the physical presence and face-to-face interactions will be a challenge for the pharmacy colleges. The educational institutes should commence considering the methods about how such activities will be dealt with. One way is to adapt to a hybrid campus, which can be defined as a combination of online education supplemented by the on-campus educational activities, which cannot be efficiently substituted virtually. This has also been referred to as a blended learning approach in the literature [38-40]. Social distancing will be a hallmark of the on-campus activities in 'new normal'. Skulmowski has described the strategy of a hybrid campus for this and the potential future emergencies [41].

The participants in our study provided numerous suggestions for modifying educational approaches and adopting precautionary measures to cope with a hybrid campus. The recurring notions in their responses regarding educational approaches were: continue conducting theoretical lectures with LMS support supplemented by on-campus practicals or workshops; condense the course contents to reduce time, effort, and stress; academic staff should be able to assess which educational activities can be conducted online and which activities require students' physical presence at the college campus; conduct the examinations on-campus; live-stream the lectures from the college campus allowing students to choose whether to attend online or on-campus. Successful healthcare education is multifactorial, which should combine blended learning or flipped classroom approaches to best achieve the program outcomes, especially in the context of a hybrid campus [42, 43].

The participants envisaged the hybrid campus or socially distanced campus, mentioning that keeping the social distance of at least one meter between the individuals and other precautionary measures must be mandatory. According to them, these can be achieved by wearing gloves and masks, placing hand sanitizers in building corridors, raising awareness among students and academic staff regarding social distancing, fining the individuals who do not maintain social distancing, removing dine-in tables and chairs from cafeterias, placing signs and stickers on the ground to facilitate social distancing, reducing the exchange of papers between students and academic staff, measuring the body temperature upon entering the college buildings and taking measures to minimize the gatherings. Regarding maintaining social distancing and precautionary measures particularly in classrooms or laboratories, the participants suggested to reduce the number of students in each class by dividing them into groups and repeat the teaching sessions; to reduce the time of teaching sessions for minimizing the duration of gatherings; to distribute the teaching sessions over a week to allow appropriate and regular sanitization of classrooms and laboratories. Many of these suggestions have been reflected by Diep and Zahneis about university campuses in 'new normal' [44]. Albeit these suggestions, the students also mentioned that it would be a challenge to maintain social distancing and sterilize some of the laboratory equipment. Moreover, they also apprehended that a hybrid campus in 'new normal' will not be completely safe as the pandemic is still active. Fulford *et al*. have further provided a comprehensive list of issues that pharmacy colleges should consider in this regard [45].

Limitations

Due to our study's innovative nature, we could only find limited relevant literature to compare our findings. Due to the removal of all the confidential information, we were unable to infer whether there was any difference in codes and subthemes that originated from the male and female students as well as the students from different universities of KSA.

Recommendations

The recommendations drawn from our findings are presented in the Appendix. They may not be holistic as these are only based on the findings of this study.

Conclusion

COVID-19 pandemic is continuing to reform our lives as well as the education system. Keeping the students' interest, perspective, and safety at the core of the pharmacy education system, our study presented the pharmacy students' opinions and suggestions about reshaping their education in the 'new normal' era induced by the pandemic. The students reflected on how the online education system can be adapted for 'new normal' and how they envisaged a hybrid campus in 'new normal' should the institutions decide to open completely or partially in the coming academic year. We expect that our findings and the recommendations will help the pharmacy colleges restructure online education and implement a hybrid campus in the 'new normal' era. Pharmacy colleges will, however, need to ensure that pedagogical standards are not compromised during the process. Further research would be required to determine the impact of changes implemented in 'new normal' on pharmacy students' knowledge, skills, and attributes.

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References

1. World Health Organization. Novel coronavirus. Situation report -1. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf?sfvrsn=20a99c10_4. Published 2020. Accessed July 20, 2020.
2. Ministry of Health (MOH). MOH news. MOH reports first case of coronavirus Infection. Available from: https://www.moh.gov.sa/en/Ministry/MediaCenter/News/Pages/News-2020-03-02-002.aspx. Published 2020. Accessed July 20, 2020.
3. World Health Organization (WHO). WHO coronavirus disease (COVID-19) dashboard. Available from: https://covid19.who.int. Published 2020. Accessed July 20, 2020.
4. Reuters World News. Saudi Arabia suspends schools, universities over coronavirus fears. Available from: https://www.reuters.com/article/us-health-coronavirus-saudi/saudi-arabia-suspends-schools-universities-over-coronavirus-fears-idUSKBN20V0YO. Published 2020. Accessed July 20, 2020.
5. Marinoni G, van't Land H, Jensen T. The impact of covid-19 on Higher education around the world. International Association of Universities. Available from: https://www.iau-aiu.net/IMG/pdf/iau_covid19_and_he_survey_report_final_may_2020.pdf. Published 2020. Accessed July 20, 2020.
6. Accreditation Council for Pharmacy Education (ACPE). Accreditation standards and key elements for the professional program in pharmacy leading to the doctor of pharmacy degree ("Standards 2016"). Available from: https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf. Published 2015. Accessed July 22, 2020.
7. Arshad S, Aslam R, Tufail HM, Alvi AM, Anwar F, Sajjad M. A survey of self medication with dietary supplements among pharmacy students of Punjab, Pakistan. Pharmacophore. 2017;8(5):10-7.
8. Hasan SS, Chong DW, Se WP, Kumar S, Ahmed SI, Mittel P. Simulation-based instruction for pharmacy practice skill development: A review of the literature. Arch Pharma Pract. 2017;8(2):43-50.
9. James P, Jamshed S, Elkalmi R, AlShami A, Nor A, Kabir F, et al. Causes of stress and management approaches among undergraduate pharmacy students: findings from a Malaysian public university. Arch Pharma Pract. 2018;8(4):109-15.
10. Global Media Insight (GMI) Blog. Saudi Arabia social media statistics 2019. Available from: https://www.globalmediainsight.com/blog/saudi-arabia-social-media-statistics/. Published 2019. Accessed July 22, 2020.
11. AlGhamdi M, Khan M. Intelligent analysis of Arabic tweets for detection of suspicious messages. Arab J Sci Eng. 2020;45(8):6021-32. doi:10.1007/s13369-020-04447-0
12. Kim B. Social constructivism. In M. Orey (Ed.), Emerging perspectives on learning, teaching, and technology. Available from: http://relectionandpractice.pbworks.com/f/Social+Constructivism.pdf. Published 2001. Accessed July 23, 2020.
13. Talbot C, O'Dwyer S, Clare L, Heaton J, Anderson J. How people with dementia use twitter: A qualitative analysis. Comput Human Behav. 2020;102:112-9. doi:10.1016/j.chb.2019.08.005
14. Richardson J, Grose J, Nelmes P, Parra G, Linares M. Tweet if you want to be sustainable: a thematic analysis of a Twitter chat to discuss sustainability in nurse education. J Adv Nurs. 2016;72(5):1086-96. doi:10.1111/jan.12900
15. Urban Dictionary. New normal. Available from: https://www.urbandictionary.com/define.php?term=New%20normal. Published 2009. Accessed July 24, 2020.
16. Dumford A, Miller A. Online learning in higher education: exploring advantages and disadvantages for engagement. J Comput High Educ. 2018;30(3):452-65. doi:10.1007/s12528-018-9179-z
17. Al-Dosari SH, Al-Drees A, Al-Qahtani FS, Alajji NA, Al-Qahtani AA. Virtual Patient as A Multimedia Learning Tool to Help Students Learn Clinical Reasoning Skills in Medicine. Int J Pharm Res Allied Sci. 2017;6(4):88-94.
18. Cahapay M. Rethinking education in the new normal post-COVID-19 era: A curriculum studies perspective. Aquademia. 2020;4(2):ep20018. doi:10.29333/aquademia/8315
19. Brown I. Individual and technological factors affecting perceived ease of use of web-based learning technologies in a developing country. Electron J Inf Syst Dev Ctries. 2002;9(1):1-15. doi:10.1002/j.1681-4835.2002.tb00055.x
20. Pei L, Wu H. Does online learning work better than offline learning in undergraduate medical education? A systematic review and meta-analysis. Med Educ Online. 2019;24(1):1666538. doi:10.1080/10872981.2019.1666538

21. Keengwe J, Kidd T. Towards best practices in online learning and teaching in higher education. J Online Learn Teach. 2010;6(2):533-41.
22. Johnson A. A nursing faculty's transition to teaching online. Nurs Educ Perspect. 2008;29(1):17-22.
23. Panda S, Mishra S. E-Learning in a Mega Open University: Faculty attitude, barriers and motivators. EMI Educ Media Int. 2007;44(4):323-38. doi:10.1080/09523980701680854
24. Kurzweil D, Marcellas B. The faculty - Instructional designer dyad. In Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications. Chesapeake, VA: AACE; 2008:3445-6.
25. Lee J, Busch P. Factors related to instructors' willingness to participate in distance education. J Educ Res. 2005;99(2):109-15. doi:10.3200/joer.99.2.109-115
26. Avery M, Cohen B, Walker J. Evaluation of an online graduate nursing curriculum: examining standards of quality. Int J Nurs Educ Scholarsh. 2008;5(1):1-17. doi:10.2202/1548-923x.1538
27. Schnetter V, Lacy D, Jones M, Bakrim K, Allen P, O'Neal C. Course development for web-based nursing education programs. Nurse Educ Pract. 2014;14(6):635-40. doi:10.1016/j.nepr.2014.06.007
28. Lorenzo G, Moore J. The Sloan Consortium report to the nation: Five pillars of quality online education. The Sloan Consortium; 2002.
29. Benner P, Suthphen M, Leonard V, Day L. Educating nurses a call for radical transformation. San Francisco, Calif.: Jossey-Bass; 2010.
30. Fogarty R, Stoehr J. Integrating curricula with multiple intelligences. Teams, Themes, & Threads. K-College. Palatine, IL: Skylight Publishing, Inc; 1991.
31. Carmean C, Haefner J. Mind over matter: transforming course management systems into effective learning environment. Educ Rev. 2002;37(6):26-34. Available from: https://er.educause.edu/articles/2002/1/mind-over-matter-transforming-course-management-systems-into-effective-learning-environments. Published 2002. Accessed July 24, 2020.
32. Vrasidas C. Issues of pedagogy and design in e-learning systems. In: 2004 ACM symposium on applied computing. 2004:911-4.
33. Barron A. Course management systems and online teaching. J Comput High Educ. 2003;15(1):128-42. doi:10.1007/bf02940856
34. Gunawardena C, Lowe C, Anderson T. Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. J Educ Comput Res. 1997;17(4):397-431. doi:10.2190/7mqv-x9uj-c7q3-nrag
35. Taplin R, Low L, Brown A. Students' satisfaction and valuation of web-based lecture recording technologies. Australas J Educ Technol. 2011;27(2). doi:10.14742/ajet.964
36. Leadbeater W, Shuttleworth T, Couperthwaite J, Nightingale K. Evaluating the use and impact of lecture recording in undergraduates: Evidence for distinct approaches by different groups of students. Comput Educ. 2013;61:185-92. doi:10.1016/j.compedu.2012.09.011
37. Volery T, Lord D. Critical success factors in online education. Int J Educ Manag. 2000;14(5):216-23. doi:10.1108/09513540010344731
38. Huang R, Ma D, Zhang H. Towards a Design Theory of Blended Learning Curriculum. In: Fong J, Kwan R, Wang F, ed. Hybrid Learning And Education (Ed.). Berlin, Heidelberg: Springer; 2008. pp. 66-78. Available from: https://link.springer.com/chapter/10.1007/978-3-540-85170-7_6#citeas. Published 2008. Accessed July 25, 2020.
39. Norberg A, Dziuban C, Moskal P. A time-based blended learning model. On the Horizon. 2011;19(3):207-16. doi:10.1108/10748121111163913
40. Graham C. Emerging practice and research in blended learning. In: Moore M, ed. Handbook of distance education. 3rd ed. New York: Routledge; 2013. pp. 333-50.
41. Skulmowski A, Rey G. COVID-19 as an accelerator for digitalization at a German university: Establishing hybrid campuses in times of crisis. Hum Behav Emerg Technol. 2020;2(3):212-6. doi:10.1002/hbe2.201
42. Chick RC, Clifton GT, Peace KM, Propper BW, Hale DF, Alseidi AA, et al. Using technology to maintain the education of residents during the covid-19 pandemic. J Surg Educ. 2020;77(4):729-32. doi:10.1016/j.jsurg.2020.03.018
43. Ahmed H, Allaf M, Elghazaly H. COVID-19 and medical education. Lancet Infect Dis. 2020;20(7):777-8. doi:10.1016/s1473-3099(20)30226-7
44. Diep F, Zahneis M. Welcome to the socially distanced campus. Chron High Educ. 2020. Available from: https://www.chronicle.com/article/Welcome-to-the-Socially/248850?cid=gen_sign_in&cid2=gen_login_refresh. Published 2020. Accessed July 25, 2020.
45. Fulford M, Lebovitz L, Ray M, Wallace J, Henson B, Smith K. PharmD students cope with transitions in the wake of the COVID-19 pandemic. Pharmacy Times. Available from: https://www.pharmacytimes.com/news/pharmd-students-cope-with-transitions-in-the-wake-of-the-covid-19-pandemic. Published 2020. Accessed July 25, 2020.

Appendix: Recommendations from the study regarding online education and hybrid campus in 'new normal' (for academic staff and institutional authorities).

Note that these recommendations are based on the data (students' views) collected in this study via Twitter chat.

For the academic staff:

1. Consider reducing or condensing the content (number of lectures/practicals/workshops/learning activities/assignments), at the course and/or curriculum level to reduce stress on the students during the pandemic. However, this must be conducted without compromising the learning outcomes and pedagogical and accreditation standards.
2. Prepare the course guides well in advance and make them available to the students.
3. The course guides should have timetables and information about learning activities clearly laid out with fair marks distribution. This must be adhered to by the course coordinator and the teaching staff throughout the semester wherever possible.
4. Design the learning activities and assignments that encourage and develop critical thinking and deep learning among the students instead of only memorizing the knowledge or surface learning, with appropriate pedagogical considerations.
5. Theoretical lectures can be conducted online, or pre-recorded lecture videos may be provided to the students.
6. Explore and utilize ways to make the online theoretical lectures more engaging and interactive (e.g. use frequent small quizzes, change voice tone, etc.).
7. Provide recordings of 'live' sessions to the students for revision via the learning management system (LMS).
8. Consider conducting practicals or workshops at the campus with all the precautionary measures (please see below), to maintain face-to-face human interaction intact to some extent.
9. The academic staff, as well as the students, should receive comprehensive training (or the instructional videos) about the different features and limitations of the LMS the institution is employing.
10. Should the limitation of LMS hinder any educational activity, other online platforms must be considered wherever possible.
11. Conducting online sessions is safer for the academic staff and the students and can save students traveling time and money during the pandemic. The academic staff must advise students to utilize their time saved in this manner wisely.
12. Use the video camera feature of LMS in online sessions wherever possible to encourage engagement and visual communication between the academic staff and the students.
13. Use the whiteboard feature of LMS in online sessions wherever possible for a better explanation of the complex learning concepts.
14. Provide extra references or resources for lectures, practicals, and assignments to the students wherever possible.
15. When/if on campus, reduce the number of students in each class by dividing them into groups and repeat the teaching sessions.
16. When/if on campus, reduce the time of teaching sessions for minimizing the duration of gatherings.
17. When/if on campus, consider distributing the teaching sessions over a week to allow appropriate and regular sanitization of classrooms and laboratories.
18. Maintain prompt and frequent communication with the students at all times throughout the semester.
19. Be more flexible and considerate towards the students to ease the pressure on the students during the pandemic wherever possible.
20. Special consideration should be given to experiential education. Modify the learning outcomes and/or the educational activities wherever possible in the best interest of the students' safety without compromising pedagogical and accreditation standards.

For the institutional authorities:

1. Consider employing/shifting to the LMS that best suits the requirements of the students' degree programs and learning needs or consider enhancing the features/resolving technical issues of the existing LMS.
2. Provide the academic staff as well as the students appropriate comprehensive training and/or instructional videos about the different features and limitations of the LMS the institution is employing.
3. In addition to the LMS, signpost the academic staff to other learning and communication platforms in order to enhance their teaching and learning experience.
4. Shifting to a completely online model may not be suitable for all healthcare degree programs. Allow the academic staff, at their discretion, to arrange on-campus activities wherever online learning cannot substitute effectively.
5. Make arrangements for conducting examinations at the campus.
6. Employ all precautionary measures at the campus to prevent the spread of the disease during the pandemic.
7. Measure the body temperature of all the individuals upon entering the college buildings.
8. Wearing masks inside the buildings must be mandatory.
9. Place hand sanitizers at the building entrance and in building corridors.
10. Prohibit or reduce the exchange of papers between the students and the academic staff.
11. Take all the measures to encourage and maintain social distancing and avoid gathering everywhere on the campus.
12. Raise awareness among the students and the academic staff regarding social distancing.
13. Place signs and stickers on the ground/floors to facilitate social distancing.

14. Remove dine-in tables and chairs from cafeterias.
15. Consider the financial penalty for individuals who do not maintain social distancing at the campus.
16. Limit the number of students who can be in each classroom or laboratory at one time, instructing the academic staff to divide the students into groups and repeat the teaching sessions.
17. Libraries should only be open for borrowing and returning the books/educational material. Consider offering a limited sitting area in libraries with all the precautionary measures.
18. Reduce the time of teaching sessions for minimizing the duration of gatherings in and outside the classroom.
19. Consider cleaning and/or sanitizing classrooms and laboratories after each session.
20. Instruct the academic staff to consider distributing the teaching sessions over a week to allow appropriate and regular sterilization of classrooms and laboratories.