Impact of COVID-19 on Academic Activities of Final Year Nursing Students in Zambia: Evidence from Zambia

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Research Article

Abstract

Background: The novel coronavirus disease 2019 (COVID-19) has had many impacts on the education sector. The pandemic has had negative impacts on the academic activities of nursing students globally. Therefore, we assessed the impact of the COVID- 19 on the academic activities of final year nursing students in Lusaka and Mufulira Districts of Zambia.

Materials and methods: This was a cross-sectional study that employed quantitative methods using a structured questionnaire among 196 final year nursing students. Data were analysed using the Statistical Package for Social Sciences (SPSS) version 21.

Results: A female predominance (67.9%) and a response rate of 95.14% were achieved. Many students strongly agreed (32.7%) and agreed (20.4%) that they did not complete their course work resulting in some concepts being poorly taught, 86.1% strongly agreed that they had delayed final examinations, and 51.5% strongly agreed that they did not do their clinical attachments. Students strongly disagreed (40.3%) that the e-library and wireless facilities in their school were well-stocked. Hence, this resulted in some students (40.3%) missing class lessons and assessments.

Conclusion: The COVID-19 epidemic has negatively affected the academic activities of nursing students in Zambia. Ministries responsible for education must put in place measures that will mitigate the impact of COVID-19 on the education sector. Schools must adapt to the changes in the way of conducting learning and assessment sessions. Finally, schools must improve on their e-library and wireless facilities to effectively support online learning.

Introduction

The ongoing novel coronavirus disease (COVID-19) pandemic emerged from China in 2019 [1]. COVID-19 is a respiratory tract disease that is transmitted from person to person through droplets from an infected person who coughs or sneezes [2, 3]. The pandemic has caused a lot of economic and education instability throughout the world [4, 5]. Therefore, this has resulted in extraordinary measures to contain the pace or reduce the impact of COVID-19 [6, 7]. The COVID-19 pandemic has affected educational systems worldwide, leading to partial and total closure of schools, universities and colleges [8]. As of mid-April 2020, approximately 1.723 billion learners were affected due to school closures in response to the pandemic [9]. According to UNESCO monitoring, 191 countries implemented nationwide closures as well as local closures, impacting about 98.4% of the world's student population [10]. School closures may have an impact on the students, teachers and families, economic and societal consequences [11, 12].

It was also noted that nursing schools were not spared by the closures because of the COVID-19 outbreak [13, 14]. Many medical programs were struggling to find ways to meet students' clinical experiences and run online classes [15]. In many countries, governments had implemented lockdown measures to curb the spread of COVID-19 [16-18]. Previous studies have shown that the closure of educational institutions is an effective strategy for breaking the critical transmission chain during the pandemic [19-22].

The COVID-19 pandemic has caused negative consequences on students' academic study, including learning interruptions, disruption to assessment, and the impact is more severe on students from disadvantaged backgrounds [15]. The nationwide closure of educational institutions, i.e. schools, colleges, and universities has adversely impacted over 60% of the world's student population [23].

The delay in re-opening educational institutions can negatively affect the mental state and academic growth of students [24]. The long-time home quarantine period caused disturbance and deterioration in students' study habits and performance of work, which eventually resulted in the growth of stress and dysfunctional learning behaviours [25]. Further, it has been observed that students and the general population have experienced psychological challenges as a result of COVID-19; this could affect their academic performance [4, 26].

Zambia, a country in the Centre of the Southern African Region only had its first two cases reported on the 18th of March 2020 [27, 28]. This resulted in the Zambian government announcing that all schools, colleges and universities were to be closed on Friday the 20th of March 2020 [29]. Due to the premature closure of education institutions, Colleges and Universities had employed technologically driven learning and assessment through online platforms such as Moodle and the open-source learning management (LMS) framework. Built on pedagogical principles, Moodle was used in learning institutions, workplaces and other sectors for blended learning, distance education, flipped classroom and other e-learning projects [30].

The closure of learning institutions necessitated by the need to curtail the spread of COVID-19, should not completely deny learners access to learning. Therefore, our study focused on assessing the impact of COVID-19 on the academic activities of final year nursing students in Lusaka and Mufulira districts of Zambia.

Materials And Methods

Study design and sites

This was a cross-sectional study that was conducted using a structured questionnaire in which quantitative methods were employed. The study was conducted in the Lusaka and Copperbelt provinces of Zambia, specifically in Lusaka and Mufulira districts. The study was conducted at Lusaka Colleges of Nursing and Midwifery, Lusaka Apex Medical University and Mufulira School of Nursing.

Data collection

Data was collected using a structured questionnaire that was pre-tested among 12 final year nursing students. The pre-test was done to determine the accuracy, consistency,

appropriateness, and easiness. The questionnaire was used to collect data on the sociodemographic characteristics of the participants, effects of COVID-19 on academic activities and the suggested measures to effectively support the academic progression of the nursing students. A Likert scale was used to measure the responses on the effects of COVID-19 on the academic activities of final year nursing students. The responses included; Agree, Disagree, Neutral, Strongly Agree, and Strongly Disagree.

Sample size determination and sampling technique

A sample size of 207 final year nursing students was determined using Yamane's formula; n $= \frac{N}{1+N(e)^2}$ [31]. We used a research population of 425 final year nursing students from the three nursing schools, and a margin of error of 5%. We took into consideration a 10% loss or non-response. We randomly circulated 228 questionnaires of which 196 were completed by the students giving a response rate of 86%. A purposive sampling technique was employed in our study.

Inclusion criteria

Final-year nursing students studying at Lusaka College of Nursing & Midwifery, Lusaka Apex Medical University and Mufulira School of Nursing & Midwifery.

Exclusion criteria

All final year nursing students who did not provide consent to participate in the study.

Data analysis

The collected data were entered into a Microsoft excel sheet and imported into the Statistical Package for Social Sciences (SPSS) version 21.0 for analysis. The results were presented in form of tables.

Results

Sociodemographic characteristics

The study found a female predominance (67.9%) of which the majority 71(36.2%) came from the Lusaka College of Nursing and Midwifery as shown in table 1.

Table 1: Characteristics of participants (n= 196)

Variable	Category	Frequency	Percent (%)
Sex	Male	63	32.1
	Female	133	67.9
Name of institution	LCNM	71	36.2
	LAMU	99	50.5
	MSNM	26	13.3

LCNM=Lusaka College of Nursing & Midwifery; LAMU=Lusaka Apex Medical University; MSNM=Mufulira School of Nursing & Midwifery

Table 2 shows that most students strongly agreed that COVID-19 caused failure to complete course content (32.7%), concepts poorly taught (41.3%), delayed their examinations (86.1%), and prevented students from doing their clinical attachments (51.5%).

Table 2: Effects of COVID-19 on course work coverage and timely completion of studies

le	Responses				
	SD (%)	D (%)	N (%)	A (%)	SA (%)
-19 has caused failure to ...te course content for final ...rsing students	30(15.3)	46(23.5)	16(8.1)	40(20.4)	64(32.7)
-19 has caused some ...ts to be poorly taught	20(10.2)	24(12.2)	17(8.7)	54(27.6)	81(41.3)
-19 has caused a delay in ...mination of the final year ...ts	6(3.1)	6(3.1)	8(4.1)	7(3.6)	169(86.1)
-19 has prevented final ...rsing students from going ...ical attachments	17(8.7)	10(5.1)	26(13.3)	42(21.4)	101(51.5)

SD=Strongly Disagree; D=Disagree; N=Neutral; A=Agree; SA=Strongly Agree

Table 3 shows that most students strongly disagreed (40.3%) that their school has an effective e-library. The students strongly agreed (40.3%) that some students missed assessments and lectures due to poor access to the internet and they strongly disagreed (36.7%) that their school has effective wireless facilities to be used for online learning.

Table 3: Nature of online infrastructure in supporting effective assessments of final-year students during the covid-19 pandemic

le	Responses				
	SD (%)	D (%)	N (%)	A (%)	SA (%)
...hool is well stocked with the ...ry	79(40.3)	35(17.9)	30(15.3)	40(20.4)	12(6.1)
...students miss assessments ...tures due to poor access to ...t	18(9.2)	14(7.1)	31(15.8)	54(27.6)	79(40.3)
...hool has effective wireless ...es to be used for online ...;	72(36.7)	25(12.6)	35(17.6)	32(16.5)	32(16.5)

SD=Strongly Disagree; D=Disagree; N=Neutral; A=Agree; SA=Strongly Agree

Table 4 shows that most students expected their school to provide face masks (51.9%) and hand sanitisers (46.8%). Most students suggested that their lecturers should do computer refresher courses (40.5%) and the school to improve on stocking of the e-library (49.2%) to improve on online learning.

Table 4: Measures to be put in place by schools to address the academic progression of nursing students

	Responses				
le	SD (%)	D (%)	N (%)	A (%)	SA (%)
hool should provide face for students in ation classes during the nic	12(6.3)	20(10.1)	10(5.1)	52(26.6)	102(51.9)
hool should provide hand ers to students during the nic	25(12.7)	2(1.3)	15(7.6)	62(31.6)	92(46.8)
ers should do computer er courses to conduct lectures effectively	5(2.5)	10(5.1)	30(15.2)	79(40.5)	72(36.7)
hool should have a well- l e-library that will e online learning	8(4.1)	0(0.0)	13(6.3)	79(40.5)	96(49.2)

SD=Strongly Disagree; D=Disagree; N=Neutral; A=Agree; SA=Strongly Agree

Discussion

We assessed the impact of COVID-19 on the academic activities of final year nursing students in Lusaka and Mufulira Districts of Zambia.

Our findings show that most students strongly agreed that COVID-19 caused failure to complete course content (32.7%), concepts poorly taught (41.3%), delayed their examinations (86.1%), and prevented students from doing their clinical attachments (51.5%). These results, therefore, mean that the academic performance of students could be affected by such disturbances. These findings were in tandem with the UNESCO 2020 report that deduced that school closures as a result of COVID-19 have a huge impact on the education sector though it was difficult to measure the specific impact [23]. In Egypt, Shehata et al. (2020) similarly reported that students experienced challenges with regards to learning clinical skills due to a lack of clinical placements [32]. Evidence has shown that University and College students were worried about their academic progress because of COVID-19 and the introduction of online learning [33, 34]. Similarly, a study by Charles et al. (2020) on alcohol abuse among college students during the COVID pandemic reported that students experienced significant educational disruptions as the pandemic interfered with their academic functioning [35]. This is because the closure of tertiary-level educational institutions suspended face-to-face teaching-learning sessions hence interrupting the regular flow of academic programs [34, 36]. Some schools had to postpone or cancel the students' examinations [37]. This can lead to an impact on the mental health and academic performance of the students [4, 26, 33, 38].

Our study revealed that students' periods of clinical attachments were disrupted and shortened due to the pandemic. Similarly, another study reported that the clinical placements of nursing students were cancelled, despite the future nurses being among the frontline workers [15]. The lack of an effective clinical learning environment for student nurses prevents them from effective learning and growth [39]. As a result, the growth and development of their skills were to be influenced. Studies showed that the students' non-effective exposure to the clinical learning environment had increased dropout rates. Some nursing students had left the profession as a result of challenges they faced in the clinical settings [39].

From our findings, it can be inferred that nursing schools in Zambia had postponed or rescheduled exams and introduced alternative methods of learning such as online and home-based assessments. The common challenges emerging included issues of fairness and the feasibility of alternative assessments. Noting a distinct trend towards online assessments, it was noted that not all courses and competencies can be assessed online. Similarly, it was reported that there have been challenges regarding the methods of summative assessments using online methods [32].

Findings on the effectiveness of online infrastructure suggest that most students strongly disagreed (40.3%) that their school has an effective e-library. The students strongly agreed (40.3%) that some students missed assessments and lectures due to poor internet access and they strongly disagreed (36.7%) that their school has effective wireless facilities to be used for online learning. Goh et al. (2020) reported that the introduction of online learning was a positive way for continuity of learning, despite the many challenges that technology comes with [40]. Some University and College students have little or no access to internet services, making it difficult for them to learn during the COVID-19 pandemic [34].

Similarly, it has been reported that successful and sustainable e-learning implementation continues to remain a challenge, particularly in Information and communications technology (ICT)-challenged environments such as rural areas [41]. This literature acknowledges the fact that there is a disparity in terms of access to ICT in different geographical locations within a country. A study conducted in Bangladesh reported that respondents explained that online education would not be the best way to use for teaching-learning in the context of Bangladesh as many universities did not have enough resources for running online education urgently [30]. The participants also said that while some teachers tried to take online classes on their initiatives, they faced some issues regarding virtual learning courses on online platforms. Some of them had no electronic devices such as computers, laptops, smartphones, or tablets to take part in online classes and no internet access at home.

Arguably, in midst of the implementation of the COVID-19 guidelines in Zambia, learning institutions were depending on the online modes of teaching to maintain continuity of education. Schools were launching apps, conducting classes over Google Hangouts or Zoom, and sending interactive worksheets and videos for learning. Even though internet-based teaching was the most appropriate stop-gap arrangement, it had highlighted the inequalities in the education system [36]. A majority of the student population were being left out in the pursuit of basic education, especially those facing financial challenges and lack of internet access [33, 34].

A policy brief by the United Nations policy eluded that in ensuring learning continuity during the time of school closures, it became a priority for governments all over the world to turn to ICT, requiring teachers to move to online delivery of lessons [42]. In various countries, some ICT modalities have been used more than others, depending on education level, with variability across regions. In areas with limited connectivity, governments had used more traditional distance learning modalities, often a mix of educational television and radio programming, and the distribution of print materials. Relatively few countries were monitoring the effective reach and use of distance learning modalities. However, estimates indicated variable coverage: distance learning in high-income countries covers about 80–85 per cent, while this drops to less than 50 per cent in low-income countries. This shortfall was largely attributed to the digital divide, with the disadvantaged having limited access to basic household services such as electricity; a lack of technology infrastructure; and low levels of digital literacy among students, parents, and teachers. All challenges with regards to the use of technology for online learning must be taken into consideration [42, 43].

With regards to the findings on the measures to be put in place to remedy the effects of COVID-19 on nursing education, final year students indicated that their schools should provide face masks (51.9%) and hand sanitisers (46.8%). Besides, most students (40.5%) suggested that their lecturers should study refresher courses in ICT and (49.2%) recommended that the schools should improve their e-library. According to the United Nations report, many educators lack basic ICT skills [42]. Many challenges may arise when students are exposed to a different mode of learning [44]. However, introducing students to online learning and assessments ensures that they continue learning and never be delayed in their academic progression [45]. Hence, there is a need for urgent steps to be taken to provide technical

resources and improve internet connection for ensuring uninterrupted online education [30]. This will in turn fulfil the education needs of tertiary level students in this period of the COVID-19 pandemic.

Conclusion

The COVID-19 pandemic has drastically contributed to nursing training institutions' failure to complete the course work coverage and late administration of examinations for final year students. The most critical aspect was the inability of the final year students to comprehensively do clinical placements which rendered the training more theoretical. The online infrastructure at the nursing training schools was not effective in supporting effective learning and assessments during the COVID-19 pandemic. It was also established that there was an urgent need to improve the competencies of lecturers and students in the areas of ICT. Learning institutions must put in place measures to mitigate the impact of COVID-19 on the academic activities, mental health and extracurricular activities of students.

Declarations

Competing interests

Conflict of interest: We, the authors have declared no competing conflict of interest.

Funding: This study received no external funding.

Ethical approval

The study was approved by the Texila Medical University ethics committee in Lusaka, Zambia. Permission to conduct the study was obtained from the Lusaka Teaching Hospital Senior Medical Superintendent (UTH) and the Principle at Lusaka Colleges of Nursing and Midwifery, Lusaka Apex Medical University and Mufulira School of Nursing. Participation in the study was done voluntarily and participants were informed of the right to withdraw at any time without negative implication. No names were indicated as collected data was confidential; however, the questionnaires had serial numbers for data entry.

References

1. Shereen MA, Khan S, Kazmi A, Bashir N, Siddique R. COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. J Adv Res. 2020;24:91–8.
2. Adhikari SP, Meng S, Wu YJ, Mao YP, Ye RX, Wang QZ, et al.Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. Infect Dis Poverty. 2020;9:
3. Mudenda S, Witika BA, Sadiq MJ, Banda M, Mfune RL, Daka V, et al. Self-medication and its Consequences during & after the Coronavirus Disease 2019 (COVID-19) Pandemic: A Global Health Problem. Eur J Environ Public Heal. 2020;5(1):em0066.

4. Cao W, Fang Z, Hou G, Han M, Xu X, Dong J, et al. The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Res. 2020;287(5):112934–40.

5. Kaul V, Gallo de Moraes A, Khateeb D, Greenstein Y, Winter G, Chae J, et al. Medical Education during the COVID-19 Pandemic. Chest. 2020;0(0).

6. Khanal P, Devkota N, Dahal M, Paudel K, Joshi D. Mental health impacts among health workers during COVID-19 in a low resource setting: a cross-sectional survey from Nepal. Global Health. 2020;16:

7. Xiao H, Shu W, Li M, Li Z, Tao F, Wu X, et al. Social distancing among medical students during the 2019 coronavirus disease pandemic in china: Disease awareness, anxiety disorder, depression, and behavioural activities. Int J Environ Res Public Health. 2020;17(14):1–13.

8. Kedraka K, Kaltsidis C. Effects of the Covid-19 Pandemic on University Pedagogy: Students' Experiences and Considerations. European Journal of Education Studies. 2020;7, 8.

9. Mustafa N. Impact of the 2019-20 coronavirus pandemic on education. International Journal of Health Preference Research. 2020; 5(20):31-44

10. Conto AC, Akseer S, Dreesen T, Kamei A, Mizunoya S, Rigole A. COVID-19: Effects of School Closures on Foundational Skills and Promising Practices for Monitoring and Mitigating Learning Loss. UNICEF - Innocenti Working Paper. 2020;2020(13)-1-30.

11. Onwusuru MI, Ogwo BA. Cloud-based portal for professional development of technology educators in Nigeria and the emerging virtual workplace. International Journal of Arts and Technology Education. 2019;11(1): 1 – 17.

12. Hoffman JA, Miller EA. Addressing the Consequences of School Closure Due to COVID-19 on Children's Physical and Mental Well-Being. World Med Health Policy. 2020;10.1002/wmh3.365.

13. Dewart G, Corcoran L, Thirsk L, Petrovic K. Nursing education in a pandemic: Academic challenges in response to COVID-19. Nurse Educ Today. 2020;92:104471.

14. Rosário R. COVID-19 and Schools Closure: Implications for School Nurses. The Journal of School Nursing. 2020;36(4):241-242.

15. Ilankoon, IMPS, Kisokanth G, Warnakulasuriya SSP. COVID-19: Impact on undergraduate nursing education in Sri Lanka. Journal of Public Health Research. 2020;9(s1):1–3.

16. Alfano V, Ercolano S. The Efficacy of Lockdown against COVID-19: A Cross-Country Panel Analysis. Applied Health Economics and Health Policy. 2020;18(4);509–517.

17. Krishan K, Kanchan T. Lockdown is an effective "vaccine" against COVID-19: A message from India. Journal of Infection in Developing Countries. 2020;14(6):545–546.

18. Sahu P. Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. Cureus. 2020;12(4):4.

19. Earn DJD, He D, Loeb MB, Fonseca K, Lee BE, Dushoff J. Effects of School Closure on Incidence of Pandemic Influenza in Alberta, Canada. Annals of Internal Medicine. 2012;156:173-181.

20. Kawano S, Kakehashi M. Substantial Impact of School Closure on the Transmission Dynamics during the Pandemic Flu H1N1-2009 in Oita, Japan. PLoS ONE. 2015;10(12): e0144839.

21. Luca GD, Kerckhove KV, Coletti P, et al. The impact of regular school closure on seasonal influenza epidemics: a data-driven spatial transmission model for Belgium. BMC Infect Dis. 2018;18:29.

22. Wu JH, Tennyson RD, Hsia TL. A study of student satisfaction in a blended e-learning system environment. Computers and Education. 2010;55(1):155-164.

23. COVID-19 Educational Disruption and Response. Unesco Org. 2020:1–4. Available from: https://en.unesco.org/news/covid-19-educational-disruption-and-response

24. Chandasiri O. The COVID-19: Impact on Education. Journal of Asian and African Social Science and Humanities. 2020;6:37-42.

25. Meo SA, Abukhalaf A, Alomar A, Sattar K, Klonoff DC. COVID-19 Pandemic: Impact of Quarantine on Medical Students' Mental Wellbeing and Learning Behaviors. Pakistan Journal of Medical Sciences. 2020;36:S43-S48.

26. Waseem M, Aziz N, Arif MU, Noor A, Mustafa M, Khalid Z. Post-Traumatic Stress of COVID-19 Pak Armed Forces Med. 2020;70.

27. World Health Organization (WHO). (2020). Coronavirus disease 2019 (COVID-19) Situation Report – 59 of 19 March 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200319-sitrep-59-covid-19.pdf?sfvrsn=c3dcdef9_2

28. Mudenda S. Letter to Editor: Coronavirus Disease (COVID-19): A Global Health Problem. Int J Pharm Pharmacol 2020;4(1):1–2.

29. Kasanga M, Mudenda S, Gondwe T, Chileshe M, Solochi B, Wu J. Impact of COVID-19 on blood donation and transfusion services at Lusaka provincial blood transfusion centre, Zambia. Pan Afr Med J. 2020;35(2):74.

30. Sushmita D, Marzia KS. The Impact of COVID-19 Pandemic on Tertiary Education in Bangladesh: Students' Perspectives. Open Journal of Social Sciences. 2020;8:9.

31. Joskow J, Yamane T. Statistics, an Introductory Analysis. J Am Stat Assoc. 1965;60(310):678.

32. Shehata MH, Abouzeid E, Wasfy NF, Abdelaziz A, Wells RL, Ahmed SA. Medical Education Adaptations Post COVID-19: An Egyptian Reflection. Journal of Medical Education and Curricular Development. 2020.

33. Mudenda S, Mukosha M, Mwila C, Saleem Z, Kalungia AC, Munkombwe D, et al. Impact of the coronavirus disease on the mental health and physical activity of pharmacy students at the University of Zambia: a cross-sectional study. Int J Basic Clin Pharmacol. 2021;10:324-32.

34. Mudenda S, Zulu A, Phiri MN, Ngazimbi M, Mufwambi W, Kasanga M, Banda M. Impact of Coronavirus Disease 2019 (COVID-19) on College and University Students: A Global Health and Education Problem. Aquademia. 2020;4(2):ep20026.

35. Charles NE, Strong SJ, Burns LC, Bullerjahn MR, Serafine KM. Increased mood disorder symptoms, perceived stress, and alcohol use among college students during the COVID-19 pandemic. Psychiatry

Res. 2021;296:113706.

36. Gonzalez T, de la Rubia MA, Hincz KP, Comas-Lopez M, Subirats L, Fort S, et al. Influence of COVID-19 confinement on students' performance in higher education. PLoS ONE. 2020;15(10): e0239490.

37. Burgess S, Sievertsen HH. The impact of COVID-19 on education | VOX, CEPR Policy Portal. 2020; Https://Voxeu.Org/. Available at: https://voxeu.org/article/impact-covid-19-education

38. Aslan H, Pekince H. Nursing students' views on the COVID-19 pandemic and their perceived stress levels. Perspect Psychiatr Care. 2020;10.1111/ppc.12597.

39. VelaUsing Slack to communicate with medical students. J Med Libr Assoc. 2018;106:504–507.

40. Goh P, Sandars J. A vision of the use of technology in medical education after the COVID-19 pandemic. MedEdPublish. 2020;9(1):49.

41. Awidi IT. E-learning implementation strategies for an ICT-challenged environment: case of the University of Ghana, Legon. 2013.

42. United Nations. (2020). Education during COVID-19 and beyond A U G U S T 2 0 2 0. (August), pp. 2–26. Available at: https://unsdg.un.org/resources/policy-brief-education-during-covid-19-and-beyond (Accessed: 12 March 2021).

43. Subedi S, Nayaju S, Subedi S., Shah SK., Shah JM. Impact of e-learning during COVID-19 pandemic among nursing students and teachers of Nepal. International Journal of Science and Healthcare Research. 2020;5(3):9.

44. Chan KS, Zary N. Applications and Challenges of Implementing Artificial Intelligence in Medical Education: Integrative Review. JMIR medical education. 2019;5(1):e13930.

45. Martin F, Ritzhaupt A, Kumar S, Budhrani K. Award-winning faculty online teaching practices: Course design, assessment and evaluation, and facilitation. The Internet and Higher Education. 2019;42:34-43.