

# Online Anatomy Education in a Nigerian University - Overview of the challenges encountered by the basic medical trainees during coronavirus disease 2019 pandemic

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## Background

At the onset of the Corona virus disease 2019 (Covid-19) pandemic, online learning system was adopted to prevent disruption of academic activities during the ongoing academic year. This study assessed the challenges encountered during online anatomy learning by the undergraduate trainee of our institution during the pandemic.

## Methods

A cross-sectional, questionnaire-based survey was conducted among 85 students of the nursing science, physiotherapy and human anatomy programmes. The challenges included five thematic areas related to change in learning environment, personal learning, finance, health and technology.

## Results

The study participants included 64.71% under 20 years and 35.29% above 20 years; 43.53% males and 56.47% females; 52.9% Nursing science, 31.8% physiotherapy and 15.3% human anatomy students. Among the study participants, 63% reported environmental change-related challenges, 57% reported personal learning-related challenges, 53% reported financial-related challenges, 36% reported health-related challenges and 40% reported technology-related challenges.

## Conclusion

Among the plethora of challenges encountered by the trainees during the online anatomy learning, the most prevalent included change in learning environment, personal-learning and financial-related while the challenges associated with students' health and technology were the least prevalent.

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The urgent need to stem the tide of the ravaging Covid-19 pandemic during its early days compelled the federal government of Nigeria to declare a nationwide lockdown of human and vehicular movements which consequently resulted into the shutting down of educational institutions at all levels.<sup>1</sup> In the past decades, the government-controlled tertiary educational institutions in Nigeria have been bedeviled by diverse challenges which include inadequate or obsolete infrastructure, poor funding, inconsistent government policies, poor personnel welfare and gross lack of the enabling environment for research and learning among others. These have repeatedly caused the down-tooling of personnel and disruption of academic activities as a form of protest to call for a definitive government intervention.<sup>2</sup>

By the twilight of 20<sup>th</sup> century, there began the establishment of privately-controlled/funded universities, including the Redeemer's university, Ede, Nigeria (established in year 2005) mainly with the cardinal goal of mitigating the aforementioned challenges and forestalling the associated disruption of academic activities during any given academic year.<sup>3,4</sup> However, following the closure of all educational institutions due to the covid-19 pandemic and to prevent the disruption of academic activities during the 2019-2020 academic year, the Redeemer's University had to necessarily transit from the traditional physical classroom learning to online learning and assessment for all academic programs including anatomical sciences.<sup>5</sup> Consequently, the faculty and students had to adjust to the new learning environment which entails the teaching and learning of all course modules including anatomical sciences through online platforms only.

The technological advancement of the recent decades has impacted the educational institutions including medical colleges around the world and resulted into the introduction of online learning and assessment model which involves the application of electronic technology and media in the existing learning strategy.<sup>6,7</sup> This has resulted into the design of hybrid or blended model of learning in some medical colleges or faculties which harnesses the advantages of both the conventional classroom and online learning.<sup>8</sup> Prior to the pandemic period, our institution has introduced an online learning

resource within the learning management system (LMS) to facilitate online learning and assessment. Essentially, the existence of the institutional online learning resource made the transition to online learning a seamless process by the onset of the pandemic.

Generally, anatomical science education entails a practical-based and clinical-oriented learning strategies which involve the characteristic procedure of cadaveric dissection.<sup>9,10</sup> Moreover, these learning strategies have also been impacted by technological advancement with accomplishment of a comparable effectiveness through the blended model that involves online learning.<sup>11,12</sup> Online learning refers to the use of technology to facilitate communication between the trainer and trainee and learning using online content.<sup>13,14</sup> During the pandemic period, the online learning system was adopted to achieve anatomy learning and assessment in different medical colleges or faculties around the world including the Redeemer's University, Ede, Nigeria.<sup>5,15</sup>

However, the pivotal role of anatomy education in the training of medical professionals underscores the need to assess the challenges associated with the online anatomy learning in developing countries particularly from the trainees' perspective. This study was carried out to assess the plethora of challenges encountered by the basic medical trainees of our institution due to the online anatomy learning adopted during the Covid-19 pandemic for possible futuristic remedial actions.

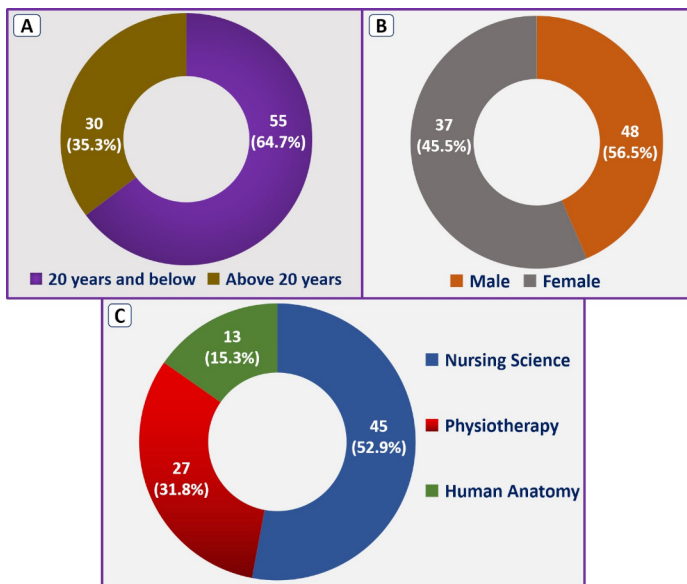
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## MATERIALS AND METHODS

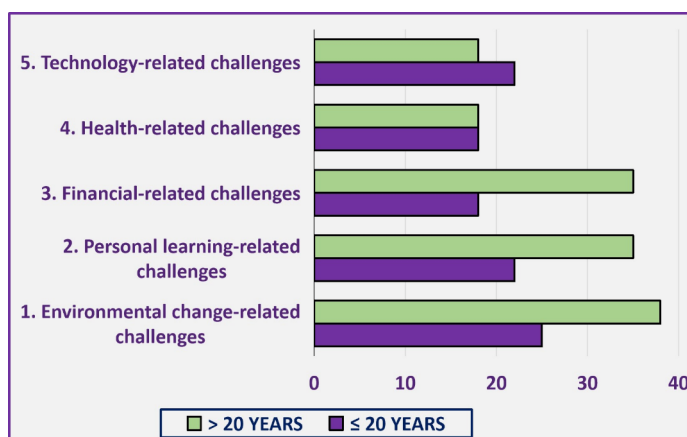
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### *Study participants*

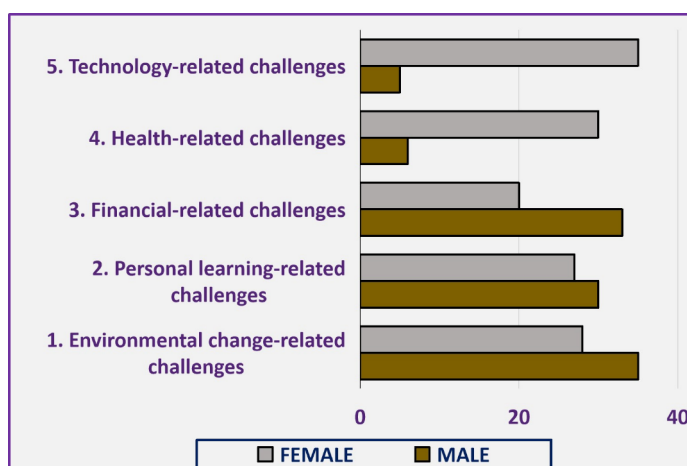
The study participants included eighty-five students of the three degree programmes (physiotherapy, nursing science and human anatomy) of the faculty of basic medical sciences of our institution. The participants included forty-five nursing science (NS), twenty-seven physiotherapy (PH) and thirteen human anatomy (HA) students that took part in the online anatomy learning adopted to sustain and conclude academic activities for the second semester of 2019-2020 academic year during the pandemic period. The informed consent of the participants was obtained before the start of the study.



**Figure 1** Socio-demographic characteristics of the study participants (A- Age groups, B - gender and C - Academic program)



**Figure 2** Frequency distribution of the challenges experienced by the study participants during online learning of anatomy according to age-groups.



**Figure 3** Frequency distribution of the challenges experienced by the study participants during online learning of anatomy according to gender.

## Study design

This study involved the conduct of a survey among the study participants to obtain a detailed information about the challenges encountered with the online anatomy learning. The survey was conducted by using a structured, three-part questionnaire created with Google Forms (Google LLC, Mountain View, CA, USA) and shared via a web-link that was forwarded to the participants' institutional email. The survey form comprised an introductory part which described the study and its significance, a first part which contained the demographic characteristics of the study participants and a second part which centred on the challenges experienced by the study participants during the online anatomy learning.

The challenges comprised five thematic areas which include environmental change-related, personal learning-related, financial-related, health-related and technology-related challenges. The survey was conducted during a thirty-day period from 1<sup>st</sup> September, 2021 till 30<sup>th</sup> September, 2021 following the approval by the Research Committee of the faculty of basic medical sciences of our institution. At the end of the survey, the responses were retrieved and translated to frequency and percentage.

## RESULTS

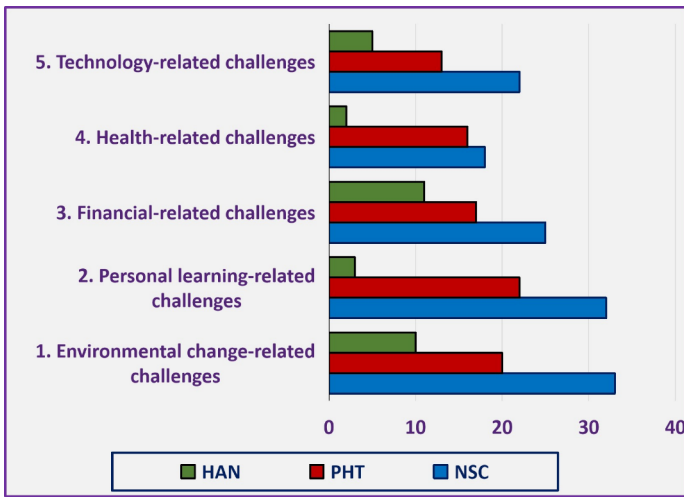
The socio-demographic characteristics of the study participants included 64.71% under 20 years and 35.29% above 20 years; 43.53% males and 56.47% females; 52.9% Nursing science, 31.8% physiotherapy and 15.3% human anatomy students (Figure 1). The findings of this study further showed the frequency distribution of the different thematic areas of challenges encountered by the study participants during online anatomy learning among different age groups, gender, degree programs (Figure 2, 3, 4) and the overall participants (Figure 5). In addition, the percentage distribution of the different thematic areas of challenges encountered by the study participants during the online learning among different age groups, gender, degree programs and overall participants was presented in Table 1.

## DISCUSSION

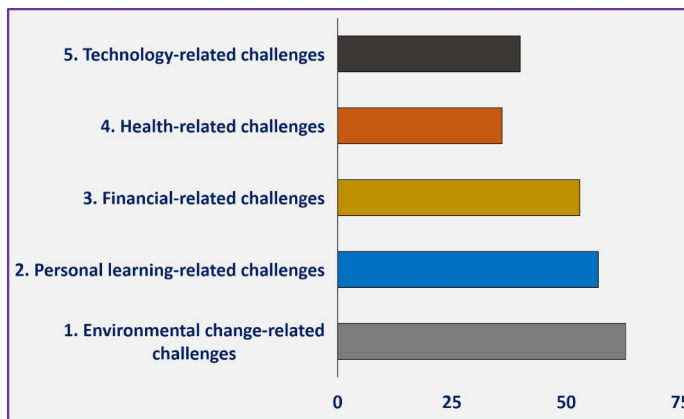
The transition from conventional physical to online learning of anatomy was adopted to sustain the training of the medical and basic medical students in different medical colleges around the world during the Covid-19 pandemic. This was similarly adopted in our institution to also prevent the disruption of 2019-2020 academic year after the Nigerian government had imposed the closure of all educational institutions at the onset of the pandemic. However, studies have reported diverse challenges associated with the adoption of the online mode of learning for medical education during the pandemic.<sup>7,16,17</sup>

According to the results of this study, majority of the participants (74.1%) indicated that challenges associated with the change of the learning environment were the most dominant during online anatomy learning. These included lack of routine classroom interaction due to isolating nature of online classes, lack of cadaveric dissection and contact session with trainers that characterized physical laboratory hours, lack of access to anatomy instructional models and non-satisfactory online lecture delivery by some faculty lecturers. Previous studies had similarly reported challenges associated with the change of learning environment and lack of class interaction during the online learning.<sup>18,19</sup>

The findings of this study further revealed that majority (57%) of the study participants experienced personal-learning related challenges during the online anatomy learning. These challenges included home distraction, difficulty in study time management, increased social media exposure and absence of



**Figure 4** Frequency distribution of the challenges experienced by the study participants during online learning of anatomy according degree programs.



**Figure 5** Frequency distribution of the challenges experienced during online learning of anatomy among the overall study participants.

**Table 1** Percentage distribution of challenges experienced during online learning of anatomy

Variables	Age groups (years)		Gender		Academic programmes			Total n (%)
	≤ 20y n (%)	> 20y n (%)	Male n (%)	Female n (%)	NSC n (%)	PHT n (%)	HAN n (%)	
<b>Environmental change-related challenges</b>	38 (44.7)	25 (29.4)	35 (41.2)	28 (32.9)	33 (38.8)	20 (23.5)	10 (11.8)	63 (74.1)
<b>Personal learning-related challenges</b>	35 (41.2)	22 (25.9)	30 (35.3)	27 (31.8)	32 (37.7)	22 (25.9)	3 (3.5)	57 (67.1)
<b>Financial-related challenges</b>	35 (41.2)	18 (21.1)	33 (38.8)	20 (23.5)	25 (29.4)	17 (20.0)	11 (12.9)	53 (62.3)
<b>Health-related challenges</b>	19 (22.3)	17 (20.0)	6 (7.0)	30 (35.3)	18 (21.1)	16 (18.8)	2 (2.4)	36 (42.3)
<b>Technology-related challenges</b>	24 (28.2)	16 (18.8)	9 (10.6)	31 (36.4)	24 (28.2)	13 (15.3)	3 (3.5)	40 (47.0)

cluster study groups. Essentially, the training of medical and basic medical professionals involves enormous academic rigor which usually require longer personal study period.<sup>20</sup> The study by Baticulon et al<sup>13</sup> similarly reported barriers to online medical education to include difficulty in students' learning with regard to adjustment to new learning styles due to the change in the learning environment.

Furthermore, majority (53%) of the participants in the current study reported financial challenges during the online anatomy learning especially with respect to the financial cost of regular internet subscription and connectivity. This findings showed conformity with a previous study among proximate study population which reported high cost of internet connectivity as one of the major challenges of online medical education during the pandemic.<sup>21</sup> The study by Salari and Sepahi<sup>21</sup> also documented diverse challenges (including increased financial cost) associated with online medical education among different study population during the pandemic.

Moreover, the findings of this study indicated that 36% of the participants experienced health-related challenges during the online anatomy learning. These included increased level of anxiety, exhaustion as well as psychological effect of the Covid-19 pandemic and nationwide lockdown. According to studies by Baticulon et al and Bolatov et al, online learning is characterized with social isolation which could results into anxiety, low self-esteem and depression that could impact the students' learning ability and academic performance.<sup>13,14</sup> Other previous studies had similarly reported pandemic-related anxiety and stress during online learning.<sup>19,23</sup>

Essentially, the online learning involves the application of technology in the communication and delivery of academic contents. In the current study, 40% of the participants experienced technology-related challenges which include poor internet connectivity, advanced technical know-how required to use certain online learning applications as well as technophobia. Similar studies had previously indicated challenges related to the use of technology and devices, poor or loss of internet connectivity and technophobia during the online learning.<sup>19,21,24</sup>

Generally, the plethora of challenges experienced by the study participants during the online learning showed similarity to the findings among trainees in developing countries but contradicted the findings

from some medical colleges in Europe and United States wherein the existence of advanced technology enhanced the transition from physical to online medical education at the onset of the pandemic.<sup>13,19,25-28</sup> The findings from the study by Adnan and Anwar<sup>29</sup> reported non-satisfactory perception and learning outcome among the students from Pakistan regarding the online classes due to a myriad of challenges. Conversely, the findings of Demuyakor<sup>30</sup> revealed positive perception and attitude among the Ghanaian international students regarding the online classes adopted to sustain learning during the pandemic.

According to Gray and Tobin<sup>31</sup>, the trainees perceived and preferred the online learning as an important complementary component within the blended learning strategy and not a substitute for the conventional trainer-driven. Another previous findings further reported the students' satisfaction with the content and mode of delivery of anatomy and physiology courses during blended learning strategy.<sup>32</sup> However, to achieve an effective blended learning strategy in anatomy education, the challenges that hamper students' satisfaction and satisfactory learning outcomes should be addressed.

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## RECOMMENDATION

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The current study indicated the areas of focus for the attention of educational administrators and policy makers in Nigeria. This will help to achieve a more effective and efficient online learning and assessment system for anatomical sciences in medical colleges and faculties as obtainable in developed countries.

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## CONCLUSION

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The current study highlighted the plethora of challenges associated with online learning of anatomy among the study population. These included change of learning environment, personal-learning difficulty, increased financial cost implication, health concerns and technology-related difficulty. The study further revealed that challenges associated with the new learning environment, personal-learning and financial implications were the most prevalent while challenges associated with the participants' health and technology were the least prevalent.

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