Original Article

PERCEPTIONS OF MEDICAL STUDENTS IN MALAYSIA TOWARDS ONLINE ANATOMY LEARNING DURING THE COVID-19 PANDEMIC

Nurul Fathen Nadia Abd Hadi*, Nur Alya Athirah Nordin, Muhammad 'Ilman Mohd Yasir, Mohamad Hamie Asyraf Mohamad Hamdan, Nur Alya' Zaidi, Ummul Aisyah Abul Hassan, Ahmad Syukri Zulkifli & Nur Sawani Syaharah Khairudin

Kulliyyah of Medicine & Health Sciences, Universiti Islam Antarabangsa Sultan Abdul Halim Mua'dzam Shah, 09300 Kuala Ketil, Kedah, Malaysia.

ARTICLE INFO

Corresponding author:
Dr. Nurul Fathen Nadia Abd Hadi

Email address:
drfathen@unishams.edu.my

Received:
October 2022
Accepted for publication:
November 2022

Keywords:
medical students;
online;
face-to-face;
anatomy;
Malaysia.

ABSTRACT

Since the first case of COVID-19 in 2019, the World Health Organisation has declared the sudden break of the COVID-19 outbreak as a worldwide pandemic. Due to the closure of institutions, universities and medical schools promptly shifted from face-to-face to online learning until the cases decreased. This study evaluates the perceptions of medical students towards online and face-to-face anatomy learning. A cross-sectional study was conducted for three weeks on 312 medical students in Malaysia to evaluate their experiences on both face-to-face and online anatomy learning. Apart from demographic information, a part of the questionnaire was adopted from Students' Perceptions of Learning from Dundee Ready Educational Environment Measure (DREEM), a reliable and validated inventory to measure students' perceptions of their learning. There was a significant difference in students' perceptions between face-to-face and online anatomy learning ($p<0.05$). The mean score for face-to-face learning is higher (37.5/48) than online anatomy learning (25.4/48). Out of a total of 12 items, 2 items for online learning and 1 item for face-to-face learning scored less than 2, which indicates the area of significant problems that need to be addressed urgently. Almost 58% of participants prefer to have anatomy learning through face-to-face rather than online and 38.5% of them are willing to have hybrid learning. Overall, medical students in Malaysia have better perceptions of face-to-face anatomy learning compared to online learning. Moving forward, we anticipate more incorporation of online teaching methods within conventional medical education. This need to be carefully done with enough preparation and support systems to achieve its objectives.

INTRODUCTION

The World Health Organisation has declared the COVID-19 outbreak a worldwide pandemic and implemented preventive measures including the closure of universities and medical schools [1–3]. Hence, educational institutions modified their teaching and learning activities to online platforms in order to avoid interruptions [4]. Online learning is defined as technology-based learning in which learning materials are distributed digitally to distant learners over a computer network [5]. Previously, studying medicine had never been done through online or distance learning. However, this is inevitable during the pandemic [6,7]. Currently, there are only a few studies on the impacts of transitioning from traditional face-to-face classrooms to online learning [6–8]. This is very crucial for medical schools to explore especially on the impacts to the students who are currently learning anatomy subject.

The Dundee Ready Educational Environment Measure (DREEM) was used to evaluate students' perceptions of their educational environments in medical schools and other health training settings. It was published in 1997 and originally designed in English but it has been translated into various languages such as Spanish and Greek [9]. The DREEM tool has 50 items or statements with five subscales include students' perceptions of learning (12 items), students' perceptions of teachers (11 items), students' academic self-perceptions (8 items), perception of the atmosphere (12 items), and social self-perceptions (7 items) [10]. Currently, the DREEM tool has been used widely across the world, especially among medical educators. The educational environment is vital as it is a major determinant in motivation, academic achievement, satisfaction and success in students' learning [11].

The components of the educational environment are not limited, it can be non-physical or physical facilities evaluation. For example, the quality of lecture halls and rooms for clinical activities, the environment in the class created by other students and lecturers, and student learning opportunities. In

a study using the DREEM survey, it was discovered medical students preferred face-to-face over online learning due to less engagement in online classes [1]. Many benefits may manifest in online learning, but these advantages may not apply to all forms of online teaching. Surely, there are several barriers shown to be impacted by online learning during COVID-19 that eventually affected medical students' studies. We are concerned about medical students' perceptions focusing on online anatomy learning, leaving the traditional methods such as cadaveric dissections and formal lectures via face-to-face.

MATERIALS AND METHODS

Study design

This is a cross-sectional and descriptive study which involves 312 participants. A 12-item questionnaire was taken from a section of the DREEM (Students' perceptions of learning). The options given were 5- point Likert- type, with 1 being strongly disagree and 5 being strongly agree. The remaining items in the questionnaire comprised a mixture of question styles to investigate further the advantages and disadvantages of online anatomy learning.

The question items were initially drafted and pilot-tested on 33 medical students before undergoing a careful review and editing process. The questionnaire was created using Google Form and distributed through social media platforms such as Facebook, Instagram, and WhatsApp. The Cronbach Alpha coefficient for the questionnaire was 0.87. This study was conducted from the end of March until mid-June 2022.

Participants

The minimum sample size is calculated by using the Cochrane formula. The sample of 373 was obtained with 5% of allowable error (e) at 95% of confidence interval (CI) or Z in the Cochrane formula.

All participants were recruited from currently studying medical students (Year 1 - Year 5) in any public and private medical schools in Malaysia and experienced both face-to-face and online anatomy learning.

Participant consent

Participation was voluntary and informed consent was taken from each participant. A mandatory selection box consenting to participation was included at the beginning of the survey, ensuring a 100% consent rate.

Statistical analysis

Data analysis was performed using SPSS version 26. The following statistical methods were used such as descriptive statistics to describe the socio-demographics of participants, chi-square test to determine the association between variables and paired T-test to compare the means between online and face-to-face anatomy learning taken from the same individual. P values <0.05 were considered statistically significant.

RESULTS

Demographics

The participants were well distributed in terms of gender, area of residence and university (Table 1).

Table 1: Demographic characteristics of the participants (n =312)

	Characteristics	Values (percents)
Gender	Male	158 (50.6)
	Female	154 (49.4)
Year of study	Year 1	161 (51.6)
	Year 2	123 (39.4)
	Year 3	13 (4.2)
	Year 4	14 (4.5)
	Year 5	1 (0.3)
Ethnicity	Malay	216 (69.2)
	Chinese	52 (16.7)
	Indian	43 (13.8)
	Others	1 (0.3)
Religion	Islam	220 (70.0)
	Hindu	36 (12.0)
	Christian	34 (11.0)
	Buddha	22 (7.0)
Area of residence	Urban	178 (57.1)
	Rural	134 (42.9)
Marital status	Single	309 (99.0)
	Married	3 (1.0)
University	Government (IPTA)	170 (54.5)
	Private (IPTS)	142 (45.5)

From 312 participants recruited, 50.6% (n=158) of participants were male and 49.4% (n= 154) were female. Majority of the participants were year1 and 2 medical students, Malay, Islam and single. There were significant associations ($p<0.05$) between online anatomy learning with the year of study, university, ethnicity and religion.

Students' engagement on online anatomy learning platforms

Before the pandemic, medical students used various online anatomy learning platforms such as videos, recording lectures, anatomy websites and applications and online quizzes. During the pandemic when teaching was shifted to online learning, these platforms were more frequently used by the majority of the students. All online platforms showed an increment in their usage during online anatomy learning as shown in Figure 1.

In regards to the number of hours spent on online anatomy learning platforms, the majority of students spent only 0 to 4 hours per week during face-to-face learning. However, during online learning, 107 of them spent 10 to 14 hours and another 91 medical students spent 5 to 9 hours on these platforms (Figure 2). It showed majority of medical students spent longer duration on these online platforms during online learning, perhaps due to time

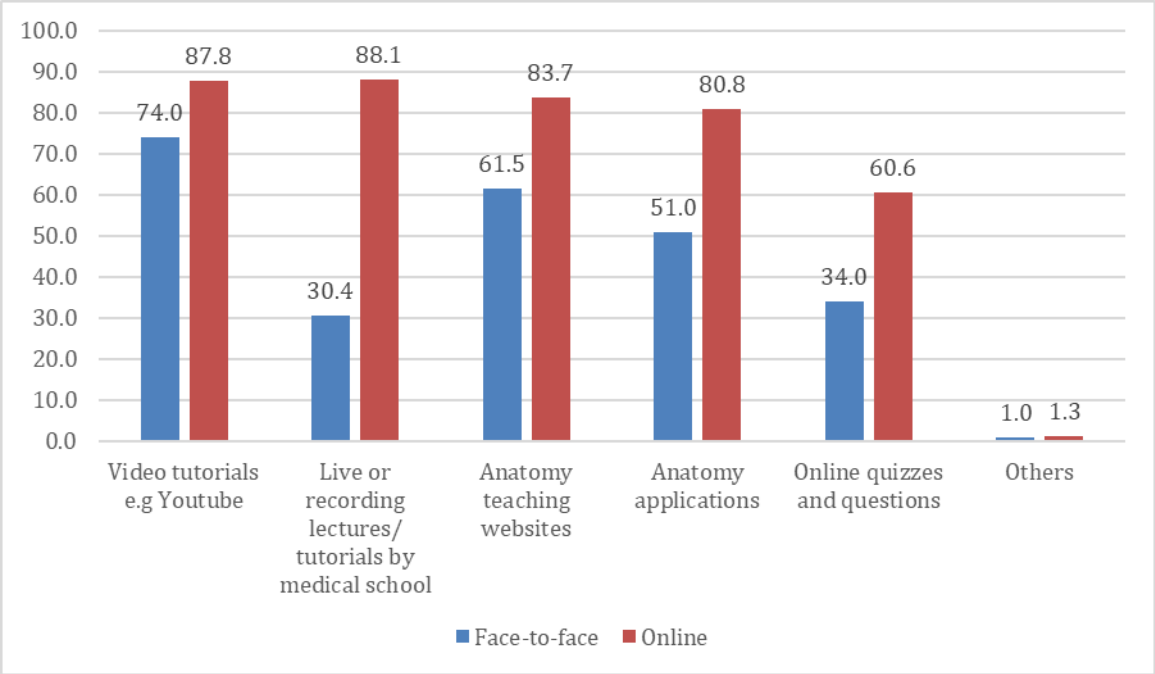

Figure 1: Different types of online anatomy learning platforms used during face-to-face and online anatomy learning.

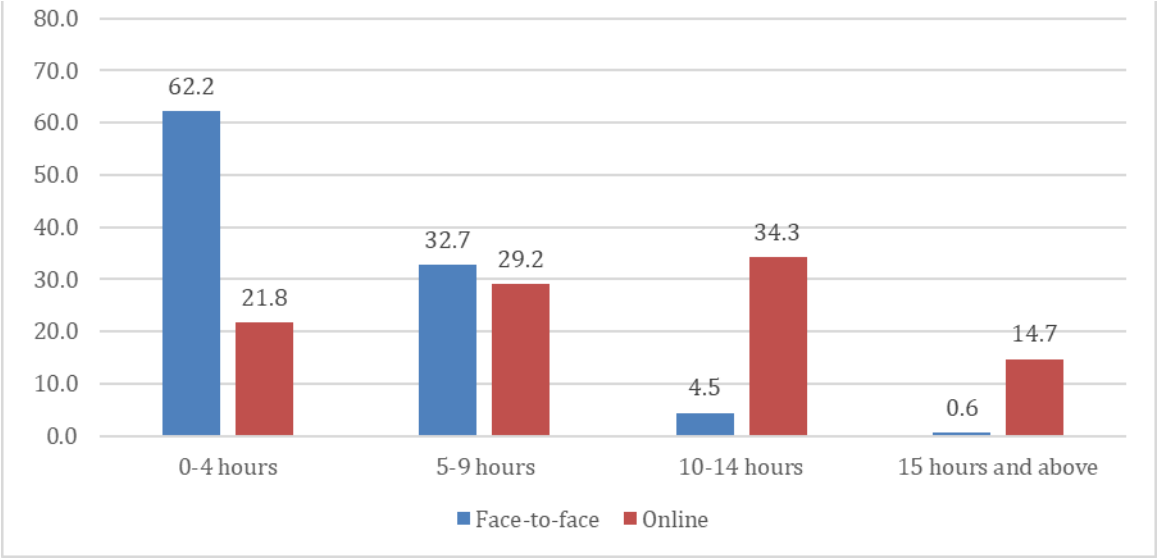

Figure 2: Number of hours spent on online anatomy platforms during face-to-face and online anatomy learning.

flexibility and students-centred learning approaches.

Students' perceptions of face-to-face and online anatomy learning

Based on the mean score of each individual item, the mean score of 0 to 1 indicates problem areas that need to be addressed urgently, 2 to 3 indicates could be enhanced and 4 means real positive points. Overall, students did not find online anatomy learning to be a suitable or pleasant experience for them. Most of the question items were scored lower during online learning except for one item (Table 2). This is consistent with the challenges for online anatomy learning that they have listed in Figure 3. The majority of them were having problem with internet connections (78.5%), family distractions when studying at home specifically during the pandemic (63.1%) and psychological distress (64.1%). At the same time, they agreed that online learning did provide some benefits such as no travel (67%), cost savings (65.7%) and the ability to learn at their own pace (60.6%).

Overall, the mean score of students' perceptions on face-to-face learning is 37.52 while the mean score of students' perceptions on online learning is 25.39 only. It indicates that anatomy teaching is highly regarded during face-to-face compared to online learning.

Furthermore, most participants prefer face-to-face anatomy learning with a percentage of 57.7%. It is followed by hybrid (38.5%) and only 4% of them choose online anatomy learning (Figure 4). It shows a good indicator to medical educationists to implement technological innovation in anatomy learning wherever possible.

Table 2: Mean score for students' perceptions of face-to-face and online anatomy learning.

Questions	MEAN – Face-to-Face	MEAN - Online
Encouraged to participate in class	3.65	2.18
Often stimulating	3.49	2.17
Student-centered	3.48	2.17
Develop competence	3.51	2.05
Well focused	3.49	2.11
Prepared well for profession	3.41	2.04
Teaching time is put to good use	3.44	2.58
Too focused on factual learning (reversely marked)	0.78	1.33
Clear about the learning objectives of the course	3.47	2.76
Encourages students to be an active learner	3.45	2.24
Life-long learning is emphasized over short-term learning	3.26	2.15
Too teacher oriented	2.08	1.62

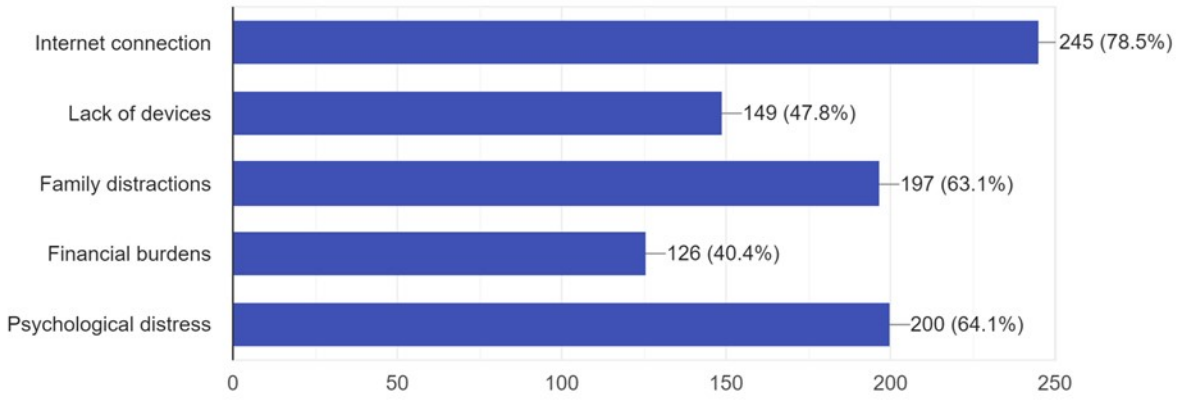

Figure 3: Barriers to online anatomy learning.

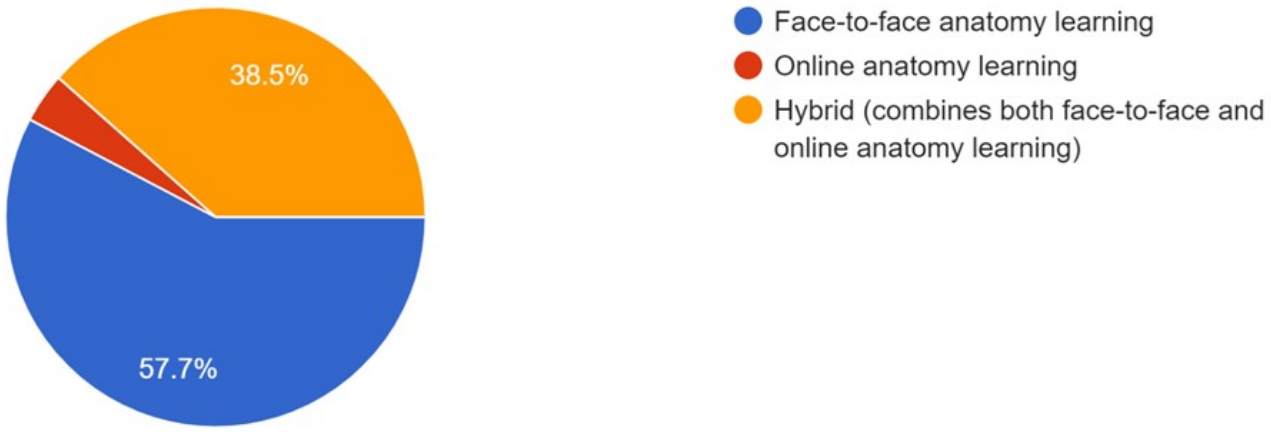

Figure 4: Students' preference for anatomy learning method

DISCUSSIONS

This study was conducted within the population of medical students in Malaysia from year 1 until year 5. During the COVID-19 pandemic, specifically during Movement Control Order (MCO), Malaysia was restricted from going out and they were instructed to always stay at home. This order was one of the ways to mitigate the cases of COVID-19 daily as people stayed at home and thus avoiding the spread of the COVID-19 virus from one person to another person. All activities outside of their home were prohibited. People needed to do everything online such as work and study from home. As for medical schools, they modified their teaching and learning activities to online platforms to avoid interruptions.

Benefits and barriers of online anatomy learning

The majority of the responses in our study are from Year 1 (n=161) and Year 2 (n=123) because they get more affected in anatomy learning. This study involved 42.9% of students who live in rural areas. The area of residence can be a great barrier to effective online anatomy learning. Some of them need to change to other internet providers while the others may need to relocate or go to other places to ensure stable internet network [12,13].

Online learning can encourage students to be an active learner. It is because online classes created by lecturers can be recorded and students can view them over and over again. The usage of anatomy applications that display the actual visual of the structure of the human body will make anatomy learning more attractive for students to explore [14]. Next, the online method adopts a student-centred approach. Procrastination is perhaps the worst enemy of online anatomy education. So, the student needs to manage their time accordingly. Indirectly, it will cultivate the value of self-discipline for pre-clinical students to step into the clinical phase at the hospital.

However, some students may find that they do not have enough resources such as medical books that can be found in the university's library and anatomical models and cadavers in the anatomy museum. Online anatomy learning can also cause problems for those with many family distractions. Poor internet connection may affect the quality of anatomy learning. The mental health of students worsened during online anatomy learning. These can be associated with inadequate interactions with friends that lead to rising psychological distress. Big family and noise distractions may affect concentration in learning sessions [15–17].

Face-to-face vs online anatomy learning

A high mean score for ‘encouraged to participate in class’ as well as ‘encourage to be active learner’ for face-to-face anatomy learning compared with online anatomy learning, showing physical classrooms encouraged students to engage with activities such as dissecting. Participation can also help students learn from each other, increasing comprehension through cooperation. Active learning sessions were more effective for learning [18]. Teaching engagement can increase the chances of students’ participation to ask and discuss questions in class among friends and teachers.

A high mean score for ‘teaching is well focused’ and ‘teaching is often stimulating’ for face-to-face compared with a score of 2.17 for online anatomy learning, showing classrooms is intriguing for the students to acquire knowledge and skills. As well as, the classroom setting provided no or less distraction.

Our study assessed that students have highly positive perceptions of face-to-face anatomy learning except for being too focused on factual learning items. However, it should be highlighted that the classroom supposedly encourages

students to engage with relevant knowledge to strengthen and integrate their problem-solving skills more than factual learning.

Limitations and future direction

First and foremost, there is a possibility of recall bias in this study. The data collection was conducted a few months after the students experienced online anatomy learning. The students may be unable to accurately recall the event, which affects the accuracy of their answers. One of the suggestions is to ideally use face-to-face or telephone surveys. Interviewees should be allowed sufficient time for adequate recall of long-term memory. Secondly, the sample size for this study is moderate. A larger sample size might help in improving the accuracy, validity and reliability of the study. Therefore, a longer study period will be appropriate to increase the number of participants.

CONCLUSIONS

In conclusion, this study concludes that medical students in Malaysia prefer to have face-to-face anatomy learning rather than online. However, it is undeniable that online anatomy learning also does provide many great benefits to medical students nowadays. Thus, this suggests the need for medical schools to manage the barriers and challenges with online anatomy learning to ensure effective delivery of teaching and learning. Hence, we will be able to maximize the benefits that the students gain from both face-to-face and online anatomy learning.

REFERENCES

1. Dost S, Hossain A, Shehab M, Abdelwahed A, Al-Nusair L. Perceptions of medical students towards online teaching during the COVID-19 pandemic: a national cross-sectional survey of 2721 UK medical students. BMJ Open [Internet]. 2020 Nov 5;10(11):e042378. Available from: https://bmjopen.bmj.com/lookup/doi/10.1136/bmjopen-2020-042378
2. Papa V, Varotto E, Galli M, Vaccarezza M, Galassi FM. One year of anatomy teaching and learning in the outbreak: Has the Covid□19 pandemic marked the end of a century□old practice? A systematic review. Anat Sci Educ [Internet]. 2022 Mar 21;15(2):261–80. Available from: https://onlinelibrary.wiley.com/doi/10.1002/ase.2162
3. Elzainy A, El Sadik A, Al Abdulmonem W. Experience of e-learning and online assessment during the COVID-19 pandemic at the College of Medicine, Qassim University. J Taibah Univ Med Sci [Internet]. 2020 Dec;15(6):456–62. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1658361220301517
4. A. T. Malaysia announces movement control order after spike in Covid-19 cases (updated). The Star [Internet]. Available from: https://www.thestar.com.my/news/nation/2020/03/16/malaysia-announces-restricted-movement-measure-after-spike-in-covid-19-cases
5. A. Eldeeb R. Students' Perceptions to e-learning. IOSR J Res Method Educ [Internet]. 2014;4(3):33–6. Available from: http://www.iosrjournals.org/iosr-jrme/papers/Vol-4 Issue-3/Version-4/G04343336.pdf
6. Cheng X, Chan LK, Pan SQ, Cai H, Li YQ, Yang X. Gross Anatomy Education in China during the Covid-19 Pandemic: A National Survey. Anat Sci Educ [Internet]. 2021 Jan 23;14 (1):8–18. Available from: https://onlinelibrary.wiley.com/doi/10.1002/ase.2036
7. Iwanaga J, Loukas M, Dumont AS, Tubbs RS. A review of anatomy education during and after the COVID-19 pandemic: Revisiting traditional and modern methods to achieve future innovation. Clin Anat [Internet]. 2021 Jan 24;34(1):108–14. Available from: https://onlinelibrary.wiley.com/doi/10.1002/ca.23655
8. Harmon DJ, Attardi SM, Barremkala M, Bentley DC, Brown KM, Dennis JF, et al. An Analysis of Anatomy Education Before and During Covid□19: May–August 2020. Anat Sci Educ [Internet]. 2021 Mar 12;14(2):132–47. Available from: https://onlinelibrary.wiley.com/doi/10.1002/ase.2051
9. Roff S, McAleer S, Harden RM, Al-Qahtani M, Ahmed AU, Deza H, et al. Development and validation of the Dundee Ready Education Environment Measure (DREEM). Med Teach [Internet]. 1997 Jan 3;19(4):295–9. Available from: http://www.tandfonline.com/doi/full/10.3109/01421599709034208
10. Al-Saleh S, Al-Madi EM, AlMufleh B, Al-Degheishem AH. Educational environment as perceived by dental students at King Saud University. Saudi Dent J [Internet]. 2018;30(3):240–9. Available from: https://doi.org/10.1016/j.sdentj.2018.02.003
11. Pai PG. Medical Students' Perception of Their Educational Environment. J Clin DIAGNOSTIC Res [Internet]. 2014; Available from: http://www.jcdr.net/article_fulltext.asp?issn=0973-709x&year=2014&volume=8&issue=1&page=103&issn=0973-709x&id=3944
12. Abbasi S, Ayoob T, Malik A, Memon SI. Perceptions of students regarding E-learning during Covid-19 at a private medical college. Pakistan J Med Sci [Internet]. 2020 May 18;36 (COVID19-S4). Available from: https://www.pjms.org.pk/index.php/pjms/article/view/2766
13. Agung ASN, Surtikanti MW. Students' Perception of Online Learning during COVID-19 Pandemic: A Case Study on the English Students of STKIP Pamane Talino. SOSHUM J Sos dan Hum [Internet]. 2020 Jul 31;10(2):225–35. Available from: https://www.pjms.org.pk/index.php/pjms/article/view/2766
14. Lewis TL, Burnett B, Tunstall RG, Abrahams PH. Complementing anatomy education using three-dimensional anatomy mobile software applications on tablet computers. Clin Anat [Internet]. 2014 Apr;27(3):313–20. Available from: https://onlinelibrary.wiley.com/doi/10.1002/ca.22256

15. Wang X, Hegde S, Son C, Keller B, Smith A, Sasangohar F. Investigating Mental Health of US College Students During the COVID-19 Pandemic: Cross-Sectional Survey Study. J Med Internet Res [Internet]. 2020 Sep 17;22 (9):e22817. Available from: http:// www.jmir.org/2020/9/e22817/
16. Meda N, Pardini S, Slongo I, Bodini L, Zordan MA, Rigobello P, et al. Students' mental health problems before, during, and after COVID-19 lockdown in Italy. J Psychiatr Res [Internet]. 2021 Feb;134:69–77. Available from: https:// linkinghub.elsevier.com/retrieve/pii/ S0022395620311535.
17. Mittal R, Su L, Jain R. COVID-19 mental health consequences on medical students worldwide. J Community Hosp Intern Med Perspect [Internet]. 2021 May 4;11(3):296–8. Available from: https://www.tandfonline.com/doi/ full/10.1080/20009666.2021.1918475
18. Yen SGS, Jalani SAM, Rushlan MAA, Hadie SNH, Minhat HS, Abas R. Anatomy Education Environment among Pre-Clinical Medical Students in Universiti Putra Malaysia Using Anatomy Education Environment Measurement Inventory. Educ Med J. 2021;13(3):21–9.