

# Utilization and Perception Towards Recorded Lectures Among Undergraduate Medical Students During the COVID-19 Pandemic

**Jesper Leonard Vun Kien Fung<sup>\*</sup>, Nanthiny Nagarajah,  
Iswari Rengasamy, Nethmi Nisanka Dandeniya,  
Charren Thevarajah Pillai**

Faculty of Medicine, Melaka-Manipal Medical College, Manipal Academy of Higher Education (MAHE), Melaka, Malaysia

## Abstract

The COVID-19 pandemic has had a major impact on education. Face-to-face teaching could no longer take place and this was largely replaced with online teaching. Online classes, distance learning and recorded lectures are some of the resources used, ensuring that education is not disrupted. We aimed to determine how many students utilize the recordings, their purpose and pattern of usage, their perception towards it and its association with their attendance and attentiveness during live online lectures. A cross sectional study was conducted among the fourth-year clinical phase medical students of Melaka Manipal Medical College. An online questionnaire was distributed and a total of 126 responses were collected. The data was statistically analysed using Epi Info version 7.2.4.0. Fisher exact test, unpaired T-test and simple logistics regression were used to analyse the data. Findings revealed that 96.83% of students used recorded lectures. However, the pattern and purpose of usage of recorded lectures differed among them. 84.92% of students revisited complex ideas and concepts while 82.54% used the recorded lectures to browse and stop at points of interest. The study found a positive perception towards recorded lectures among the students. The junior batch (mean=79.08) showed to have better perception towards it compared to the senior batch (mean=74.55) as emphasised by a p-value of 0.019. There was a positive association between the perception of the students towards recorded lectures and their utilisation of it (OR=1.051, 95% CI=1.034-1.067, p-value <0.001). A significant positive association was established between students' attentiveness in class before (OR=2.525, 95% CI= 1.895-3.364, p-values <0.001) and after (OR=3.999, 95% CI= 2.561-6.245, p-values <0.001) recorded lectures were provided and their usage. However, there was no association found between attendance and usage. In summary, the majority of the students used recorded lectures to facilitate learning during the pandemic. They mostly revisited complex ideas and concepts that were unclear during the lectures, stopping at points of interest to save time. Overall, the perception towards these recordings was good and this was associated with an increased likelihood of using them. As such, we recommend that education institutes make lecture recordings available to students using lecture capture technology at all times and not just during the movement restriction in a pandemic period.

## Keywords

Utilization, Perception, Recorded Lectures, Medical Student, Cross-sectional Study, Malaysia

Received: November 20, 2020 / Accepted: December 8, 2020 / Published online: January 3, 2021

@ 2020 The Authors. Published by American Institute of Science. This Open Access article is under the CC BY license.

<http://creativecommons.org/licenses/by/4.0/>

---

---

\* Corresponding author

E-mail address: [jespervun98@gmail.com](mailto:jespervun98@gmail.com) (J. L. V. K. Fung)

## 1. Introduction

In the early days, education delivered to students of higher education centres was limited to the conventional face to face method, whereby students and lecturers would get together either in classrooms or lecture halls at a scheduled period and teaching would take place. [1] Face to face learning is a type of teacher-centred education and students receive passively learned information from what the lecturer teaches. [1] Educating via lectures is the foremost common strategy that is being followed in higher education centres. [2] Although this may be an ancient method of teaching, it is still widely adopted as it is convenient for students and teachers while allowing interaction between the two.

Since the dawn of the internet era, many fields have been revolutionized for the better, education being no exception. Technology brought many changes upon the education system, one of which is online learning. This new form of education proved to play an important role in studies and contributed to productivity in the learning process as it was well adapted by students. [3] Fast advancements in innovation have made remote learning simpler. [4] By viewing lectures online, students are given the flexibility that was not possible with traditional on-campus teaching paradigms as they could now listen to lectures at any location. [5] This brought the classroom from the college surroundings to the home environment, permitting students the benefit of seeking knowledge without the bother of daily travels to campus. Online lectures act as a bridge that connects distant students with their lecturers and provides better interactions between them. [6]

As the usage of online lectures increases, universities began supplementing students with recorded lectures or recordings of live lectures while encouraging them to take advantage of it. [7] Recorded lectures further provide students as well as distant learners the benefit to study and learn according to their free time and allow them to spend time on other commitments. [8, 9] Contrary to the traditional face to face learning, recorded lectures are established as a more student-centred approach to learning. [9]

However, there is an obvious contrast between the traditional method of teaching and taking online lessons. Online learning is usually non-contemporaneous, which implies that there is no communication between the educator and the student at the same time. [10] While attending an online lecture, the flow of the lesson may be completely lost due to lack of internet availability whereas the traditional method of teaching does not require internet availability for its continuance. Several studies have also recognized certain disadvantages of online education such as a high number of drop-outs and student irresponsibility. [11] On the contrary, live-lecture recordings are shown to have numerous points of

interest especially for undergraduate students. [12] Students can have the convenience of when to access the materials, which in turn ensures more alterability for adult learners that have other commitments in their daily routine. [1] Utilizing online platforms and lecture recordings abides by the rule of "anyplace" and "anytime". Personalization and adaptability are the two driving watchwords that come to the mind regarding online-based learning. Undergraduates may gain more out of the learning sessions once they get to know that the same session will be made easily accessible to them after the ending of the lesson as they can prioritize more on understanding the context instead of taking notes. [1] With the help of recorded lectures, one can cover the topics that were taught on the day of their absence. Furthermore, recorded lectures allow the students to review the lessons at a speed of their own preference, providing them control over how fast they can watch, learning and advancing concurring to their abilities and capacities, thus paving the path for more effective study habits. [13] The ability for students to re-watch lectures seems to be an effective study aid especially right before exams as a tool of revision. Also, in the event that relevant resources on their subject matter are accessible, students can select them for further reference. [14]

On the other hand, when students are presented with exterior materials such as recorded lectures, they may misjudge the benefits of showing up for class, neglecting learning exercises focused on adopting mandatory skills. [1] Moreover, students might also end up misjudging the online portion of the lesson to be of no value and will ultimately end up not paying attention in class. [15] Furthermore, the learners might get into the habit of accessing resources which takes only a short reference time. [16] Listening to recorded lectures can be quite time-consuming.

The recent COVID-19 pandemic and the subsequent lockdown in many countries this year has had a major impact on the lifestyles we lead in numerous ways. One of the disruptions that hit closer to home for students is the temporary cessation of studies as schools, colleges and universities were shut down in order to curb mass gatherings that could result in spread of the disease. [17] As a result, an estimated 1.2 billion students worldwide were unable to attend classrooms for face-to-face learning. [18] Fortunately, education did not come to a standstill. Online classes, distance learning and recorded lectures have already been introduced to varying degrees prior to this pandemic. These resources for distant learning were carefully curated in order to keep up with the times and facilitate teaching and learning outside of the classroom. [4] In Malaysia, institutes of tertiary education were aware of the leverage recorded lectures provide its students and have taken steps in implementing the use of such technology. [19] Many institutions were prepared to make the switch to online

learning, and different universities came up with comprehensive plans to deliver modules in the best way possible for the students. [20] Recorded lectures are usually provided alongside the conduction of live online lectures, for the students' convenience to view at any time and to revisit the material covered. [21] Video recording or online lecture capture is taken while the lecture is ongoing, and later uploaded as digital archives to university-administered multimedia sites such as Moodle, Blackboard, and various others, where the students can access them. [22, 23]

It is quite clear that there are several different mediums of learning that students can choose from to facilitate their learning outside of the classroom, but the question remains as to how much of it is actually utilized effectively by the students. It is not enough to merely provide a service, we must continually assess its usefulness to the target population as well. Prior to the pandemic, the traditional way of taking classes at Melaka-Manipal Medical College (MMMC) was being physically present in the classroom environment. Given the recent unorthodox turn of events, the educational sector is battling to discover choices to bargain with this challenging circumstance. [24] Melaka-Manipal Medical College (MMMC) implemented the novel approach of online teaching along with providing lecture recordings thus guaranteeing the continuation of the learning process of the future group of healthcare workers. The extent to which students embrace and effectively employ the availability of recorded lectures is not often studied, and there are yet sufficient theories on students' viewpoint on the strategic usage and integration of recorded lectures in their learning process. [25] Since the use of such technology is fairly new to the members of this college, undertaking this study among the undergraduate students of MMMC would provide useful insight

on students' perception and utilization of such facilities, and pave the path for upgrade of such tools for better learning.

The objectives of our study are to determine the percentage of students who utilize the recordings, their purpose and pattern of usage, their perception towards it and its association with attendance and attentiveness during live online lectures.

## 2. Methods

### 2.1. Study Design, Time, Setting, Study Population

The study is a cross-sectional study which was conducted from August 2020 till November 2020 among the undergraduate students of Melaka Manipal Medical College (MMMC), a private medical college in Malaysia. The college has one campus in Melaka and another campus in Muar, Johor. This college offers three courses, Bachelor of Medicine and Bachelor of Surgery (MBBS), Bachelor of Dentistry (BDS), and Foundation in Science (FIS). In our study, we included students of the MBBS programme in semesters 6 and 7 (year 4) who were studying in the Muar campus. We selected them as our target population as they had online classes for which recordings of the lectures were provided.

### 2.2. Sample Size

Based on a previous study done in St. George's University, Grenada, 95% of all participants used recorded lectures to supplement their studies. [25] With the formula application software "Epi Info" version 7.2.4.0, the sample size (n) was calculated as below: -

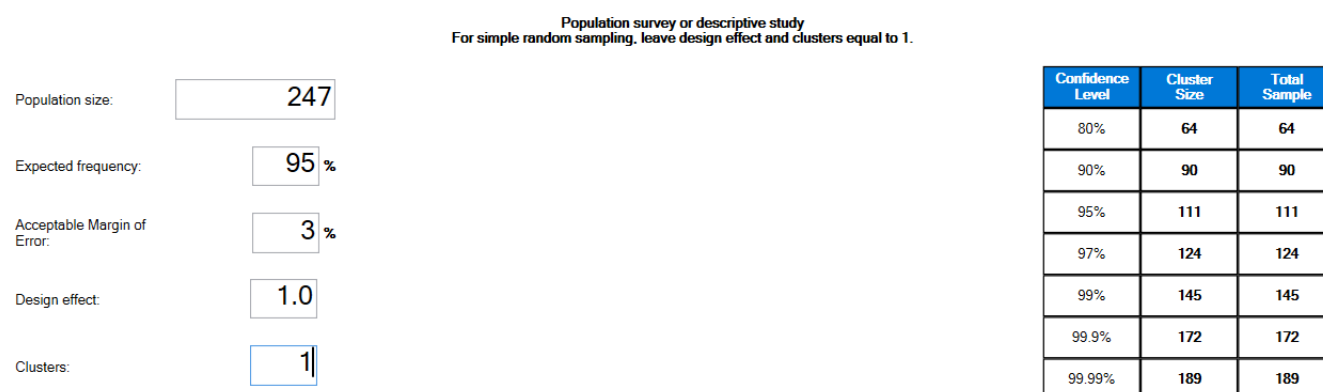


Figure 1. Calculation of minimum sample size.

The minimum sample size required with the confidence level of 95% is 111.

Taking non-response percentage of 20% into consideration, the final sample size was calculated as follows:

$$n(\text{final}) = \frac{n(\text{calculated})}{1 - (\text{non-response})} = \frac{111}{1 - 0.2} = 138.75$$

Therefore, the final sample size for this study is 139.

### 2.3. Sampling

The sampling method used was purposive sampling. This method

was selected in line with the characteristics of the sample population and the objectives of this study. Students of the MBBS programme studying in semesters 6 and 7 in the Muar campus of Melaka Manipal Medical College were selected to participate in this study. The inclusion criteria were MBBS students in semesters 6 and 7 who were provided with recordings of theory classes, and willingly consented to participate in this study as well as completed all the required parts of the questionnaire given. The exclusion criteria were students who were not provided with recordings of theory classes, students who did not consent to participate in the study and those who failed to complete the required parts of the questionnaire.

## 2.4. Data Collection

The questionnaire was taken from a previous study and modified accordingly to better suit our case. [26] The data was collected by the distribution of questionnaires via google forms. These questionnaires were forwarded to fourth year medical students of MBBS batches 40 and 41. The questionnaire consisted of five sections.

The first section collected demographic data consisting of age, gender, nationality, batch and residency. The second section consisted of five questions. The first four questions were about attendance and attention which reflected on the differences of percentage of attendance and level of attention before and after the commencement of online/recorded lecture. The level of attention was assessed on scale of one to five between face to face classes and upon commencement of online/recorded lectures with one being not attentive at all and five being very attentive. The fifth question determined the reason for non-attentiveness in online class. This was a multiple-choice answer question with eight options. For example, "I have already studied the content beforehand" and "I can get the same information from reading slides and textbooks" etc.

The third section mainly assessed the purpose of use of recorded lectures. This comprised of five questions. The

fourth section included six questions to assess the usage pattern of the recorded lecture. In these two sections, each student was given the option to choose either 'Yes' or 'No'. The final section aimed to gauge students' overall perception of the recorded lectures with seven questions. The students needed to respond on a four-point Likert scale with the option of strongly agree, agree, disagree and strongly disagree depending on the personal opinion.

## 2.5. Data Processing and Data Analysis

Data was collected from the Google forms distributed to the participants. The data collected was entered into Microsoft Excel and the compiled data were statistically analysed using Epi Info version 7.2.4.0.

For this study, the categorical qualitative data were gender, nationality, batch, residency, attendance, attentiveness, and utilization of recorded lectures. To measure the frequency and percentage of utilization, section 4 of the questionnaire was referred. If anyone of the six questions were marked as 'yes' then the entry will be considered as 'use' recorded lectures. Quantitative data included age and perception. Perception was assessed in section 5 of the questionnaire on a four-point Likert scale. The maximum score that can be obtained is 28. Therefore, the score obtained by each individual will be calculated as percentage, a continuous qualitative data.

Descriptive characteristics including age, gender, nationality, batch, residency, percentage, purpose and pattern of utilization of recorded lecture and perception towards recorded lecture were calculated and summarized. Furthermore, inference and association between independent variables such as gender, nationality, batch, residency, attendance and attentiveness and dependent variables like the utilization and perception of recorded lecture was also calculated. Statistical tests conducted were unpaired t-test, fisher exact test and simple linear regression. Level of significance was set at  $p = 0.05$  with a 95% confidence level.

**Table 1.** Variables and statistical tests used in data analysis.

Independent variable	Dependent variable	Statistical test
Gender	Utilization of recorded lectures	Fisher exact test
Nationality	Utilization of recorded lectures	Fisher exact test
Batch	Utilization of recorded lectures	Fisher exact test
Residency	Utilization of recorded lectures	Fisher exact test
Gender	Perception towards recorded lectures	Unpaired T-test
Nationality	Perception towards recorded lectures	Unpaired T-test
Batch	Perception towards recorded lectures	Unpaired T-test
Residency	Perception towards recorded lectures	Unpaired T-test
Perception towards recorded lectures	Utilization of recorded lectures	Simple logistic regression
Attendance	Utilization of recorded lectures	Fisher exact test
Attentive	Utilization of recorded lectures	Simple logistic regression

## 2.6. Ethical Consideration

An informed consent form detailing all the important and

relevant particulars of the study were provided to the participants. The participants were given full freedom of choice to participate in this study. No incentives were given

to encourage participation, nor were the participants coerced or forced into taking part in this study. Whatever information that were provided by the participants in this study were kept strictly confidential and served only the purpose of this study. Maintenance of the anonymity and privacy of the participants were ensured. This research was approved by the Research Ethics Committee of the Faculty of Medicine, Melaka Manipal Medical College, Melaka, Malaysia.

### 3. Results

**Table 2.** Sociodemographic characteristic of undergraduate medical students. (n=126).

VARIABLES	FREQUENCY (%)
Age:	
≤ 22	76 (60.32)
>22	50 (39.68)
Mean (SD)	22.25 (0.93)
Minimum – Maximum	19 – 24
Gender:	
Female	74 (58.73)
Male	52 (41.27)
Nationality:	
Malaysian	113 (89.68)
International	13 (10.32)
Batch:	
Year 4 senior batch	48 (38.10)
Year 4 junior batch	78 (61.90)
Residency:	
Rural	19 (15.08)
Urban	107 (84.92)

Table 2 shows the sociodemographic characteristics of the studied participants. A total number of 126 responses were received out of 139 undergraduate medical students from the online questionnaire (response rate of 90.65%). The ages of the participants were classified into 2 groups for this study, 76 (60.32%) were aged 20 or below, while the other 50 (39.68%) were above the age of 22. The mean age was 22.25 years with a standard deviation of 0.93. Among the participants, 74 were females (58.73%) and the remainder of 52 participants were males (41.27%). With regards to nationality, 113 of the respondents were Malaysians (89.68%) and the remaining 13 respondents were International students (10.32%). Batch wise, the leading number of responses, 78, was from the junior batch (61.90%) and the remaining 48 responses were from the senior batch (38.10%). Most of the participants resided in urban areas with a total of 107 (84.92%) while the remaining 19 participants hailed from rural areas (15.08%).

**Table 3.** Number and percentage of utilization of recorded lectures. (n=126).

	Yes n (%)	No n (%)
Utilisation of recorded lectures	122 (96.83)	4 (3.17)

Table 3 mainly highlights the number and percentage of utilization of recorded lectures among the year 4 students. Among the 126 participants, most of them (96.83%) responded that they use the recorded lectures while only 3.17% of students did not use the recorded lectures at all. The number of students were 122 and 4 participants respectively.

**Table 4.** Purpose of use of recorded lecture. (n=126).

Purpose of use	Yes n (%)	No n (%)
To pick up on points that missed.	104 (82.54)	22 (17.46)
To pick up announcements and exam hints	94 (74.60)	32 (25.40)
To revisit complex ideas and concepts when the lectures are unclear	107 (84.92)	19 (15.08)
To take comprehensive notes and/or correct notes taken during live online lectures.	88 (69.84)	38 (30.16)
When the students have missed the class.	103 (81.75)	23 (18.25)

Table 4 shows the part of the questionnaire assessing on the purpose of use of recorded lectures. The highest number of use of recorded lectures among 126 participants was “to revisit complex ideas and concepts when the lectures were unclear”. 84.92% of students chose this whereas the lowest use, 69.84% of these lectures was “to take comprehensive notes and/or correct notes taken during live online lectures.” 82.54% of the participants used these recordings to pick up on points that they missed during lectures. 81.75% used recorded lectures when they missed the lectures and 74.60% used recorded

lectures to pick up on announcements and exam hints. In contrast, 30.16% of participants did not use recorded lectures to take comprehensive notes and/or correct notes taken during live online lectures followed by 25.4% who did not use it “to pick up announcements and exam hints”. 18.25% answered no when asked if they used recordings when they missed lectures. 17.46% did not use them “to pick up on points that they missed during lectures”. Finally, the least percentage of students, 15.08% voted no towards revisiting complex ideas and concepts when the lectures were unclear.

**Table 5.** Usage pattern of recorded lectures. (n=126).

Usage pattern	Yes n (%)	No n (%)
I listen to the entire recording.	36 (28.57)	90 (71.43)
I choose particular segments of the recording while listening to recorded lectures.	99 (78.57)	27 (21.43)
I listen to recorded lectures regularly/repeatedly.	32 (25.40)	94 (74.60)
I have used recorded lectures to browse and stop at points of interest.	104 (82.54)	22 (17.46)
I have used recorded lectures to listen to multiple lectures a day.	53 (42.06)	73 (57.94)
I use recorded lectures infrequently and only use it before the examination.	53 (42.06)	73 (57.94)

Table 5 describes how students used the lecture recordings while watching them. Only 28.57% of students listened to the entire recording. However, many of the students, 71.43%, did not listen to the entire recording. This is reflected by the next statement where 78.57% of students chose to listen only to particular segments of the lecture recording while 21.43% of students opposed this usage pattern of recorded lectures. Only 25.40% of students admitted to listening to the recorded lectures regularly / repeatedly while most students (74.60%) did not do this. The vast majority of students browsed and

stopped at points of interest when using lecture recordings. This usage pattern was shown to be the most popular with 82.54% of students who did this, and only 17.46% who did not prefer this usage pattern. On the frequency of lecture usage, roughly half of the students (42.06%) admitted to using recorded lectures as frequently as multiple times a day, while 57.94% disagreed with this. In contrast, 42.06% of students said that they listened to lecture recordings infrequently and mostly before examinations in order to prepare for them, while 57.94% disagreed with this statement.

**Table 6.** Perception of recorded lectures. (n=126).

Perception of recorded lectures	Strongly agree n (%)	Agree n (%)	Disagree n (%)	Strongly disagree n (%)
Recorded lectures helped me to pass the course and/or block exam.	28 (22.22)	74 (58.73)	23 (12.25)	1 (0.79)
By using recorded lectures, I can work at my own pace	56 (44.44)	61 (48.41)	9 (7.14)	0 (0)
Using recorded lectures helped me to achieve my desired scores.	30 (23.81)	67 (53.17)	29 (23.02)	0 (0)
I find that recorded lectures helped me in preparing for exams effectively.	32 (25.40)	72 (57.14)	19 (15.08)	3 (2.38)
I can view the recorded lectures anywhere (outside the house).	59 (46.83)	50 (39.68)	15 (11.90)	2 (1.59)
It is too time-consuming to relisten to the recorded lectures.	13 (10.32)	53 (42.06)	49 (38.89)	11 (8.73)
I can use recorded lectures on all types of electronic devices including cell phones, iPads, laptop computers, etc.	60 (47.62)	59 (46.83)	7 (5.56)	0 (0)

Table 6 demonstrates the perception of students towards recorded lectures. It can be seen that only a small percentage 0.79% of students strongly disagreed that recorded lectures helped them pass their exams. A strong 58.73% agreed with the statement, followed by 22.22% who strongly agreed and 12.25% who disagreed. 48.41% of the participants agreed that recorded lectures allowed them to work on their own pace. 44.44% of them strongly agreed and only 7.14% disagreed. A good majority of 53.17% of participants agreed that recorded lectures helped them achieve their desired scores. 23.81% strongly agreed to this fact whereas a similar 23.02% disagreed. 57.14% of students admitted that recorded lectures helped in their preparation of exams. This majority was followed by the 25.4% who strongly supported this statement. 15.08% disagreed with this and only 2.38% strongly disagreed. Many students supported the statement that they were able to view the recorded lectures anywhere, including outside their house. 46.83% of students strongly agreed to this, while 39.68% agreed. However, 11.90% of students disagreed with this and 1.59% strongly disagreed. When it came to the time taken to listen to the recorded lectures, some students felt it was too time-consuming to do so. About 10.32% students strongly felt this way while 42.06% also agreed to this. On the other hand, a good number of students did not feel this way, with a disagreement by 38.89% and a strong disagreement by 8.73% strongly disagreeing with this. The vast majority of students supported that recorded lectures could be used on all types of electronic devices, such as cell phones, iPads as well as on laptops. 47.62% strongly agreed and 46.83% agreed with this. Only 5.56% of students disagreed with this statement.

**Table 7.** Reasons for non-attentiveness during online classes. (n=126).

Reasons for non-attentiveness in online classes	Frequency (%)
I have already studied the content beforehand.	5 (3.97)
I can get the same information from reading slides and in textbooks.	30 (23.81)
I find the online lectures difficult to follow.	61 (38.41)
I don't find the online lectures engaging.	85 (67.46)
My internet connection is poor.	50 (39.86)
I can just watch the recording instead.	43 (34.13)
Inconvenient time of lectures.	17 (13.49)
Others	7 (5.56)

\*Multiple response answer

Table 7 demonstrates the reasons for non-attentiveness in online classes. 85 participants (67.46%), which was the majority of the participants selected the option of "not finding the online lectures engaging", while 5 participants (3.97%) chose the least selected reason of having "already studied the content beforehand." The second highest reason, that was chosen by a number of 61 participants (38.41%), was of them finding "online lectures difficult to follow." A number of 50 respondents (39.86%) supported the statement of having "poor internet connection" as the reason for non-attentiveness, while 43 respondents (34.13%) found that being able to "just watch the recording instead" made them non-attentive during online classes. 30 participants (23.81%) admitted to being non-attentive due to being able to "get the same information from reading slides and in textbooks" and 17 participants (13.49%) chose the reason of non-attentiveness to be "inconvenient time of lectures." A minority of 7 students (5.56%) listed out some other reasons for non-attentiveness which included: having to sit for long

hours and having to experience straining of eyes, presence of several distractions including the mobile phones, preference over self-reading and the mere fact of simply being lazy having to be present for lectures while being at home.

**Table 8.** Association between sociodemographic characteristics and usage of recorded lectures.

Independent variable	Usage of recorded lectures		P value
	Yes n (%)	No n (%)	
Gender			
Male	50 (95.15)	2 (3.85)	0.999
Female	72 (97.3)	2 (2.70)	
Batch			
Year 4 senior batch	44 (91.67)	4 (8.33)	0.019
Year 4 junior batch	78 (100)	0 (0)	
Nationality			
Malaysian	109 (96.46)	4 (3.54)	0.999
International	13 (100)	0 (0)	
Residency			
Urban	105 (98.13)	2 (1.87)	0.108
Rural	17 (89.47)	2 (10.53)	

\*Fisher exact test was used

Table 8 details the sociodemographic factors of the study participants and their possible effect on the usage of recorded lectures. The significance of these associations was calculated using Fisher's exact test. Results were considered significant if the p value was less than 0.05. Gender was shown to have no association with the usage of lecture recordings. It was statistically insignificant with a p value of 0.999. Students from both batches clearly showed a difference in usage of online lectures, as emphasised by a p value of 0.019, which was statically significant. This shows that the junior batch students used recorded lectures more than the senior batch students. The nationality of the students also was not a differentiating factor, illustrated by an insignificant p value of 0.999. As for the residency of the students, the p value was calculated to be 0.108, therefore it was deemed not significant as well. In short, batch was the only factor which had a significant influence on students' usage of online lectures.

**Table 9.** Association between sociodemographic characteristics and perception towards recorded lectures.

Independent variable	Perception percentage mean (SD)	Mean difference (95% CI)	P value
Gender			
Male	77.13 (12.60)	0.38 (-4.05, 4.81)	0.865
Female	77.51 (12.21)		
Batch			
Year 4 senior batch	74.55 (11.28)	-4.52 (-8.94, -0.10)	0.045
Year 4 junior batch	79.08 (12.69)		
Nationality			
Malaysian	77.81 (12.59)	-4.46 (-11.59, 2.67)	0.218
International	73.35 (9.18)		
Residency			
Urban	77.60 (12.42)	-1.66 (-7.75, 4.43)	0.590
Rural	75.94 (12.01)		

\*Unpaired T-test was used

Table 9 describes the association between the sociodemographic profiles and how they affect the students' perception towards the use of recorded lectures. Results are considered significant if they have a p value less than 0.05. The data collected showed that gender did not have any significant association with the perception of recorded lectures. The p value was 0.865, therefore it was statistically insignificant. There was only a slight difference in the mean values of the two genders, males with a score of 77.13 (SD=12.60) and females with a score of 77.51 (SD=12.21). The mean difference in perception was 0.38 with a confidence interval from -4.05 to 4.81. Students from different batches had a significant difference in perception of recorded lectures, with a p value of 0.045. Hence the two variables were associated. Students from the two batches had quite a large difference in their mean values, with a score of 74.55 (SD=11.28) from the senior batch students while students from the junior batch had a higher score of 79.08 (SD=12.69). There was a mean difference of -4.52 between the two batches, with a confidence

interval of -8.94 to -0.10. When it came to the nationality of the students, being either Malaysian or non-Malaysian, this factor was shown to be not statistically significant, with a p value of 0.218. When the mean values were compared, Malaysian had a mean score of 77.81 (SD=12.59) to the non-Malaysian mean score of 73.35 (SD=9.18). The mean difference was -4.46 with a confidence interval of -11.59 to 2.67. Therefore, there was no association between nationality and their perception of recorded lectures. The residency of the students, whether urban or rural, also did not have a significant association on their perception towards recorded lectures. The p value for this factor was calculated to be 0.590. Students who lived in urban areas scored a mean value of 77.60 (SD=12.42) while those who lived in rural areas scored a mean value of 75.94 (SD=12.01). The mean difference stood at -1.66 with a confidence interval of -7.75 to 4.43. In short, the only demographic factor shown to have any significant association with the students' perception towards recorded lectures was the batch that they were in.

**Table 10.** Simple logistic regression analysis of association between perception and utilization of recorded lectures

Independent variable	Odds Ratio	95% C. I.	Standard Error	P-Value
Perception	1.051	1.034 - 1.067	0.008	<0.001

\*Simple logistic regression was used

Table 10 shows the association between perception and utilization of recorded lectures. Since P-value is less than 0.05, this association is statistically significant. Odds ratio was calculated to be 1.051 with a 95% confidence interval of 1.034 - 1.067. This suggests that the students with good or better perception towards recorded lectures were 1.051 times more likely to use them.

**Table 11.** Attendance before and after the commencement of online lectures classes.

Attendance	n (%)	
	Before commencement of online classes	After commencement of online classes
100%	31 (24.60)	62 (49.21)
90-99%	89 (70.63)	55 (43.65)
80-89%	3 (2.38)	7 (5.56)
<80%	3 (2.38)	2 (1.59)
Total	126 (100)	126 (100)

Table 11 details the attendance of the students before and after commencement of online lectures. Before the commencement of online lectures, 31 students, or 24.60% of the sample attended all face-to-face classes and had 100% attendance. The majority of students, 89 or 70.63% of students fell into the category of 90-90% attendance. Only 3 students (2.38%) were in the 80-89% attendance category while 3 other students (2.38%) had an attendance of less than 80%. After the commencement of online classes where recorded lectures were given, there was a twofold increment in 100% attendance, with 62 students (49.21%) having full attendance for online lectures. A good number of students also fell into the 90-99% attendance category, with 55 students, or 43.65%. 7 students (5.56%) reported attendance between 80-89% and 2 students (1.59%) had an attendance below 80%.

**Table 12.** Association between attendance and usage of recorded lectures.

Independent variable	Usage of recorded lectures		P-value
	Yes n (%)	No n (%)	
Attendance before recorded lecture provided			
<80%	3 (2.38)	0 (0)	0.648
80-89%	3 (2.38)	0 (0)	
90-99%	85 (67.46)	4 (3.17)	
100%	31 (24.60)	0 (0)	
Attendance after recorded lectures provided			
<80%	2 (1.59)	0 (0)	0.999
80-89%	7 (5.56)	0 (0)	
90-99%	53 (42.06)	2 (1.59)	
100%	60 (47.62)	2 (1.59)	

\*Fisher exact test was used

Tables 12 shows the students' attendance for lectures before the commencement of recorded lectures (during face to face lectures) and after the commencement of online classes, where recorded lectures were provided and their association with the usage of recorded lectures. The p value for attendance in face to face lectures is 0.648 whereas the p

value for attendance in online lectures (with lecture recordings provided) is 0.999. Both p values were calculated to be more than 0.05, therefore it is statistically insignificant. This shows that the students' attendance was not associated with their usage of recorded lectures.

**Table 13.** Simple logistic regression analysis of association between attentiveness and utilization of recorded lectures.

Independent variable	Odds Ratio	95% C. I.	Standard Error	P-Value
Attentiveness in the class before providing recorded lectures	2.525	1.895 - 3.364	0.142	<0.001
Attentiveness in the class after providing recorded lectures	3.999	2.561 - 6.245	0.227	<0.001

\*Simple logistic regression was used

Table 13 highlights the association between the attentiveness of students in class before (during face to face classes) and after (when online classes started) recorded lectures were provided. It was found that attentiveness of students in class before recorded lectures were provided had an association

with their usage of the recordings. The calculated P- value is less than 0.05 which makes this association statistically significant. The calculated odds ratio is 2.525 with a 95% confidence interval of 1.895 -3.364. It indicates that students who were attentive in class before recorded lectures were



provided were 2.525 times more likely to use them. On the other hand, the attentiveness of student in class after recorded lectures were provided too has an association with their usage of the recordings. The calculated P- value is also less than 0.05 which makes this association statistically significant. The calculated odds ratio is 3.999 with a 95% confidence interval of 2.561 - 6.245. This suggests that students who were attentive in class after recorded lectures were provided are 3.999 times more likely to utilize them.

## 4. Discussion

The study we conducted was a cross-sectional study to investigate the utilization of recorded lectures among Year 4 MBBS students of Melaka-Manipal Medical College, Muar campus. Furthermore, we set out to determine their purpose and pattern of usage, their perception towards recorded lectures and its association with attendance and attentiveness during live online lectures.

With regards to the utilisation of recorded lectures among these students, it was found that 96.83% of students do use recorded lectures while only a small percentage of 3.17% never used them. According to a research done in St. George's University in Grenada, 95% of their students admitted to have used recorded lectures. [25] Another cross-sectional study by Cardall on live lecture versus video-recorded lecture in Harvard Medical School showed that all students have viewed a recorded lecture. [21] While most of the students admitted to have used recorded lectures, the usage pattern of these recordings differed among them. Most of the students browse and stop at points of interest and listen to particular segments of the recording. A majority of them did not prefer to listen to the entire recordings regularly or repeatedly. The results were relatively consistent with the cross-sectional study done among medical students in St. Matthew's University in the Cayman Islands assessing their medical students' usage pattern of lecture recording software. In their study, it showed that 71.43% of students browse and stop at points of interest while 52.38% of them do not listen to lecture notes regularly. [26] In our study, it was also found that a large percentage of students use recorded lectures to revisit complex ideas and concepts when the lectures were not clear to pick up on points that they've missed or when they were absent for class. Most of the students used recorded lectures either to pick up announcements and exam hints or to take comprehensive notes and/or correct notes taken in the class. In comparison to the study done in St. Matthew's university, the results also showed the same. They stated that 75.24% of participants revisited complex ideas and concepts whereas 78.10% used the recordings when on sick leave. [26] However, based on study conducted in

Robert Wood Johnson Medical School, USA the highest percentage of students use recorded lectures as supplement for missed live lectures while half of the students use them to listen to segments that they didn't comprehend during live lectures. [27] According to the research done in School of Nursing at Fontys University of Applied Sciences in the Netherlands and Eindhoven University of Technology, a majority of students from both universities stated that they used recorded lectures making up for a missed class and half of the students from both universities use recorded lectures to review materials after the lectures. [9]

The analysis of the students' perception towards recorded lectures showed that there was an overall positive perception towards the use of recorded lectures, with the majority of students agreeing that recorded lectures were helpful in preparing for and passing their exams, achieving their desired scores and allowing them to work at their own pace. The students also largely agreed that the recorded lectures could be used on a large variety of electronic devices as well as could be viewed anywhere, even outside their homes. The only drawback seemed to be where more than half of the students who participated felt that it was too time-consuming to listen to the recorded lectures. This was reflected on our analysis explaining the students' usage patterns of recorded lectures, where most of the students do not listen to the entire recording but instead listen to certain parts of it as required. With respect to previous studies, Hussain et al. showed that students largely supported the benefits of using lecture recording software, which aligns with the findings of our study. [26] In their study, they found that the students agreed most on the fact that recorded lectures allowed them to work at their own pace and that they could use the recorded lectures anywhere. [26] Similar to our results, the students also believed that it was too time-consuming to listen to the recorded lectures. [26] Another study done by Karnad showed that while students had a generally positive perception towards the use of recorded lectures, overall, they preferred to attend live or face-to-face lectures as it facilitated their learning better. [8] Similar findings were presented by Simcock et al in their survey on first year biology students' (of Massey University, New Zealand) opinions on live lectures and recorded lectures. [22] All the students that participated in the study had a favourable view towards the availability of lecture recordings, and almost all of them regarded lecture recordings as a good quality learning experience. [22] However, as a whole, the students still preferred attending live lectures over just watching the lecture recordings, and none of them considered the latter to be sufficient as a primary source of information. [22] When asked about whether it was acceptable to replace live lectures with lecture recordings, the majority of students opposed this,

even though the lecture recordings contained the same information as live lectures. [22] The study concluded that even though students did have a positive perception towards recorded lectures, their engagement with the lecture recordings was low enough to contradict this and as a whole they valued live lectures over recorded lectures. [22] This difference in perception can be explained by the fact that our study was done in the midst of the COVID-19 pandemic, where online modes of teaching replaced face-to-face teaching as most areas were under the Movement Control Order (MCO). Since our students had no access to campus for face-to-face lectures, online classes and recorded lectures were the only way they could supplement their learning, thus we could deduce this to be a contributory factor for the better perception our students have towards recorded lectures.

Based on our results, it was also found that there was a significant positive association between students' attentiveness in class after recorded lectures were provided and their usage of it. Students who paid better attention in class after given recorded lectures were more likely to utilize them. However, there were students who did not pay good attention during class when the recorded lectures started. Among those, more than half of our participants admitted that they did not find online classes engaging. This came to support the findings of a previous cross-sectional study done by Topale where she describes the primary cause of missed lectures were the lecturer's ability to engage and communicate rather than the availability of recordings. [25] Other notable reasons of our students included poor internet connection, finding it difficult to follow lectures online and feeling like they could just watch the recordings instead. Only a minority of them answered that they could get the same information from other reading materials, that they studied the content beforehand and found the lecture timings inconvenient.

This study also measured the association between sociodemographic factors like gender, batch, nationality, residency and the usage of recorded lectures. The only significant association that could be made was between batch and usage of recorded lectures. Other sociodemographic characteristics failed to show any association. Among the fourth-year medical students, the junior batch used recorded lectures more than their senior counterpart. This is in contrast to a past research done on the analysis of lecture videos utilization in undergraduate medical, the results showed that senior year students use lecture videos more than the junior students. [28] As for our case, it could be reasoned that senior students were exposed to face to face lectures for a duration of 6 months in their initial phase of the clinical year prior to the Movement Control Order (MCO). They favoured learning by being physically present in the classroom rather

than virtually online and using recordings. This is one factor contributing to their minimal usage. On the other hand, junior students started their clinical phase during the MCO and hence did not get to experience face to face teaching. Therefore, a higher percentage of usage was recorded among them. However, another study conducted by Gupta A & Saks revealed that there was no association between batch and usage of recorded lectures as junior and senior year students appear to use an almost equal percent of recorded lectures. [27]

Based on the assessment on the association between the sociodemographic characteristics of the participating students and their perception towards recorded lectures, the only significant association found was the difference in batches, where students from the junior batch showed a better perception towards recorded lectures as compared to the students from the senior batch. Meanwhile, the perception of the students towards recorded lectures had a positive association with their utilisation of recorded lectures. In short, students with a better perception of recorded lectures were shown to be more likely to make use of them. Several previous studies done strongly supported this relationship. A study done by Topale on medical students in Grenada found that the students were deliberate in their use of recorded lectures, backed by sufficient reasoning as to why and how they chose to use them. [25] The study concluded that the availability of recorded lectures was indeed an indispensable resource in medical schools and its strategic use an important facilitator of self-directed learning for the students. Soong *et al.* did a survey on students at Nanyang Technology University who used recorded lectures as part of their learning experience and almost all of the students agreed on the usefulness and benefits of using the lecture recordings. [23] Thus, it can be said that the students who used recorded lectures had very good reasons to do so, and believed that it not only supplemented their studies but was also an integral part of their learning experience.

We encountered a few limitations in the course of conducting this research. To begin with, the students might have been negligent in responding to the questionnaire following the commencement of clinical postings where students were too caught up by day to day activities. Out of a total student population of 247, only 126 students responded. The 118 students who did not participate were responsible for a refusal rate of 48.99% implying the likelihood of volunteer bias in this study. Moreover, most notably, the participation from the year 4 MBBS seniors was considerably less in comparison with the participation from the year 4 MBBS juniors. The reason for this was that we faced some difficulty in acquiring responses from the senior students during the lockdown period especially with the commencement of their

clinical postings before that of the junior batch students as both batches followed different timetables. Another limitation would be that the participants in our study might have chosen and listed out whatever they thought would be acceptable responses to the researcher, rather than picking the answers that resonate with them the most indicating the presence of social desirability bias. In light of the Covid-19 pandemic, the recorded lectures were introduced among undergraduate medical students for the very first time. Therefore, the last limitation would be the fact that this study was done at a point in time where the students were having a novel experience in the usage of recorded lectures, which means that the participants might not have been used to the concept of recorded lectures during the time of our data collection. Moreover, as this is a cross-sectional study, it does not allow us to gauge any change in perception and utilization of recorded lectures that might occur over a period of time.

As it was evident in our study, the highest percentage of students stated the fact of not finding classes engaging as the reason for non-attentiveness. To overcome this, the medical college faculty should establish several measures to engage the students in their lectures in order to keep them attentive during online classes. Even though we assessed the purpose and usage pattern of the recorded lectures in the study, there was no further elaboration regarding the frequency of usage. For example, we could have further assessed for an increase in the usage and any significance in the timing of consulting recorded lectures, whether it was for revision during normal times or solely for preparations right before exams. Thus, further evaluation on the frequency of usage should be done in any future study on the matter. Our current study also lacked an establishment based upon the impact of learning by the use of recorded lectures on academic performance. To address this, future studies can compare the students' exam results prior to and after the usage of recorded lectures. In order to prove a correlation between the utilization of recorded lectures with the attendance of the students, the analysis could be more focused on the number of times and when the recorded lectures were used by the students based upon their attendance. For example, whether a student with the lowest attendance has the highest frequency of referring to the recorded lectures and also whether the absentees are covering up the missed lectures on the same day of being absent or on some other day. Since our study only includes undergraduate medical students in one private college, we recommend future researchers to include all students doing their higher studies in different colleges for a better further assessment of perception and utilization of recorded lectures. This study has also not explored the attitudes of the lecturers at campus regarding the utilization and perception of recorded lectures therefore, this aspect should be considered for future work.

## 5. Conclusion

In summary, it was observed that 96.83% of year 4 MBBS students of our college who are in their clinical phase use recorded lectures to facilitate their learning during the period of the Movement Control Order. The most popular purpose of using these recordings was to revisit complex ideas and concepts that were unclear during the lectures. Students were found to mainly browse and stop at points of interest instead of reviewing the entire recording to save time. Overall, student's perception towards these recordings was good and this was associated with an increased likelihood of using them. Since it was found that there was a good acceptance of recorded lectures, the college or any other institute of education should make lecture recordings available to students not just during times of restricted movement or lockdowns, but also during face-to face classes using lecture capture technology. This will undoubtedly facilitate better learning among undergraduate students.

## Acknowledgements

The authors would firstly like to thank all the volunteers who willingly participated in our study. We also wish to extend our heartfelt gratitude to the Dean of Melaka-Manipal Medical College (MMMC) and Head of Department for Community Medicine MMMC, Professor Dr Adinegara Lufti Abas, our lecturers Professor Dr Htoo Htoo Kyaw Soe, Associate Professor Dr Sujata Khobragade and Assistant Professor Dr Mila Nu Nu Htay from the Department of Community Medicine, MMMC Muar Campus for their unending patience and guidance for us throughout the conduct of the research. We would also like to thank the Research Ethics Committee, Faculty of Medicine, MMMC, Malaysia for their approval and support of the study. Last but not least, we thank Mr. Azhar Hussain, MD/DHA Candidate, Research Assistant in Biomedical Engineering, Department of Orthopedics and Rehabilitation Medicine, SUNY Downstate Medical Center. for giving us permission to refer and use his questionnaire from his study.

## References

- [1] Davies TL, Cotton VK, Korte L. Students usage and perceptions of the value of recorded lectures in a traditional face-to-face (F2F) Class. *Journal of College Teaching & Learning*. 2016; 13. 85. 10.19030/tlc.v13i3.9714.
- [2] Behr AL. Exploring the lecture method: an empirical study', *Studies in Higher Education*, vol. 13. 1988; 189-200. DOI: 10.1080/03075078812331377866

- [3] Warnecke E, Pearson S. Medical students' perceptions of using e-learning to enhance the acquisition of consulting skills. *Australas Med J.* 2011;4(6):300-7. doi: 10.4066/AMJ.2011.736. Epub 2011 Jun 30. PMID: 23386892; PMCID: PMC3562947.
- [4] Reimers F, Schleicher A, Saavedra J, Tuominen S. Supporting the continuation of teaching and learning during the COVID-19 pandemic. *Organization for Economic Co-operation and Development*; 2020.
- [5] Lefoe, G., and R. Albury. 2004. Editorial. *Educational Media International* 41: 181–2.
- [6] Woo K, Gosper M, McNeill M, Preston G, Greenc D, Phillips R. Web-based lecture technologies: blurring the boundaries between face-to-face and distance learning. *ALT-J, Research in Learning Technology*, Vol. 16; No. 2. June 2008; 81–93.
- [7] Leoni, K. & Lichti, S. (2009) *Lecture Capture in Higher Education*, Northwestern University.
- [8] Karnad A. Students Use Of Recorded Lectures. [online] Pdfs.semanticscholar.org. [cited 2020 Aug 4] Available from: <https://pdfs.semanticscholar.org/4cac/bd06497bb87297fc84bc956efdeb9a2433bb.pdf>
- [9] Gorissena P, Bruggen JV, Jochemsc W. Students and recorded lectures: survey on current use and demands for higher education. *Research in Learning Technology*, Vol. 20. 2012
- [10] El Mansour B, & Mupinga DM. Students' positive and negative experiences in hybrid and online classes. *College Student Journal.* 2007; 41(1), 242-248.
- [11] Sullivan P. Gender differences and the online classroom: Male and female college students evaluate their experiences. *Community College Journal of Research and Practice.* 2001; 25, 805-818.
- [12] Johnston AN, Massa H, Burne TH. Digital lecture recording: a cautionary tale. *Nurse Educ Pract.* 2013;13(1):40-47. doi:10.1016/j.nepr.2012.07.004
- [13] St. Clair KL. A Case Against Compulsory Class Attendance Policies in Higher Education. *Innovative Higher Education.* 1999; 23, 171–180. Available from: <https://doi.org/10.1023/A:1022942400812>
- [14] Zounek J, Sudický P. Heads in the Cloud: Pros and Cons of Online Learning. [Internet] 2003 Jun [cited 2020 Aug 4]; .Available from: [https://www.researchgate.net/publication/311807840\\_Heads\\_in\\_the\\_Cloud\\_Pros\\_and\\_Cons\\_of\\_Online\\_Learning](https://www.researchgate.net/publication/311807840_Heads_in_the_Cloud_Pros_and_Cons_of_Online_Learning)
- [15] Lin Q. Student satisfactions in four mixed courses in elementary teacher education program. *The Internet and Higher Education.* 2008; 11. 53-59. doi:10.1016/j.iheduc.2007.12.005.
- [16] Grabe M, Christopherson K. Optional student use of online lecture resources: Resource preferences, performance and lecture attendance: Original article. *Journal of Computer Assisted Learning.* 2008; 24. 1 - 10. doi:10.1111/j.1365-2729.2007.00228.x.
- [17] Li C, Lalani F. The COVID-19 pandemic has changed education forever. This is how. [Internet] *World Economic Forum*; 2020 [cited 2020 Aug 5]. Available from: <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/>
- [18] UNESCO.org [Internet]. Education: From disruption to recovery; c2019 [cited 2020 Aug 4] Available from: <https://en.unesco.org/covid19/educationresponse>
- [19] Chong CM, Puteh M, Goh SC. Use of Lecture Capture in the Teaching and Learning of Statistics. [Internet]. 2014 Nov [cited 2020 Aug 4]; Available from: [https://www.researchgate.net/publication/289406387\\_Use\\_of\\_Lecture\\_Capture\\_in\\_the\\_Teaching\\_and\\_Learning\\_of\\_Statistics](https://www.researchgate.net/publication/289406387_Use_of_Lecture_Capture_in_the_Teaching_and_Learning_of_Statistics)
- [20] Sani, R. [Internet]. Readiness for continuity in online learning: *New Straits Times.* 2020 April [cited 2020 Aug 4]. Available from: <https://www.nst.com.my/education/2020/04/584436/readiness-continuity-online-learning>
- [21] Cardall S, Krupat E, Ulrich M. Live lecture versus video-recorded lecture: are students voting with their feet?. *Academic medicine: journal of the Association of American Medical Colleges.* [Internet]. 2008 Dec [cited 2020 Aug 4]; 83(12), 1174–1178. Available from: <https://doi.org/10.1097/ACM.0b013e31818c6902>
- [22] Simcock D, Chua WH, Hekman M, Levin MT, Brown S. A survey of first-year biology student opinions regarding live lectures and recorded lectures as learning tools. *American Physiology Society.* [Internet]. 2017 Jan 31 [cited 2020 Aug 4];41(1), 69-76. Available from: <https://doi.org/10.1152/advan.00117.2016>
- [23] Soong KAS, Chan LK, Cheers C, Hu C. Impact of video recorded lectures among students. *Proceedings of the 23rd Annual Ascilite Conference: Who's Learning? Whose Technology?* Sydney, Australia. Vol. 2. 2006; pp. 789–793.
- [24] Dhawan S. Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, vol. 49. 2020; pp. 5-22.
- [25] Topale, L. The strategic use of lecture recordings to facilitate an active and self-directed learning approach. *BMC Med Educ* 16, 201 (2016). Available from: <https://doi.org/10.1186/s12909-016-0723-0>
- [26] Hussain A, Tabrez E, Basu A, D'Silva CSM. Medical Students' Perception of the Usage of Lecture Recording Software. *Cureus.* 2018 Jul 11;10(7):e2963. doi: 10.7759/cureus.2963. PMID: 30210951; PMCID: PMC6135296.
- [27] Gupta A, Saks NS. Exploring medical student decisions regarding attending live lectures and using recorded lectures. *Med Teach.* 2013 Sep;35(9):767-71. doi: 10.3109/0142159X.2013.801940. Epub 2013 Jul 22. PMID: 2386943
- [28] McNulty JA, Hoyt A, Gruener G, Chandrasekhar A, Espiritu B, Price R Jr, Naheedy R. An analysis of lecture video utilization in undergraduate medical education: associations with performance in the courses. *BMC Med Educ.* 2009 Jan 27;9:6. doi: 10.1186/1472-6920-9-6. PMID: 19173725; PMCID: PMC2647683.