

# Are recorded lectures suitable for medical students? Impact of attendance on students' outcome.

Ghassan Nabbout<sup>1</sup>, Dima Bchennaty<sup>2</sup>, Pierre Zalloua<sup>1</sup>

1- Faculty of Medicine, University of Balamand

2- Medical Student, Faculty of Medicine University of Balamand

## Abstract

*Background: During the Covid -19 lockdown, the Faculty of Medicine at the University of Balamand adopted the Webex platform to deliver the lectures live for the students. All lectures were also recorded and posted. This study compares the results of students who attended the live online lectures with those who only reviewed the recordings of the lectures, taking the previous year's rank into consideration.*

*Method: We retrieved attendance data of Med 2 students and their grades for 7 modules. We also had access to the previous year's rank as predictor of outcome. The students had two types of exams, the standardized NBME questions and in-house questions prepared by the lecturers. The students rank from the previous year was used to divide the students into the top 20% of the class, the lower 20% and the rest. Analysis to assess the impact of attendance on outcome was made for the two types of exams, and for the different groups of students.*

*Results: Our analysis shows a significant correlation between the two types of questions, and a significant correlation between attendance and the previous years' rank. Also for all the groups, attendance had a significant contribution to the outcome, more significant among the top students and the bottom of the class students.*

*Conclusion: This study shows the importance of attending lectures even if they are online, not only for the poor performing students but also for the top 20%. Recorded lectures may be a beneficial adjunct but not a replacement of live lectures, at least for now.*

**Keywords:** Online medical education, Live versus recorded lectures, attendance among medical students, lecture delivery and outcome.

## Introduction

The Covid-19 pandemic resulted in significant challenges for medical schools, not in lecture delivery as much as in ensuring adequate knowledge acquisition among students. Schools and universities have adopted different platforms for lecture delivery ranging from live lectures to prerecorded sessions. Online teaching is not a recent occurrence in education, and in fact, it was introduced in the 1980's in certain universities that offered degrees exclusively taught online. (1). Over the last decades however, online teaching has evolved tremendously with the emergence of many online courses in almost every field of study.

In medical education, and with the increasing number of studies that have shown the usefulness and positive perception of online teaching, hybrid education is becoming a well established teaching approach in some medical curricula. (2,3).

With the Covid-19 pandemic and the resulting lockdowns, medical schools, even those with no previous experience with online teaching, had to shift quickly and completely to online lecture delivery, either live through virtual platforms or through prerecorded lectures.

Between August 2020, the beginning of the academic year, to December 2020, seven Med II course modules were delivered at the University of Balamand -Faculty of Medicine. All module lectures were delivered live using the WebEx platform. Lectures were also recorded and posted on MOODLE at the end of each session. Some students chose not to log in on WebEx and attend the live lectures and elected to review the recordings. In this study we compared the exam results of all Med 2 students in the seven different modules and correlated these results with the students' attendance and their previous year's rank in order to assess any impact the attendance might have on academic outcome.

## Methods

We evaluated the performance of Med 2 students in 7 different topics: Pathology, Pharmacology, Virology, Parasitology, Bacteriology and Infectious and Cardiology. All lectures were delivered through live WebEx sessions, respecting the same schedule as for in-house lectures. The slides of the lectures were posted on MOODLE before the lectures and all the sessions were recorded and then posted on MOODLE after they were delivered. The attendance in each lecture was retrieved from the database as the students would login using their names (Table1). Each of the seven courses had one exam, and all exams consisted of both National Board Medical Examination (NBME) questions and in-house questions except for one that was entirely composed of in-house questions due to technical issues related to NBME administration. All the lectures were represented in the exams and the lecturers provided the questions related to the lectures they delivered with the same question / lecture-hour ratio. All exams were computer-based and were done on campus with direct monitoring. All safety measures against Covid-19 transmission were taken; students were divided into small groups and distributed to different classrooms to provide safe physical distancing, masks were obligatory and the exam rooms were disinfected before and after each exam session and the classrooms windows remained opened. Body temperature checks were done for all students before they were allowed on campus. Students who were diagnosed with Covid-19, provided a medical report and had to sit for a makeup exam after they became asymptomatic and after providing a negative PCR test. The percentage of each type of questions varied between courses as shown in (Table-2).

The results for NBME and in-house questions were retrieved separately for each student.

*Table 1 Average attendance in each module.*

Module	Attendance
Pharmacology	75%
Pathology	43%
Parasitology	24%

Virology	61%
Bacteriology	65%
Infectious diseases	14%
Cardiology	40%

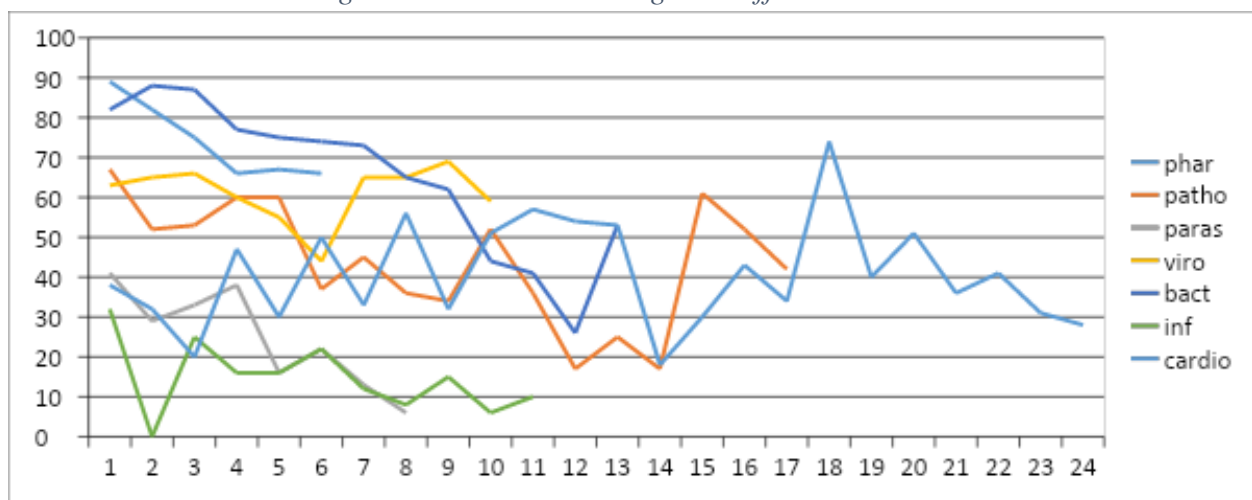
*Table 2 Percentage of NBME versus in-house questions*

Module	NBME	MOODLE
Pharmacology	69%	31%
Pathology	40%	60%
Parasitology	0%	100%
Virology	67%	33%
Bacteriology	72%	28%
Infectious diseases	55%	45%
Cardiology	65%	35%

### Results:

As discussed above, the attendance varied between modules, and it was observed that there is a certain tendency for the attendance to decrease as the module progressed irrespective of the length of the module or the number of lectures (fig 1).

*Figure 1 Attendance throughout different modules*



Analysis of the grades in both exam modalities, showed a statistically significant positive linear correlation between the NBME grades and the grades obtained for the in-house questions, (Pearson=.518, sig=0.000). Both grades (NBME and MOODLE) have a positive linear association with attendance (Pearson=+0.301, sig=0.000 and Pearson=.518, sig=0.000 for NBME and MOODLE respectively).

While both exams are linearly associated with rank and attendance the bias related to students' rank and attendance was analyzed and there was a statistically significant correlation between the two (Pearson=-.183 and Sig= 0.000).

To assess the influence of attendance on performance irrespective of rank, four models were tested. First, the effect of attendance on NBME (model 1) and MOODLE (model 2) performance. Second, the students were divided according to rank into High (top 20%), medium (21%-79%) and low (bottom 20%) and the 2 models (NBME and MOODLE) were tested again. Results revealed that all models were significant and attendance influenced the grade. Adjusted R<sup>2</sup> were recorded for all models indicating that for all students, attendance explains 9.1% of the Moodle grade and 8.9% of the NBME grade (F= 53.856, p=0.000 for Moodle and F=46.935, p= 0.000 for NBME). For the subcategories, attendance contributed up to 10% for the top students and (table below).

*Table 3 Contribution of attendance to grades.*

	Percentage Attendance	Mean	N	Std. Deviation	Moodle Regression R <sup>2</sup>	NBME Regression R <sup>2</sup>
Rank Category	Low	51.99	97	31.46	10%	10.2%
	Mid	58.32	321	31.51	4.5%	4%
	High	70.67	123	31.57	7.2 %	10.7%
Rank	Total	59.99	541	32.07	9.1% (F= 53.856, p=.000)	8.9% (46.935, p=.000)

### Discussion:

While classroom lectures are still an important component in preclinical medical education, the use of alternative lecture-delivery methods such as prerecorded or video lectures is common in medical schools with a resulting decline in classroom attendance observed among medical students (4,5). While some studies suggested that the availability of recorded lectures adversely affected the attendance of live lectures (6), others showed the contrary (7,8). Some students prefer the recorded lectures because they are readily available so they can repeat them as many times as they want, and at an accelerated speed to save time (9, 10). The type of recording is also important for student engagement as studies have shown that video recorded lectures are more appreciated and engaging than power point recordings (11). In addition, the recorded lectures may help students with language (non-native speakers) or other barriers, who may find it difficult to follow live lectures efficiently (12). Some students however, still prefer live lectures and find them motivating with the direct interaction with instructors and their colleagues (4). The drop in attendance observed among students became a major concern for the educators as it may negatively affect students' knowledge acquisition and performance in exams. In our study, the decrease in attendance and the variation of attendance between different modules may be related to the topic and content of the lectures or negative experiences with the lecturer (13).

Some studies have found that the video recorded lectures are comparable to live lectures advocating the utilization of this methodology for its efficiency and accessibility, and even some have gone to the extreme of abolishing live lectures in favor of the virtual classrooms (10,14, 15). However, other studies warned against the widespread use of this modality and concluded that the recorded lectures are not as beneficial

as the live lectures when it comes to students' retention of information and assimilation of knowledge (16,17,18). A hybrid system of both methodologies, using the recorded lectures and other web-based resources as complementary to classroom lectures has also been advocated as it will enhance students' self-learning abilities (19).

A significant positive correlation between NBME and the in-house exam scores indicates that our students have acquired the competencies needed to sit in for an international standardized exam.

What is appealing and unique about our study is that we included the student rank of the previous year in our analysis. There is significant negative correlation between last year's rank and the attendance ( $p = -0.183$ ;  $\text{Sigma} = 0.000$ ), which means that highly ranked students attend more the live lectures, however, R2 analysis showed that attendance improved the results for all students irrespective of their rank. This can be attributed to the way students attend the live lectures and the ability to interact and focus more as compared to recorded lectures during which students can accelerate the videos missing some information or even get distracted and pause the video multiple times affecting the flow of information and their assimilation of knowledge. One can add to that, the students' maturity and responsibility in being implicated in the live lectures and the effect live interaction can have on the student's cognitive abilities as social interaction would improve knowledge creation (20).

The contribution of attendance on grades is significant for all students but interestingly, it is more the two extremes, the top students and the bottom of the class, based on the previous year's rank, as shown in table-3. One can assume that the top students are more implicated and responsible and they would also review the recorded sessions. Their participation in the live sessions gives them the possibility of understanding and assimilating the material completely so there would be no gaps in their understanding. For the lower performing students, they would certainly benefit from the discussion that happens during the live sessions and also have the chance to clarify any issue as needed, and they are guided to acquire a deeper understanding that could be missed with just reviewing the recordings at accelerated speed (21,22).

In conclusion, our study revealed the importance of attending the lecture live, even in the absence of physical presence and further studies to explore student's readiness and familiarity with online teaching as additional factors that would affect performance would further explain the differences in outcome.

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