The Impact of Live Lectures and Pre-recorded Videos on Students' Online Learning Satisfaction and Academic Achievement in a Malaysian Private University

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***Abstract*—This study aims to compare students' preferences for pre-recorded videos and live lectures, and to establish the relationship between these two types of online lectures on students' online learning satisfaction and academic achievement during the pandemic. This study is quantitative in nature and involved 552 respondents who are undergraduate students from four faculties in one of the private universities in Malaysia. Structural Equation Modeling (SEM) was used to analyse the proposed hypotheses. The results show that the pre-recorded video lecture has a positive effect on students' online learning satisfaction in three faculties, i.e., Social Science, Business and Medical Science, whereas, in the faculty of Innovation and Technology, the live online lecture has a significant effect on their students' online learning satisfaction. However, students from all four faculties responded that both pre-recorded video lectures and live online lectures did not significantly improve their academic achievement. The findings of this study provide a guideline for academics in their online pedagogical consideration, especially in deciding the type of online lecture preferred by their students which has contributed to their online learning satisfaction, thus improving the overall quality of the online learning experience.**

***Index Terms*—Online learning satisfaction, live online lectures, pre-recorded video, structural equation modelling.**

I. Introduction

COVID-19 pandemic has challenged higher education in Malaysia and globally to provide effective education remotely with immediate action required. In March 2020, mass migration to online learning occurred. The mode of campus-wide learning delivery was changed from face-to-face to online learning, and this was implemented almost 'overnight' following the immediate closure of higher education institutions in Malaysia and movement restriction implemented. Online learning was implemented as the only viable option to ensure learning continuation with teaching faculty needing to appear on-screen instead of physical classroom presence. The strategies by the teaching faculty for implementing online learning have been through the use of synchronous and asynchronous lecture technologies. The technologies are not new but such a university-wide implementation is unprecedented. Given this, how does an 'overnight' strategy using these technologies impact the student learning experience? How have they levelled the situation for a good impact on education in difficult times? Engaging students 'overnight' [1] on online platforms have impacts across many organizational relationships and different online lecture technologies bear different impact. With urgency for an immediate and successful transition to online education widely, an in-depth understanding of the relationships in play for delivery at the institutional level is highly pertinent.

Classroom-based teaching has been the prioritised mode of teaching due to the accessibility and the convenience it provides for physical engagement as well as interaction for student learning. Educators can deliver various interactive and complex instruction such as collaborative work, problem-solving activities, and face to face discussion. Despite different lecture technologies put in place to support online learning in a variety of approaches, changing these circumstances from in-person engagement to using online learning may significantly affect their learning experience and academic achievement. The development of online learning as an area of study intended to support learners balancing work and study [2], is now being stepped up as the main mode of learning delivery in terms of introducing instructional technological innovation for online learning. With the COVID-19 situation, the development of understanding has been extended to the offering of new models of online teaching for the adoption of 'new normal' circumstances [3]. How can we bring these applied understanding to comprehend the impact of the new strategies in the learning experience of our students? Following the changes to deliver the educational experience online, is learning significantly affected in terms of their satisfaction and achievement?

Following the changes of using online learning delivery at a massive scale with immediate timing, this campus-wide implementation of exclusive online learning would provide a deeper understanding of how the situation is progressing in relation to strategies using different lecture technologies. The effects of online lecture technologies in the literature previously was motivated to highlight the advantages of how these technologies could bring to address flexibility and accessibility issues. Generally, the studies were subject oriented which relied mostly on surveys of student preference of the lecture technologies. More comprehensive studies in the exploratory approach are rare as the situation in higher education did not necessitate such a drastic shift in education strategy to rely fully on virtual learning platforms. As a result, the immediate circumstances may only allow us to learn from the action. Such an instance is documented in Chen,

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Kaczmarek & Ohyama [4] who explored live synchronous teaching for dental students which resulted in worsening of their learning experience. The faculty then augmented the live lecture with an asynchronous, recorded lecture feature. The improvement was well received with students providing supportive feedback on how the strategy is helping them in terms of supporting their learning in learning large material content.

In this study, we intend to compare both the online lecture technologies, synchronous and asynchronous to develop an informed decision of our educational strategies, with a population involving students across four faculties. Students' preference for pre-recorded videos and live lectures to their online learning satisfaction and academic achievements are provided with a discussion on the impact and potential future strategies.

II. Literature Review

A. Live Online Lecture

Live online lectures are classified as lectures using technology that provides live interaction or delivered in synchronous. Live online lecture has been popular due to the flexibility it provides to educators to modify, instruct and gesture to the class in real-time as they would do in real physical classrooms. Instructors lead the lesson objective by pacing themselves and gaining exchanges from the students through the feedback gestures. The presence of an online peer group allows the development of a similar active environment where learning is two ways.

Live online lecture has also been useful to increase interactivity about encouraging collaboration as is apparent with the use of collaboration supportive apps such as Microsoft Teams or Zoom. A study taken with dental students who have benefitted from the online live lectures supported by the Microsoft Teams environment, included them ideating and sharing their understanding visually [5] thus appearing more engaged. The awkwardness that is faced in a face-to-face environment has been said to be eliminated as live online lecture encouragesstudents to be part of an active learning environment.

The challenges with live online lectures are in relation to the comfort of students in following the pace of learning. As the interaction in live online lectures is teacher paced, students may find it difficult to control the pace of learning, particularly in addressing new material and making viable connections to their learning. This is also coupled with fatigue from continuous screen time. Dental students in the study by Chen *et al.* [4] experience burnout from continuous Zoom lessons. The synchronous mode of learning can be challenging for students who may be distracted from the new changes of learning in place.

The advantages of live lectures have been weighed significant where students prefer the interaction with the instructor, the focus they have with live interaction as well as the higher amount of content to be learned with the guide of the instructor [6], [7]. However, lower ratings have been given due to the fast pace of learning expected which requires extra student focus and thus, potentially increases burnout [4], [8].

B. Pre-recorded Video Lectures (PVL)

Pre-recorded video lectures are lectures provided asynchronously or with delayed timing to students. Learning is one way or asynchronous. The teaching faculty is not in interaction with the students in an active learning setting. However, teachers have control over adding supporting material for visual stimulation and engagement. As an example, interactive simulations can be linked to recorded material to display effective simulation for the teaching of important concepts passively, at the benefit of students' own learning time [9]. As there is a significant delay in time for learning to be received, the asynchronous delivery is a model of approach for passive learners. Unlike the live online lecture model, which is based on leading by the teacher instructor, pre-recorded lectures centre on personalized learning built with capturing and accelerating technological features like stop, record forward, play and rewind. It allows personal control over the pace and direction of learning.

With online learning, encountering a large volume of content during screen time is a challenge for students performing material synthesis. It increases the chances to fall out from the learning pace intended. However, with pre-recorded video lectures, students can learn on their own and synthesize the material without burnout. There is pressure to master a large amount of content and present understanding comprehensively in medical and dental education. In studies by Chen *et al.* [4] and Topale [10], students have benefitted from the use of pre-recorded lectures to learn on their own at an accelerated pace. With facilitation and support forum in engaging peers through email consultations upon learning on their own, students benefit from the passive learning technology through self-directed learning.

The challenges with the use of pre-recorded lecture technologies are based on the potential to detract students from learning following a passive mode of approach. The executive functioning that is expected from self-directed learning may be challenging for students struggling to perform on their own. They may struggle from the isolated environment when learning from pre-recorded lectures on their own. Brockfeld [11] reported that despite watching the pre-recorded lectures multiple times, students are not able to achieve the targeted learning outcomes. Expecting student participation without facilitation may also end up not influencing students in engaging with the technology for learning. Topale [2] discussed the results of using pre-recorded lectures with medical students in which participation was only evident with the facilitation of teaching faculty and by self-directed initiative.

C. Impact of Online Lectures and Pre-recorded Video on Students' Online Learning Satisfaction and Academic Achievement

In terms of understanding the impact of online learning through measuring students' academic achievement and learning satisfaction, the former refers to objective evaluation of student progress while the latter represents a subjective evaluation of what students feel about their learning experience. The impact of online lecture technology in terms

of students' satisfaction and academic achievement has been documented in relation to live online lectures as well as pre-recorded video lectures. Studies showed student preference for live online lectures were discussed with relevance to accessibility to peer and teacher interaction on the online platforms. Chen et. al [4] discussed findings from a poll of students who despite the initial burnout from continuous live lectures, highlighted the need for more interactive sessions that can be made available through live lecture sessions. Live lectures have an impact in terms of creating the learning atmosphere with interaction to the online learning platform. Brockfeld [11] discussed the preference of students for live lectures with a highlight on the learning environment which is engaging in real-time that is potentially supportive to learning online. However, in the same study, students found live lectures and pre-recorded lectures equally valuable for the same quality of learning. Students' ability to focus on both lecture technologies has contributed to their positive impact on learning satisfaction.

Student preferences of pre-recorded video lectures have been numerously noted across different subject areas. Islam *et al.* [12] discussed business management students' preference for pre-recorded video lectures. In their results, they reported more than half of their students indicated their preference for pre-recorded video lectures, noting that most of their responders are female students. Cardall *et al.* [13] on the other hand discussed medical students responses in relation to their perception, evaluation and motivation for use of different lecture technologies. Medical students' responses from the first and second years of study were compared in relation to their confidence about the respective lecture technology medium. Students consistently responded that the video accelerated technologies of pre-recorded video lectures were satisfying their learning needs. They felt more likely to organize their learning time with learning needs and achieve the objective of learning in lesser time.

While many studies look at students' preferences in evaluating the effectiveness of online learning, it would be misleading to conclude a positive evaluation of student preference as a suggestion of an effective online lecture strategy [12], [8]. The use of subjective evaluation to represent the effect of online learning does not ascertain whether students are doing well as they rate themselves. A study by Brockfeld *et al.* [10] showed that despite preference shown towards live lectures, student exam scores upon learning from pre-recorded lectures and live lectures hardly show any difference with regards to effectiveness in the scoring of medical students training for the clinical exams. In another study on biochemistry students, despite no difference in their preference of live versus pre-recorded lectures, there is a significant relationship between students' low performance and reliance on pre-recorded lectures alone [11]. The significance of online learning to academic achievement with the use of these technologies is of the mixed outcome. Combining both of the elements as related markers in a study to evaluate the effectiveness of online lecture technologies would

Given this, this study intends to compare the different strategies used and understand the impact of live lectures and pre-recorded lectures on students' learning satisfaction as well as their academic achievement to evaluate the situation more comprehensively through multi relationship analysis. In this study, academic achievement is defined as the attainment of course learning outcomes in the current semester and it was expressed in terms of grade point average (GPA), which is calculated by the total amount of grade points earned divide by the total credit hours attempted in the semester, whereas learning satisfaction refers to the extent to which students have enjoyed their studies, resulting from a subjective evaluation of learning experience and outcomes in a blended learning course.

III. Hypothesis for Study

The hypothesis of the study has been developed based on what has been deduced from the review of previous literature in relation to measuring online learning satisfaction and student academic achievement with the use of pre-recorded video lectures and live online lectures. The specific hypothesis of this study are as follows:

H1: Pre-recorded video lectures contribute positively to students' online learning satisfaction.

H2: Live online lectures contribute positively to students' online learning satisfaction.

H3: Pre-recorded video lectures contribute positively to students' academic achievement

H4: Live online lectures contribute positively to students' academic achievement

H5: There is a relationship between online learning satisfaction and students' academic achievement.

IV. Methodology

The target population for this study comprised undergraduate students (*N*=7,515) who studying at a private university in Klang Valley. From the data given by the university's administration on the number of active undergraduate students as of the March 2019 semester, there are approximately 7,515 students as summarized in Table I.

TABLE I: Total Number of Undergraduates

Faculty	Number of Undergraduates
Faculty of Business & Law (FBL)	1,934
Faculty of Social Sciences & Leisure Management (FSLM)	2,429
Faculty of Health & Medical Sciences (FHMS)	816
Faculty of Innovation & Technology (FIT)	2,336
Overall Total	**7,515**

The proportional stratified sampling method was used in this study. This is to reduce possible bias in competency levels among learners in a particular academic discipline as well as to ensure the sample size taken from each faculty is proportionate to its population size when viewed against the entire university. In this method, each subgroup of undergraduates from four different faculties within the same university has the same sampling fraction and present results

in the same proportion as they were in the population. This sampling technique also improves the potential for samples to be more evenly spread over the population.

The minimum sample size in this study is guided by Cochran's formula as follows:

$$n_o = \frac{Z^2 pq}{e^2}$$

where n_o= calculated sample size; Z= z score of confidence level; p*q= variance of hypothesized proportion; e= desired margin of error

$$n_o = \frac{1.96^2 x\, 0.5\, x\, 0.5}{0.05^2} = 384.16$$

$$n = \frac{n_0}{1+\frac{n_0}{N}}$$

where n= corrected estimation of sample size; N= population size

$$n = \frac{384.16}{1+\frac{384.16}{7515}} = 365.48$$

Therefore, Cochran's formula suggested **366** as the minimum sample size for this study.

A set of online self-reported questionnaires was created and administered using SurveyMonkey.com. The survey link was then distributed through the University's official Learning Management System (LMS) after the mid-semester of the August 2020 cohort. The survey link was posted in the announcement section of each blended learning course four weeks before the end of the semester. A recruitment message was sent to instructors via email at the middle of the semester and respondents did not have any direct contact with the researcher. To avoid duplicate responses by the same student, respondents are required to provide student ID. These student IDs were later used to obtain their academic achievement (GPA) from the examination centre of the university.

V. Findings

A. Measurement and Instrumentation

In this study, data was gathered using the survey method with a set of online questionnaires. The questionnaire employed in this study was adapted from pre-existing reliable and valid multi-item instruments derived according to the literature review and objectives of the study. Based on the conceptual framework, the researcher employed four instruments as summarized in Table II. The first instrument was about the respondent's demographic information which was developed by the researcher, while the remaining three instruments, namely (i) Online Learning Satisfaction, (ii) Pre-Recorded Videos Experience and (iii) Live (Synchronous) Online Lectures which were adopted from several established instruments.

TABLE II: Components of the Questionnaire

Section	Section	No. of Item
Section A	Demographic Information & GPA	4
Section B	Pre-Recorded Videos Experience	5
Section C	Live (Synchronous) Online Lectures	5
Section D	Online Learning Satisfaction	3

For both pre-recorded videos and live (synchronous) online lectures experiences, participants were asked to rate quality of these delivery platforms based on five aspects, namely, i) Learning Atmosphere, ii) Ability to concentrate, iii) Usefulness of examinations, iv) Clarity of presentation and v) Tempo.

Of the 615 respondents, only 552 were valid for data analysis and 63 respondents had to be excluded. This is due to incomplete responses with missing values including invalid student identification numbers and inappropriateness of action in giving responses such as spending less than 1 minute to complete the online survey or having the monotonous pattern in answering the questionnaire. Consequently, data from 552 respondents were analysed, forming a usable case of 89.75%.

B. Measurement Model Assessment

The current study used Partial Least Square-Structural Equation Modelling (PLS-SEM) technique with Smart PLS 3.0. to evaluate the proposed model and corresponding hypotheses. Partial least squares (PLS), a component-based SEM technique addresses some of the constraints of covariance-based SEM, such as sample size requirements, conditional multivariate normality, and model complexity [14]. Furthermore, unlike covariance-based SEM, which is solely concerned with explanatory model testing, PLS-SEMallows for the evaluation of a model's prediction capabilities [15]. A two-stage procedure was used for data analysis and interpretation, as recommended by Hair et al. [15]. First, the measurement model was examined to verify the proposed model's reliability and validity, and then the structural model was analysed to empirically test the research hypotheses

In relation to Cronbach alpha, all values show above 0.9 which is excellent and appropriate for applied scenarios. Composite Reliability (CR) values also show above 0.9, acceptable if the value is above 0.7. The average variance (AVE) is above the 0.5 thresholds taken as a rule of thumb. As such, all reliability evaluation has been satisfied as shown in Table III.

TABLE III: Construct Validity and Reliability

Construct	Alpha	CR	AVE
Pre-recorded lectures	0.91	0.93	0.73
Live lectures	0.91	0.93	0.74
Online Learning Satisfaction	0.92	0.95	0.96

The validity test chosen was the Fornell-Larcker criterion to examine the discriminant validity to establish each construct is different from the others. In relation Fornell Larcker criterion, the diagonal values are higher than any

correlation values suggesting acceptable validity, as shown in Table IV.

TABLE IV: CONSTRUCT VALIDITY AND RELIABILITY TESTS ARE DONE FOR MEASUREMENT MODEL ASSESSMENT

		Pre-recorded Lecture	Live Lecture	Online Learning Satisfaction
Fornell-Larcker criterion	Pre-recorded Lecture	0.86		
	Live lecture	0.6	0.86	
	Online Learning Satisfaction	0.6	0.59	0.93

C. Structural Model Assessment

The study used the PLS-SEM technique to develop a theoretical model that looks at pre-recorded video lectures and live online lectures as independent variables to be interpreted the relationships between online learning satisfaction and academic achievement. The interpretation of the results is reported accordingly.

PLS-SEM path modelling was used to present the measurement or outer model to deal with latent variables as presented in the following Fig. 1.

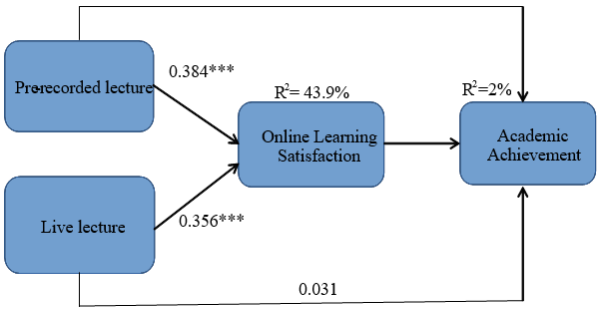

Fig. 1. Structural model depicting coefficient of determination and regression coefficient with the *p*-value. ***significant at $p < 0.001$.

The structural model analysis in Fig. 1 shows both pre-recorded video lectures and live lectures have significant strength in relation to online learning satisfaction, stronger being pre-recorded video lectures (β = 0.384; p = 0.000). Therefore, H_1 and H_2 were supported by the structural model. From the structural model, the coefficient of determination (R^2) value for students' online learning satisfaction is 0.439. This indicates 43.9% of the variation in the respondents' online learning satisfaction was explained by the variations in their experience during pre-recorded video lectures and live lectures.

Results in Table V showed that the overall effect of each of the predictor variables did not show a significant contribution to student academic achievement. Also, there is no significant relationship between online learning satisfaction to student academic achievement, hence, the H_3, H_4 and H_5 were rejected, which implies that preference on online delivery does not influence their academic achievement at 0.05 level of significance.

TABLE V: OVERALL EFFECT OF THE PREDICTOR VARIABLES ON ONLINE LEARNING SATISFACTION AND ACADEMIC ACHIEVEMENT

Variable	Beta	t value	p-value
Pre-recorded video → Online Learning Satisfaction	0.384	9.879	<0.001
Live online lecture → Online Learning Satisfaction	0.356	9.247	<0.001
Pre-recorded video → Academic achievement	0.014	0.257	0.797
Live online lectures → Academic achievement	0.031	0.642	0.521

Further analysis in Table VI also showed that pre-recorded lectures have a stronger effect on online learning satisfaction as compared to live lectures among students from Business and Law (FBL), Health Science (FHMS) and Social Science (FSLM) students. However, among Technology (FIT) students, live lectures showed a stronger effect on online satisfaction compared to pre-recorded lectures.

TABLE VI: STRUCTURAL MODEL ASSESSMENT ON FOUR FACULTIES

Paths	Path Coefficients				t-value			
	FBL	FHMS	FIT	FSLM	FBL	FHMS	FIT	FSLM
Pre-recorded lecture → Online Learning Satisfaction	0.498	0.328	0.332	0.340	7.737	3.839	3.418	4.270
Live lecture → Online Learning Satisfaction	0.359	0.175	0.49	0.362	5.406	2.307	5.332	4.163
Pre-recorded lecture → Academic Achievement	-0.020	0.095	-0.193	0.053	0.192	0.909	1.030	0.463
Live Lecture → Academic Achievement	0.086	-0.165	0.289	-0.028	0.916	1.714^	1.606	0.227
Online Learning Satisfaction →Academic Achievement	0.101	-0.020	-0.097	0.042	0.683	0.198	0.717	0.393

VI. Discussion

From the results of the PLS-SEM analysis, this study found that both pre-recorded video and live online lecture contributed significantly to student online learning satisfaction but not on their academic achievement. In comparison, there is also a higher significance in terms of students' satisfaction with the use of pre-recorded video lectures as compared to live online lectures. Despite significant contribution to learning satisfaction, there is no significant contribution from either of the lecture technologies to overall student academic achievement.

A significant contribution to learning satisfaction by students preferring pre-recorded video lectures and live online lectures suggests that the flexibility and accessibility that these lecture technologies provide have contributed to the positive experience of students' online learning. Students can gain feedback as well as access learning at all times. The provision of these technologies in the Virtual Learning Environment (VLE) also allow students to continue experiencing learning continuation in restricted times. Among the papers on the provision of exclusive online learning during COVID-19 pandemic mitigation [1], [2], [13], there is continued emphasis on the provision of non-stop education which is to be appreciated and is reflected in the positive feedback of students.

In comparison, viewing of pre-recorded video lectures led to higher learning satisfaction than viewing live online lectures. Analysis of responses from four faculties show three faculties (FHMS, FBL and FSLM) present significance in relation to pre-recorded video lectures and FIT alone present significance to the preference of live online lectures. Pre-recorded video lectures being preferred to suggest the flexibility and self-driven pace that the technology provides is of high importance particularly when students are to study on their own at home. These patterns of higher value attributed to pre-recorded video lectures for learning satisfaction are viewed in other studies as well. Cardall [12] as well as Islam *et al.* [8] who covered medical science and business studies students depict findings of similar significance and highlight the value of pre-recorded video lectures for online learning. There is an emphasis on the flexibility that pre-recorded video as a technology provider in both these studies. Students in this study preferred pre-recorded lectures for the '24 hours accessibility' and 'paused when needed' which illustrates the advantage of flexibility, similarly noted in these papers.

In the emergency online learning situation of COVID-19, deriving significant learning satisfaction strengthens the position of faculty to continue producing live or pre-recorded lectures. However, previous studies that derive significant learning satisfaction have noted that there is a possibility that students may be overestimating the value of technology where they may feel that the technology is helping but it is not reflected in the evaluation of their learning outcomes as a result of their learning process [8], [11]-[13]. This is reflected in this study in terms of insignificant academic achievement across faculties. In response, faculty members when designing learning material could consider how the material and online delivery may be aligned to support better learning outcomes achievement.

This study also suggests the importance of self-directed learning as an essential soft skill that enables students to succeed in a post-COVID situation. The use of pre-recorded video which has been significant in gaining positive feedback suggests that the learning conditions that have changed have made students more dependent on self-paced technology to support their learning. In this study, however, we also find that the lack of impact on student academic achievement must be addressed with an understanding of the link between learning material, delivery and learning outcomes. The alignment of these three elements is to be improved by faculty to potentially improve students' academic achievement. As a result, a closer look is needed at the improvement of pedagogical content to support teaching and learning activities in more constructive and sustainable manners as we continue to transition into the exclusive online learning environment.

VII. Conclusion

This study concludes that students prefer pre-recorded video lectures as compared to live online lectures. The patterns unveiled across four faculties imply mainly to focus on continuing to produce quality pre-recorded video lectures that are aligned to learning outcomes attainment. It is also found that preference for learning from pre-recorded video lectures or live online lectures does not affect students' academic achievement. From the structural modal assessment, it was found that there is no relationship between online learning satisfaction and student academic achievement.

Following these results, it is recommended that the respective faculties are to continue in producing the relevant high quality and engaging lectures formats as preferred by the students of the various faculties. The three faculties, namely FHMS, FBL and FSLM to work on quality pre-recorded lectures, whereas FIT continues offering engaging live lectures. The pattern of preference for pre-recorded lecture formats should also be unveiled to faculty members so that they could take advantage to support students in better organizing their learning at their own pace, especially in an isolated learning environment. However, the study also notes that there is no relationship between learning satisfaction and academic achievement which implies that students may be overestimating the value of the online lecture formats in their learning process. This presents itself as an opportunity for faculty members to again 'pay attention to not only producing learning content but also to focus on the pedagogical design of the lectures to achieve better learning outcomes attainment.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

The content of this paper is based on research carried out by Lim Chee Leong and Nurhanim Hassan for the Centre for Future Learning Taylor's University. She Long worked on

the data analysis. All authors contributed to the writing of the paper and all authors have approved the final version.

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REFERENCES

[1] S. Dhawan, "Online learning: A panacea in the time of COVID-19 crisis," *J. Educ. Technol. Syst.*, vol. 49, no. 1, pp. 5-22, 2020.

[2] M. P. Virtic, K. Dolenc, and A. Šorgo, "Changes in online distance learning behaviour of university students during the coronavirus disease 2019 outbreak, and development of the model of forced distance online learning preferences," *Eur. J. Educ. Res.*, vol. 10, no. 1, pp. 393–411, 2021.

[3] R. Rehman and S. S. Fatima, "An innovation in flipped class room: A teaching model to facilitate synchronous and asynchronous learning during a pandemic," *Pakistan J. Med. Sci.*, vol. 37, no. 1, p. 131, 2021.

[4] E. Chen, K. Kaczmarek, and H. Ohyama, "Student perceptions of distance learning strategies during COVID-19," *J. Dent. Educ.*, 2020.

[5] A. Rath, P. Sidhu, M. Wong, and C. Pannuti, "The impetus to interactive learning: Whiteboarding for online dental education in COVID-19," *J. Dent. Educ.*, 2021.

[6] C. Sutton-Brady, "Zooming through a pandemic: A COVID-19 approach to teaching," *Mark. Educ. Rev.*, vol. 31, pp. 1-6, 2021.

[7] A. K. Brady and D. Pradhan, "Learning without borders: Asynchronous and distance learning in the age of COVID-19 and beyond," *ATS Sch.*, vol. 1, no. 3, pp. 233-242, 2020.

[8] M. Islam, D.-A. Kim, and M. Kwon, "A comparison of two forms of instruction: Pre-recorded video lectures vs. live ZOOM lectures for education in the business management field," *Sustainability*, vol. 12, no. 19, p. 8149, 2020.

[9] R. Hadgu, S. Huynh, and C. Gopalan, "The use of pre-recorded lectures on student performance in physiology," *J. Curric. Teach.*, vol. 5, pp. 101-112, May 2016.

[10] L. Topale, "The strategic use of lecture recordings to facilitate an active and self-directed learning approach," *BMC Med. Educ.*, vol. 16, article 201, Aug. 2016.

[11] T. Brockfeld, B. Müller, and J. de Laffolie, "Video versus live lecture courses: a comparative evaluation of lecture types and results," *Med. Educ. Online*, vol. 23, no. 1, p. 1555434, 2018.

[12] S. Cardall, E. Krupat, and M. Ulrich, "Live lecture versus video-recorded lecture: are students voting with their feet?" *Acad. Med.*, vol. 83, no. 12, pp. 1174-1178, 2008.

[13] L. Mishra, T. Gupta, and A. Shree, "Online teaching-learning in higher education during lockdown period of COVID-19 pandemic," *Int. J. Educ. Res. Open*, vol. 1, p. 100012, 2020.

[14] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *European Business Review*, vol. 31, pp. 2-24, 2019.

[15] J. Hair, C. L. Hollingsworth, A. B. Randolph, and A. Y. L. Chong, "An updated and expanded assessment of PLS-SEM in information systems research," *Industrial Management & Data Systems*, vol. 117, pp. 442-458, 2017.

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