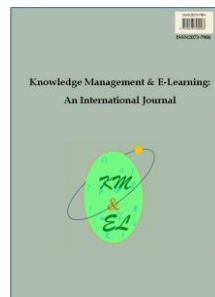

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Malaysian universities**

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Online teaching during the Covid-19 pandemic: Perspectives from lecturers and administrators in Malaysian universities

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Abstract: University administrators and lecturers played vital roles in delivering education online during the global shift caused by the COVID-19 pandemic. However, most studies explore the experiences of students during the pandemic and often overlook the perspectives of university administrators and lecturers. This study aims to understand university administrators' experiences and factors

influencing lecturers' behavioural intentions towards online teaching and learning in Malaysian higher education institutions (HEIs) during and post-pandemic. A mixed-methods approach was used, where interviews with 24 university administrators and a survey with 100 lecturers were conducted. The qualitative data were analysed using thematic analysis, and the quantitative data were analysed using SPSS version 26. The results revealed six key themes related to the challenges of online learning and solutions, the effectiveness of online tools, and satisfaction with online teaching. Key factors influencing online teaching intentions were identified, with '*Suitability for Teaching*' and '*Online System Flexibility*' ranking highest. While high satisfaction levels were reported, the study highlights the need for ongoing improvements in online education within Malaysian HEIs. This study draws on the integrated views and understandings of the administrators and the practical reality and views of the lecturers. This paper thus provides an integrated and ecosystem-like set of guidelines for university policymakers to make adjustments to current online teaching and learning practices, ensuring optimal pedagogical experiences and preparedness for future emergencies such as pandemics in Malaysian HEIs.

Keywords: Covid-19 pandemic; Higher education; Lecturers; Online teaching and learning; University administrators

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1. Introduction

The COVID-19 pandemic, which began in the year 2020, has had a significant worldwide influence on many areas, including education. From 18 March 2020 onwards, a staggering 107 nations imposed countrywide school closures in response to the pandemic (Viner et al., 2020). This widespread closure of educational institutions resulted in a shift in the manner of instruction from face-to-face to entirely online. The pandemic spurred an unprecedented disruption in education, forcing higher education institutions (HEIs) throughout the world, including in Malaysia, to quickly shift from traditional teaching techniques to technology-driven practices (Sia et al. 2020). As a result, online teaching and learning have swiftly become widely practiced (Chan et al., 2021). This transition towards technology-enabled teaching and learning has not only transformed educational methods but also revealed new opportunities and challenges that require careful investigation and form the motivation for this study to explore the experiences of university lecturers and administrators towards online teaching and learning within the Malaysian context.

Although a substantial amount of the literature is centred on the experiences of students during this sudden change, university administrators' and lecturers' experiences and perspectives have not received enough attention. These groups play a critical role in forming the educational environment since they not only require and put policies into action but also modify teaching methods in response to shifts in circumstances. Their perceptions in an integrated form offer an insightful background on the obstacles and improvements required for successful online learning. In Malaysia, higher education institutions encounter distinct cultural, technological, and infrastructure obstacles. Therefore, it is crucial to fully understand the viewpoints of both university administrators and lecturers in order to develop effective approaches to improve online teaching and learning

This study attempts to bridge this gap by looking into the experiences of lecturers and university administrators with online teaching and learning both during and after the pandemic. Exploring the perspectives of university administrators and determining the primary factors impacting lecturers' attitudes towards online teaching is undertaken in this study by using a mixed-methods approach that combines a quantitative survey of 100 lecturers with qualitative interviews with 24 university administrators. The results not only draw attention to the significant difficulties faced by both administrators and lecturers but also evaluate the usefulness of different online tools and how satisfied people are overall with the move to online learning.

Furthermore, this study highlights the need for continuous enhancements in online learning to guarantee that higher education institutions in Malaysia can offer the best

possible educational experiences. The shift to online instruction has brought to light important obstacles that need to be addressed in addition to innovative potential. The melding of the viewpoints of both the administrators and the lecturers in this study to form integrated or ecosystemic-like guidelines will support enhanced online teaching and learning.

This study thus attempts to provide policymakers with useful ideas by obtaining thoughts from those directly involved in the transition. With the help of these insights, institutions will be better equipped to withstand disruptions in the future and continue to provide high-quality instruction in an integrated way for our world that is becoming increasingly digital. The study's ultimate goal is to further the conversation around online learning and help stakeholders gain a better understanding of how they can work together in an ecosystemic mode to improve teaching and learning both during and after a crisis.

1.1. Research questions

This study's research questions examine the impacts and educational challenges of online learning, the factors affecting lecturers' behavioural intentions towards online teaching and learning, and the satisfaction levels of lecturers and university administrators towards online teaching and learning during the pandemic in Malaysian HEIs. Specifically, the following three research questions are addressed:

RQ1: What are the impacts and educational challenges for online learning in higher education institutions in Malaysia as a result of the ongoing COVID-19 pandemic?

RQ2: What are the influencing factors towards the behavioural intentions of lecturers in using online tools effectively for online learning in higher education institutions in Malaysia?

RQ3: What is the current perceived satisfaction of lecturers and university administrators with online teaching and learning in its support for life-long learning in higher education institutions in Malaysia?

2. Online teaching and learning during the Covid-19 pandemic

Several researchers have studied the impacts of the shift in the mode of education from face-to-face to fully online. The shift happened so suddenly that university lecturers were expected to quickly adapt to their new roles and methods of teaching without prior preparation or training. Alshahrani et al. (2017) found that with the use of online resources, the role of lecturers transitioned from providers of knowledge to facilitators. Annamalai (2021) and Tajuddin et al. (2021) explored online learning in the Malaysian setting and found that due to the unforeseen change, lecturers were not prepared for the shift to fully online teaching and learning, which brought about challenges in achieving optimal pedagogy. Lestiyawati (2020) studied the problems faced by lecturers in Indonesia during the pandemic and reported lecturers' lack of ability to efficiently utilise technology for teaching, being unfamiliar with the available online tools and software. Such a lack in their technological knowledge could result from the inadequacy of the training provided or the lack of infrastructure in their institutions (Caliskan et al., 2020; Liesa-Orus et al., 2020). Reyes-Chua et al. (2020) examined the implementation of online learning during the pandemic in 2020 and stressed that the lack of proper training for lecturers to practice online learning was a substantial issue when it came to delivering online lessons during the

pandemic. Apart from their initial inability to use technology efficiently, lecturers found it difficult to deliver and explain learning materials online as compared to face-to-face (Lestiyawati, 2020). However, despite most lecturers having minimal experience with fully online learning pedagogy, they adapted well and quickly gained knowledge in implementing online teaching and learning (Schlenz et al., 2020).

Previous studies have reported various challenges faced by lecturers in conducting online teaching and learning during the pandemic. Internet connection was one of the most frequently raised issues among lecturers. Playing a vital role in online learning, the lack of internet connectivity is a hindrance to smooth online teaching and learning delivery, especially in rural areas (Agung et al., 2020; Junus et al., 2021). Hollister et al. (2022) and Sarder (2014) investigated students' engagement levels in online classes and identified another worrying issue, which was the lack of engagement and interactivity between students and lecturers during online classes. Students found it difficult to ask questions and provide feedback in online classrooms as compared to the discussions and collaborations in physical classrooms (Wut & Xu, 2021). It was found that 80% of students kept their cameras off and 84% kept their microphones muted during online classes, negatively affecting teaching and learning efforts (Castelli & Sarvary, 2021; Yarmand et al., 2021). In another study, Rotas and Cahapay (2020) acted as the voice of students in the Philippines in highlighting the issue of home responsibilities and inconducive learning environments during online classes stemming from financial issues and lack of necessary learning support, which led to distraction. As for practical courses, although online delivery is possible, the lack of hands-on practice may affect students' learning and understanding of their topics (Franchi, 2020). Despite the challenges, most lecturers found online learning to be a good alternative during the pandemic. Several studies have suggested that continued use of online learning beyond the times of the pandemic is a high possibility; this raises the important question of what are the factors that will affect lecturers' behavioural intentions towards online teaching (Afshan & Ahmed, 2020; Khyzniak et al., 2021).

Previous researchers have investigated the effect of various factors on behavioural intentions towards online teaching and learning (Khong et al., 2022; Tseng et al., 2022). A significant factor is that online teaching and learning are mainly preferred due to the convenience it provides in terms of time, space and use of resources, as long as an active internet connection is present (Barr & Miller, 2013; Soh et al., 2024). Studies have also shown that satisfaction towards online learning was highly influenced by its flexibility, where students could study at any time and at their own pace (Azizan et al., 2022; Sit et al., 2005). With recorded online lectures widely used during the pandemic, students had the option to re-watch the recordings, play them at their own pace and pause in between taking notes, which was not possible in a traditional lecture (Costley et al., 2020; Voelkel et al., 2023). In their study on the benefits, challenges and strategies during and after the pandemic, Paudel (2020) found that online learning was considered the most suitable alternative to continue education delivery during the pandemic in many countries. In fact, the suitability of such learning emerged among the highest influencing factors towards students' satisfaction with online learning (Azizan et al., 2022). During the pandemic, various online tools such as learning management systems (LMS) like Google Classroom, communication tools like Zoom and game-based learning platforms like Kahoot were incorporated in supporting online teaching and learning activities (Abazi-Bexheti et al., 2018; Kohnke et al., 2023; Martin-Somer et al., 2021; Nuraziza et al., 2021). Moreover, a study by Crosling et al. (2023) supports the use of the TIP model (Technology, Integrity and Preparedness), which positively impacts online proctoring and grading assessments, and addresses the need for technology 'savviness' coupled with the need for training and

upholding the quality integrity of assessments. These authors also highlighted the need for an ecosystem that establishes policies, standards and procedures to facilitate such online approaches.

Coman et al. (2020) shared that although the use of online tools enhances the teaching and learning process, it is still in the hands of the lecturer to successfully integrate the tools in their teaching, for the benefit of the students. Enakrire (2024) and Mardiana (2020) examined lecturers' technological abilities to handle online classes and reported that lecturers should possess significant computer skills to be able to enhance their online teaching. As such, the computer self-efficacy factor is a commonly researched and influential factor in the acceptance of online learning (Al Kurdi et al., 2020; Alfadda & Mahdi, 2021; Compeau & Higgins, 1995).

Substantial research explores the use of technology in higher education and students' satisfaction with online learning. Importantly, however, a notable research gap exists concerning the associated factors and emerging issues within Malaysian HEIs during the pandemic, particularly from the viewpoints of lecturers and university administrators. Several existing studies in Malaysia reported on the experiences of online teaching and learning in HEIs during the pandemic from the students' perspectives, like Azizan et al. (2022), Selvanathan et al. (2020), and some others presented case study findings from selected institutions, like Mohamad and Yusuf (2022) and Lim (2020), but research that specifically studies the integrative views of HEIs' lecturers and university administrators in public, private and foreign branch HEIs in Malaysia is limited. Given that in the higher education context, both lecturers and university administrators are involved in multi-faceted decision-making processes that shape the educational landscape, it is crucial to understand and to integrate the perspectives of lecturers and university administrators. This provides an ecosystemic-like approach (Crosling et al., 2015; Niemi, n.d.), where the interdependence and interconnectedness of the stakeholders of the administrators and the lecturers are drawn on to incorporate more practical insights into the effectiveness and challenges of online teaching and learning. This includes the factors affecting their behavioural intentions for adopting online teaching and learning during unprecedented times like the pandemic.

3. Materials and methods

3.1. Research design

A convergent parallel mixed methods design was applied in this study, where the qualitative and quantitative data were collected concurrently. According to Creswell (2003), the advantage of this method is that it allows for the combination of their respective strengths, such as context or setting information provided by qualitative data and generalizability through quantitative data. A qualitative method through interviews was used to collect data from university administrators, and a quantitative method through an online questionnaire survey was used to collect data from lecturers from public, private and foreign branch HEIs in Malaysia. Ethics approval was obtained from the Sunway University Research Ethics Committee (Code: PGSUREC2022/049) before proceeding with data collection. The procedures of data collection and demographics are discussed in this section.

3.2. *Qualitative research procedure*

Firstly, the identified university administrators of undergraduate programmes in Malaysian public, private and foreign branch universities were invited via email to participate in research interviews on online learning during COVID-19. After agreeing and signing consent forms, they received the information sheet and interview questions for preparation. Sessions were held online via Microsoft Teams or Zoom, recorded with consent, and transcribed for thematic analysis. The protocol included ten open-ended questions on the impacts and educational challenges of online learning, factors affecting behavioural intentions towards online learning and satisfaction levels towards online learning during the COVID-19 pandemic. The interview questions are listed in Appendix A. After the interviews were completed, transcriptions from the recordings were analysed manually, with codes collapsed into themes over three rounds to answer the research questions, supported by participant quotes in reporting findings and discussion.

3.2.1. *Demographics of interview participants*

The interview participants consist of university administrators, including heads of school, heads of department and programme leaders of undergraduate programmes from public, private and foreign branch universities in Malaysia. Email invitations were sent to 95 university administrators who fit the criteria. Their email addresses were retrieved from university websites. A total of 24 participants agreed to participate in the interview. The information about the participants is listed in Appendix B.

3.3. *Quantitative research procedure*

Lecturers teaching undergraduate programmes at Malaysian public, private and foreign branch universities were invited via email to voluntarily participate in an online survey on factors affecting their intentions and satisfaction towards online teaching during COVID-19. A self-administered survey questionnaire in the English language was created on Google Forms and consisted of 50 five-point Likert scale items, adopted from past research. Two open-ended questions were included to better understand their experiences. The survey questionnaire is displayed in Appendix C. The reliability of the items in the questionnaire was tested using Cronbach's Alpha (α), and the results are shown in Table 1. The table shows the Cronbach's alpha scores of each factor tested in this study. The number of items used to measure each factor is in parentheses. The Cronbach's Alpha value of all the items is above the threshold of 0.7, indicating strong reliability (Nunally & Bernstein, 1994). The data collected over six months, from January to June 2023, was cleaned and analysed using SPSS version 26, adhering to ethical guidelines. Participants were given the option to withdraw at any time, and the data remained confidential for the research team.

3.3.1. *Demographics of survey participants*

The participants consisted of lecturers from Malaysian public, private and foreign branch universities teaching undergraduate programmes. Out of 107 responses collected, 100 (93.5%) were usable, with 62% being female and 38% male participants. The participant response from private universities was 40%, and 30% was from foreign branches and public universities, respectively. Appendix D displays the survey participants' demographic information in tabular form.

Table 1
Reliability scores

Factors	Cronbach's Alpha (α)
User Computer Self-Efficacy (9 items)	0.721
Online System Flexibility (3 items)	0.766
Suitability for Teaching (2 items)	0.709
Perceived Usefulness (3 items)	0.816
Perceived Ease of Use (3 items)	0.873
Perceived Fit (3 items)	0.824
Task-Technology Fit (12 items)	0.945
Lecturers' Attitude (9 items)	0.901
General Attitude (3 items)	0.924
Behavioural Intention (3 items)	0.943

4. Results and discussion

The research findings are reported on the basis of the results of the qualitative and quantitative research. RQ1 is responded to through qualitative results. RQ2 is responded to with quantitative results where the mean scores of each factor in the study are discussed. RQ3 is answered using qualitative and quantitative methods, where the satisfaction levels of lecturers and university administrators towards online learning are investigated and compared. Overall, six main themes have emerged from the findings as follows: *Role of Lecturers and Educational Responsibilities*, *Challenges and Solutions in Online Learning*, *Effectiveness of Online Tools*, *Adaptation to Online Teaching*, *Evaluation and Performance* and *Preference and Hybrid Teaching*.

4.1. Research Question 1: What are the impacts and educational challenges for online learning in higher education institutions in Malaysia as a result of the ongoing COVID-19 pandemic?

A total of seven questions were asked during the interview sessions to address RQ1. The university administrators' responses to the questions have revealed three main themes, which are *Role of Lecturers and Educational Responsibilities*, *Challenges and Solutions in Online Learning* and *Effectiveness of Online Tools*. The main themes and sub-themes emerging from the responses and illustrative quotes from the university administrators are shown in Appendix E.

4.1.1. Role of lecturers and educational responsibilities

The first theme emerging from the findings concerns the change in the roles of lecturers in handling online teaching and learning during the pandemic. Various forms of technology were incorporated into teaching to support online learning, and it became crucial for lecturers to possess adequate technological skills in order to teach effectively online. To keep up with the evolving technology, administrators were well aware that lecturers had to constantly pick up new skills and receive adequate training to be able to efficiently use online tools for teaching. One university administrator shared: '*We keep stimulating them with using ... technology effectively, and you need a different set of skills in online teaching*

that's quite different from the face-to-face teaching' (P19). This finding aligns with Enakrire (2024) and Mardiana (2020), who suggested that lecturers must have adequate technological skills to adapt to the technological change in the 21st-century online learning process. Not only was there a change in the way education was delivered, but teaching materials and lessons also had to be altered to suit the online teaching and learning environment. For instance, there was an increased emphasis on interactive lessons and innovative ways of delivering practical sessions. Despite all the changes, lecturers' responsibility to educate students and provide knowledge remained the same, but, reflecting their interconnectedness, administrators understood that lecturers were now expected to transition from being instructors to facilitators or moderators of discussion. As an example, one participant shared their opinion on the role of lecturers during the pandemic: *'The role now will be more of a facilitator of discussion, exchange of ideas during the so-called live session compared to the traditional way in face-to-face'* (P5). Researchers like Bryson and Andres (2020) and Martin et al. (2020) have also acknowledged this transition during the time of the pandemic. Besides their primary role of teaching, lecturers were given added responsibilities during the pandemic in ensuring that their students' mental health was taken care of and that they were focused on learning. According to one participant: *'I don't think the role changes, but the role expanded, so that when we want to make sure that our students are okay. Now we have to take it ... because more students will probably need a little bit more attention'* (P16). Although attending to the mental health problems of students is not in the job scope for lecturers, Eloff et al. (2021) reported that lecturers played an important part in it during the pandemic. Collectively, university administrators thought that the change in the roles of lecturers was not drastic, but rather a learning process throughout the pandemic.

4.1.2. Challenges and solutions in online learning

The second theme highlights the challenges faced in online learning and solutions to overcome them, which reflects the interdependence of both the administrators and the lecturers. From the university administrators' points of view, there are several criteria for successful online teaching and learning. The most frequently raised point was the need for proper infrastructure and connectivity to facilitate online learning. As an example, one participant said: *'I think the infrastructure must be ready. So, the Internet speed, the maturity of the platform, like what we're using now'* (P12). Previous research by Al-Ansi and Fatmawati (2023) and Arias (2018) supports the point that proper infrastructure and connectivity are important for online learning. However, the lack of peripherals and internet connection was the most commonly faced problem in carrying out learning online. Studies done by Erlangga (2022) and Adnan and Anwar (2020) show that this issue may disrupt the online teaching and learning experience. To address the lack of suitable devices and poor internet connection for learning, some universities donated computers, notebooks and other devices that support learning for students who cannot afford them. One public university supplied broadband dongles to students who did not have proper internet access, while other universities opened up their hostels with strong internet access available for students to learn online while on campus. According to Mohd Basar et al. (2021), students' financial issues are one of the factors in the inability to obtain suitable electronic devices and internet connections for online learning. Based on the responses of the university administrators, private and foreign branch universities did not face issues of students with financial problems and a lack of devices as much as those from public universities, as they are mostly from the upper income bracket.

Moreover, interactive classes are a key factor in ensuring that the students are engaged during online learning, but the participants have reported a lack of engagement and interaction between students and lecturers, as well as with their peers, during online classes. This finding is in line with previous studies by Cardullo et al. (2021) and Alawamleh et al. (2020). The diminished social interaction during the pandemic caused difficulties for students to engage with their peers for group discussion and knowledge sharing. The university administrators recognised the situation that lecturers faced in the online classroom and shared that the students often hesitated to respond online and turned off their cameras and microphones during online classes to avoid interacting with others. Previous studies reveal that reasons for this behaviour could be due to students' feelings of anxiety, fear and shyness (Gherhes et al., 2021; Woldeab & Brothen, 2021). This affects student-lecturer relationships and lowers their engagement in class, making it difficult for lecturers to measure their understanding of the subject being taught. Without close monitoring from lecturers, students tend to lack commitment and motivation to learn. They also get easily distracted by their surroundings or games on their laptop, which causes them to lose focus during class. This finding is supported by previous studies by Kostaki and Karayianni (2022) and Dontre (2020). Besides, students had to share a common space with their families during the pandemic, which made it an inconducive learning environment for online learning. Similar findings have also been reported by Jalongo (2021) and Mohd Salleh et al. (2021). To overcome this issue, lecturers tried to make their online classes interactive to grab the students' attention using different approaches like *'game-based learning'* (P4, P19), *'breakout rooms'* (P6, P19), *'videos, quizzes and demonstrations'* (P10, P19). Previous researchers like Hollister et al. (2022) and Lasekan et al. (2024) have reported that interactive classes are crucial in keeping students engaged. The suggestion by one administrator participant draws attention to the interconnectedness of the administrator and lecturer stakeholders, which was the use of positive reinforcement to encourage the students to engage during class: *'They (lecturers) also do congratulate those who switch it (cameras) on and ... just telling them, you know how great it is to see other people'* (P16).

Apart from that, university administrators from the department of pharmacy, engineering and dance have highlighted the difficulties in conducting labs and practical sessions for their students. For instance, one participant shared: *'Our problem was running difficult tutorial questions and running difficult procedural practical labs. This has no substitute online. So, it was a struggle to carry out these labs online using online tools'* (P8). This finding is supported by Gopal et al. (2021), that these courses typically require students to carry out hands-on activities for better understanding, and it is difficult to replicate this in an online setting. Although lab sessions and practical classes are difficult to conduct online, the university administrators shared that interesting new ways of delivering the lessons were introduced during the pandemic, like *'virtual lab'* (P4), *'simulation software'* (P8) and *'live streaming'* (P18). One university administrator suggested the use of Virtual Reality (VR) to deliver lab sessions online in the future for a more effective learning experience. Universities also provided several forms of training on ways for lecturers to utilise online tools to facilitate teaching and learning, and to conduct creative and interactive classes in handling online teaching.

Another criterion of successful online learning shared by the university administrators recognises the needs of the lecturers, that they should receive proper training in utilising the online tools to deliver effective online lessons. During the pandemic, some lecturers faced challenges and needed guidance in adapting to online teaching, especially the older generation of lecturers, who needed more assistance in handling online teaching. According to Jaarsveld (2020), the older generation of lecturers needs more support in

conducting online learning as they lack digital literacy and are not familiar with using advanced technology to support their teaching. Impressively, all universities were able to provide some sort of training for their lecturers in an effort to assist them in delivering lessons online. Some of the universities even had dedicated units to prepare and provide suitable training for their staff. Training was given to lecturers in the form of courses, sharing sessions, and repository materials covering important topics to equip them with the necessary skills to teach online effectively. For instance, one university administrator highlighted the type of training given to lecturers in their institution: *'We teach lecturers on how to use the whiteboard. We teach them how to do live online classes. We teach them how to prerecord videos using PowerPoints by using Teams or using Zoom, or whatever technology. We also teach them how to use a flipped classroom. We also teach them game-based teaching.'* (P4). As for older lecturers who are unfamiliar with using technology, interconnectedness is evident as they were encouraged to request additional training according to their needs in order to fully grasp the concept of online teaching and learning. Again, illustrating the interconnected approach, one foreign branch university also gave training on topics other than teaching, like mental health and ways to cope with the pandemic. This finding contradicts previous studies, which reported a lack of proper training for lecturers in conducting online classes (Richards & Thompson, 2023; Reyes-Chua et al., 2020). Overall, the training given was sufficient for the lecturers to be able to handle online teaching during the pandemic, but additional effort from the lecturers and students is needed to truly make it work.

4.1.3. Effectiveness of online tools

The third theme focuses on the effectiveness of online tools in facilitating online learning. The main advantage of online tools, as highlighted by the university administrators, is the convenience they provide for students and lecturers. Other researchers like Haleem et al. (2022) have also recognised the convenience of using online tools in terms of time, place and pace. With the use of online platforms, lecturers and students have the freedom to attend classes despite their location, and it also provides students with the ability to watch recorded lessons at their own time and pace. One participant shared that pre-recorded lessons could help students with language barriers: *'We also ... auto record. So, the moment the student finishes the lecture, they can play back. Those who [are] weak in English can then record, use a certain app to translate, and get into their native language'* (P18). Apart from that, the university administrators recognised the lecturers' challenges in fostering student activity in learning and found that the online tools consist of interactive features which could draw students' attention to the subject being taught. They thus noted that some lecturers incorporate online tools like Kahoot and Quizizz, as well as features like chat boxes and breakout rooms to help make teaching and learning sessions more interactive.

Although online learning has its advantages, it also possesses a fair share of disadvantages, including the difficulty of conducting lab sessions and tutorial classes virtually for subjects that require hands-on training and the difficulty of monitoring student assessments online despite the availability of online proctoring tools. One participant claimed that online tools are not advanced enough to replace traditional teaching: *'I don't think at the moment, the technology is anywhere near delivering an online lesson in the way that you would deliver a face-to-face lesson. To get to that, you would have to have full virtual reality in which people could act and talk, interact together and see each other'* (P14). However, the online tools gradually improved throughout the pandemic and are continuing to improve by introducing additional features that help with online teaching and

learning. The full potential of online tools can be achieved, depending on how well lecturers and students utilise them for their teaching and learning activities. Although the online tools were not as advanced in the beginning and lacked certain features, generally they were sufficient to facilitate online teaching activities like conducting live classes, communicating with students and pre-recording lectures for future viewing.

4.2. Research Question 2: What are the influencing factors towards the behavioural intentions of lecturers in using online tools effectively for online learning in higher education institutions in Malaysia?

RQ2 is addressed using data from quantitative analysis. Fifty-five-point Likert scale questions were asked to measure the participants' ratings towards the factors being studied, namely User Computer Self-Efficacy, Online System Flexibility, Suitability for Teaching, Perceived Usefulness, Perceived Ease of Use, Perceived Fit, Attitudes and Behavioural Intentions. Table 2 displays the mean scores and standard deviations of the ten factors rated by the lecturers in regard to their perspectives on online teaching according to the different types of universities. The values are displayed according to the type of universities, which are public, private and foreign branch universities.

Table 2

Mean scores and standard deviations of the ten factors ($N = 100$)

Factors	Private		Foreign branch		Public	
	Mean	SD	Mean	SD	Mean	SD
UCSE	3.60	0.46	3.67	0.50	3.56	0.70
OSF	4.15	0.83	3.89	0.74	4.26	0.71
SFT	4.39	0.80	4.20	0.71	3.78	0.91
PU	3.56	0.94	3.26	1.08	3.67	1.04
PEOU	3.93	0.83	3.70	0.81	3.87	0.87
PF	4.07	0.77	3.88	0.81	3.74	0.83
TTF	3.97	0.63	3.59	0.74	3.84	0.78
LA	3.84	0.67	3.59	0.77	3.77	0.71
GA	4.01	0.78	3.60	1.08	3.78	0.88
BI	4.18	0.90	3.64	1.11	3.64	0.98

Note. UCSE = User Computer Self-Efficacy; OSF = Online System Flexibility; SFT = Suitability For Teaching; PU = Perceived Usefulness; PEOU = Perceived Ease of Use; PF = Perceived Fit; TTF = Task-Technology Fit; LA = Lecturer Attitude; GA = General Attitude; BI = Behavioural Intention

The lecturers from public, private and foreign branch universities have rated all ten factors above 3.00 out of 5.00 ($M > 3.00$), which indicates that they have an above-average perspective towards online teaching, and this would have been an attribute noted by the administrators during the pandemic, as seen in the discussion in the previous section in this article. *Suitability for Teaching* is the highest rated factor ($M = 3.78$ to $M = 4.39$) among private and foreign branch universities, showing that the lecturers perceive the online teaching method to be suitable for delivering knowledge to students. This finding is supported by a study done by Paudel (2020), which reported that online teaching was the most suitable replacement for traditional education during the pandemic to ensure the continuity of pedagogy. *Online System Flexibility* is another highly rated factor ($M = 3.89$ to $M = 4.26$), rated highest by public universities and second highest by private universities, indicating that the lecturers find online teaching to be flexible in terms of time, place and pace of teaching. This finding in terms of the flexibility of online education is in line with

past studies conducted by Weldon et al. (2021), Soh et al. (2024) and Barr and Miller (2013). In contrast, *Perceived Usefulness* had among the lowest ratings ($M = 3.26$ and $M = 3.67$) and is rated lowest by foreign branch universities, which means the lecturers did not find online teaching to be useful in terms of communication and engagement. This finding contradicts previous studies reporting that online learning is a useful tool to enhance engagement between students and lecturers (Coman et al., 2020; Samat et al., 2020). Similarly, another lowly-rated factor was *User Computer Self-Efficacy* ($M = 3.56$ to $M = 3.67$), where it was rated lowest by public universities and second lowest by private universities, showing that the lecturers possess average ability in computing, media and web-based skills. The reason for this could be that, prior to the pandemic, technology was only adopted to a certain degree, and lecturers were not entirely exposed to its use in teaching, as is evident in the awareness of the administrators noted previously. Lecturers were thrown into handling online teaching without prior knowledge of how to utilise online tools to facilitate learning activities (Svihus, 2023). Previous studies also show that lecturers lacked proper training in using online tools for teaching, which could also be the reason for lecturers' low ratings on their computer self-efficacy (Richards & Thompson, 2023; Reyes-Chua et al., 2020). Interestingly, behavioural intention had contrasting ratings, where it was rated highest by private universities ($M = 4.18$) and rated on average ($M = 3.64$) by foreign branch and public universities. This means that private university lecturers have very strong intentions of using online teaching in the future, whereas lecturers from both foreign branch universities and public universities have equally average intentions to use online teaching. The average intentions to use online teaching could be due to their preference towards a traditional or blended learning approach, which is a combination of face-to-face and online modes of learning, as they can experience the benefits of both modes (Atwa et al., 2022; Ntim et al., 2021). The other factors, namely *Perceived Ease of Use*, *Perceived Fit*, *Task-Technology Fit*, *Lecturer Attitude* and *General Attitude*, had average ratings, with the lowest rating being $M = 3.59$ and the highest rating being $M = 4.07$.

4.3. Research Question 3: What is the current perceived satisfaction of lecturers and university administrators with online teaching and learning in its support for life-long learning in higher education institutions in Malaysia?

Qualitative and quantitative research methods were used to answer RQ3. For the qualitative method, the university administrators were asked three questions on their evaluation of online learning in their respective institutions, lecturers' attitudes towards online teaching and criteria used to evaluate their online teaching performances. As for the quantitative method, one question was asked where lecturers rated their satisfaction levels towards online teaching, ranging from a scale of 'Very Satisfied' to 'Very Dissatisfied'. The themes and sub-themes that emerged from the responses and illustrative quotes from the participants are shown in Appendix F.

4.3.1. Adaptation to online teaching

The first theme discusses lecturers' adaptation towards online teaching during the pandemic. The university administrators expressed that lecturers were expected to respond immediately to the shift in education methods despite the pressure of time to ensure the continuity of students' learning. There was a sudden need to learn relevant technologies to be implemented in the classrooms. In addition, and indicating interdependence,

administrators needed to be willing to address financial and non-financial budget constraints so that lecturers could operate effectively. Administrators showed interdependence in being confronted with the rescheduling of classes as some lecturers were unwell due to the pandemic. As a result, some institutions seemed to be overwhelmed by the situation. However, in these circumstances, both lecturers and administrators had no choice but to work together to accept that the pedagogy had to be moved online.

In the beginning, adapting to the new mode of teaching was challenging. One university administrator has shared the impact this had on the lecturers: *‘Positive (attitudes of lecturers towards online teaching) but stress among lecturers to figure out how to conduct online teaching in a short time’* (P10). Another university administrator also elaborated that the stress levels among lecturers were raised by their unfamiliarity with technology: *‘But some, they ... find it stressful because they are not familiar with all this (technology)’* (P12). However, it was only a matter of time until the lecturers adapted to the change, which eased the process of teaching online. Most lecturers embraced the shift and accepted the change in teaching methods positively. One university administrator shared: *‘Maybe for the first six months it was a bit negative. Once they tune themselves and warm up to the platform, then I think it was quite positive’* (P8). Although several previous studies, like Annamalai (2021), Junus et al. (2021) and Aboagye et al. (2020), claim that lecturers were not ready to move online, the findings of this study suggest that with time and support, lecturers were able to overcome their initial hesitation and embrace the shift to online teaching. In fact, many university administrators think that the shift towards online learning during the pandemic was an eye-opening experience that unlocked a new realm in pedagogy. For example, one university administrator said: *‘I think that it is a silver lining where it pushes everybody to sort of digitalise their teaching learning experience to enable the students to also be, be able to manoeuvre that digitalised world in a comfortable way, which would place them at an advantageous position’* (P16). This situation allowed room for a shift in mindset by the administrators, from a conventional method to a “cloud” method, coupled with the urgency of the matter, which accelerated learning and flexibility by both the administrators and lecturers. Some administrators were on call constantly to deal with challenges faced by the students and lecturers. Indeed, the term “*thinking on your feet*” prevailed during the pandemic. Administrators also took on board problem-solving skills as they had to immediately address technical, scheduling and students’ complaints.

4.3.2. Evaluation and performance

Lecturers were evaluated to measure their performance and to ensure that they were fulfilling their teaching objectives. The three main forms of lecturer evaluation are through student evaluation, peer reviews and administrator review. Most universities maintained their existing evaluation criteria during the period of online teaching, but either altered or added a few additional criteria that specifically addressed the online environment. As an example, one participant shared the evaluation criteria incorporated that measured the lecturers’ online teaching performances in their institution: *‘I think some of the criteria that we look for are whether they use a variety of e-learning tools, whether they design the activities accordingly and whether it’s engaging’* (P17). Some other main criteria for lecturer evaluation for online teaching include the course content, engagement with students, proper use of online tools and interactive activities and assessments. One university administrator also shared that although the criteria of evaluation did not change, the importance of certain criteria like engagement and delivery of information increased: *‘The item itself didn’t change. But the importance of certain items changes. So how (the*

lecturers) engage or the, the lecturer has enough knowledge and skills, (they) provide ... sufficient information' (P19). In some universities, lecturers always had to maintain a certain level of performance. It is found that the performance of lecturers before and during the pandemic remained at a similar level. When asked about lecturers' performances during the period of online teaching, all of the university administrators were happy with their performances. This finding is in line with Utomo and Rachmawati (2021), who reported that lecturers' performance with online teaching during the pandemic was at a good level. It was also noted that the performance of lectures was at a good level, owing to the ecosystem of support from the administrators who contributed tirelessly to the satisfaction of all stakeholders.

4.3.3. Preference and hybrid teaching

Online teaching has both advantages and disadvantages, and its suitability depends on other factors like the use of proper teaching materials and appropriate learning content. The teaching materials and content should be compatible with the online learning environment in order for online teaching to be carried out effectively. When the university administrators were asked to evaluate the online teaching experiences in their institutions, most participants claimed that they had a good experience, while some participants still prefer traditional teaching over moving online. On the other hand, most university administrators suggested that the integration of face-to-face and online teaching would be the best approach. For instance, one university administrator said: *'There are definitely advantages and disadvantages. That's why the ... hybrid approach would be pretty good'* (P12). Another university administrator also suggested that combining the strengths of online teaching and traditional teaching would produce a better outcome: *'You take the positives from online learning, and you take the positives from traditional learning, and then you mix the two and then apply it. So, let's get the best, the best from both worlds, right?'* (P4). Many university administrators think that the hybrid teaching approach is a promising future way forward for education. This is supported by research by Nørgård (2021), which supports the idea of hybrid learning for the future and theorises best practices for implementing the hybrid approach for lifelong learning. The administrators also agreed that human interaction contributes to a holistic approach to learning.

4.3.4. Satisfaction towards online teaching

When asked if they are satisfied with online teaching and learning, the university administrators from public, private and foreign branch universities have shown a positive reaction and claimed to be satisfied. One university administrator even said that online teaching and learning has been a good contribution to the academic setting: *'I would say that I'm satisfied. I actually think that that was actually something good for us as academics or for us to contribute in the academic setting'* (P16). Nevertheless, some university administrators think that online teaching and learning are still not at their best form and can be improved. Higher education institutions are thus posed with the challenge to engage in capital expenditures, which may have implications for their financial budgets. For example, one university administrator shared about his satisfaction towards online teaching and learning: *'I am satisfied so far with the online learning environment. However, there is room for improvement in terms of making sure that the students learn better in online learning, and I think the opportunities are out there'* (P15). While there are opportunities, the earlier study by Shea and Bidjerano (2010) revealed that challenges

include creating “learning presence” with online learning, especially in establishing students’ self-efficacy; their level of engagement and participation is crucial in making online learning a success. Secondly, it was clearly pointed out by Dwivedi et al. (2024) that online learning has the absence of physical human touch, which may influence students’ feelings lonely, culminating in depression. Despite the imperfections in the initial state of online teaching and learning, many university administrators see potential in it and predict its continued use post-pandemic, given that it is altered to suit students’ learning activities. As an example, one university administrator shared their perspective on the future of online teaching and learning: ‘Moving forward, I think online learning is here to stay, but it’s not for everything. It has to be designed for things that are suitable to be done online, can be done online’ (P17). Recent research also suggests the continued use of online learning beyond the pandemic, highlighting the importance of continuous improvements and adaptations to maximise its benefits (Afshan & Ahmed, 2020; Khyzniak et al., 2021).

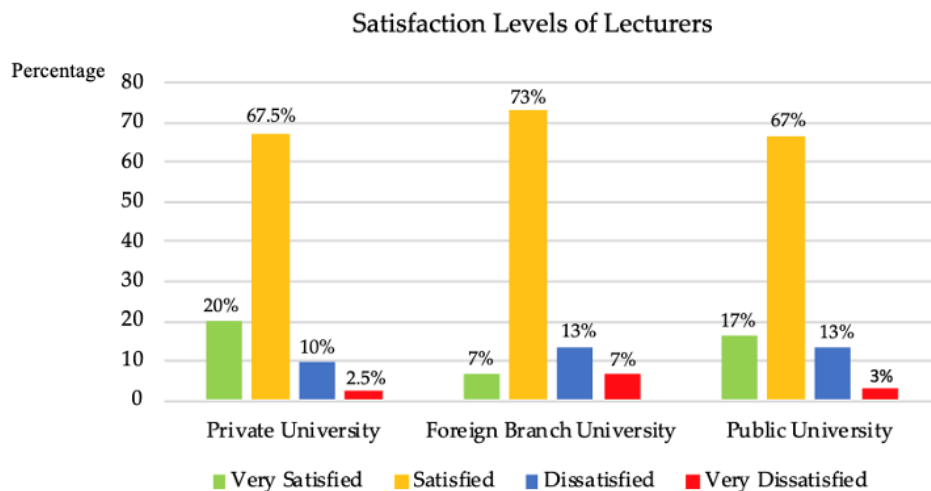


Fig. 1. Satisfaction levels of lecturers

As for lecturers’ perspectives, the percentages of lecturers’ satisfaction levels towards online teaching in public, private and foreign branch universities during the pandemic are illustrated in Fig. 1. The bar graph shows the percentages of lecturers’ satisfaction towards online teaching and learning in private ($N = 40$), foreign branch ($N = 30$) and public universities ($N = 30$) in Malaysia. A total of 67.5% of participants in private universities were satisfied with online teaching, and 20% of them were very satisfied. 10% of participants were dissatisfied with their experience with online teaching, but only 2.5% were very dissatisfied. In foreign branch universities, an incredible 73% of participants were satisfied with their experience of online teaching, but only 7% were very satisfied. 3% of participants were dissatisfied with online teaching, and 7% were very dissatisfied. As for public universities, 67% of participants were satisfied, 17% were very satisfied, 13% were dissatisfied, and 3% were very dissatisfied with their online teaching experience. The results show that private universities have the highest percentage of lecturers (87.5%) who were either satisfied or very satisfied with their online teaching experience. Overall, the participants who were either satisfied or very satisfied with online teaching were above 80% which indicates that a majority of lecturers from public, private and foreign branch universities expressed their satisfaction with their online teaching experiences in HEIs during the pandemic. This finding is in line with the results of previous studies, which have

concluded that a high percentage of lecturers were satisfied with online education (Elshami et al., 2021; Marasi et al., 2020). However, an average of 16% of lecturers were either dissatisfied or very dissatisfied with online teaching. Although there were only a few lecturers who were dissatisfied with their online teaching experience, it should not go unnoticed that there are still certain areas of the existing online teaching practices that need improvement. This is supported by a past study, which highlighted the areas of online teaching and learning that could be further enhanced (Heng & Sol, 2021).

5. Conclusion and recommendation

Lecturers and university administrators are key stakeholders who play essential roles in creating a conducive and effective teaching and learning environment in HEIs. The combined and integrated efforts of these key stakeholders lead to significant impacts on curriculum design, delivery of instruction, support services, adaptation to technological advancements, and overall institutional effectiveness. However, most research only focuses on the perspectives of students, leaving a research gap related to the associated factors and emerging issues within Malaysian HEIs during the pandemic, particularly from the integrated viewpoints of lecturers and university administrators from public, private and foreign branch universities. This highlights the importance of exploring their perspectives on online teaching during the COVID-19 pandemic in order to understand the associated factors, the root of the challenges faced, and to identify opportunities for improvement in future educational endeavours. This study bridges the gap in the lack of comprehensive understanding by delving into the experiences, challenges, and adaptations made by the lecturers and university administrators in navigating the complexities of online education in Malaysian HEIs. Importantly, it results in an ecosystemic-like approach that integrates both these perspectives in a set of guidelines for enhanced online learning.

This study has thus explored the perspectives of lecturers and university administrators towards online teaching, identifying key themes and sub themes related to the impacts, challenges and effectiveness of online tools, influential factors affecting lecturers' intentions, and satisfaction levels towards online teaching. In answering the first research question on the impacts, challenges and effectiveness of online tools, the key themes identified include the role of lecturers and educational responsibilities, challenges and solutions in online learning and the effectiveness of online tools. The first theme on the role of lecturers and educational responsibilities revealed sub themes including technological reliance, shifts in lecturers' roles and emphasis on students' mental well-being. The second theme on challenges and solutions in online learning revealed several sub themes which are lack of devices and reliable internet connectivity, insufficient engagement and need for interactive classes, difficulty to conduct practical lessons and importance of training, aligning with findings from other studies on online education challenges in Malaysian HEIs (Crosling et al., 2023; Santoso et al., 2024; Tajuddin et al., 2021). The third theme on the effectiveness of online tools revealed sub themes including the convenience of online tools, gradual improvement and sufficiency for online teaching and learning. In addressing the second research question on the factors affecting lecturers' behavioural intentions towards online teaching, *Suitability for Teaching and Online System Flexibility* emerged as the highest influencing factors. As for the third research question on the satisfaction levels of lecturers and university administrators towards online teaching, the key themes that emerged were adaptation to online learning, evaluation and performance and preference and hybrid teaching. The first theme on adaptation to online

learning revealed sub themes like a challenging start, unfamiliarity with technology and lecturers that embraced the shift. The second theme on evaluation and performance revealed sub themes, including evaluation criteria and performance levels. The third theme on preference and hybrid teaching revealed sub themes like preference for traditional teaching and hybrid teaching.

Overall, from the integrated perspectives of lecturers and university administrators, online teaching has its opportunities and challenges, emphasising the importance of ongoing enhancements designed as guidelines that form an ecosystem and establish a conducive and efficient learning environment, benefiting students and other higher education stakeholders.

Hence, based on these key findings, the following integrated set of recommendations as guidelines is put forward for relevant higher education stakeholders in Malaysia for more enhanced online teaching and learning practices, but also to fortify their readiness for potential future challenges, contributing to a more robust and adaptive higher education system (see Fig. 2).

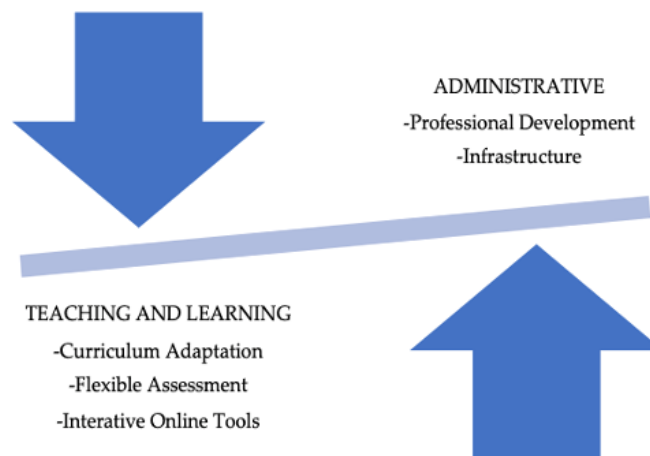


Fig. 2. Guidelines for enhancing online teaching and learning

5.1. Administrative issues: Prioritise continuous professional development

Training is a significant aspect that would help prepare lecturers towards effective online teaching. However, the training provided during the pandemic was developed under time constraints, which may have impacted its comprehensiveness and effectiveness in adequately preparing lecturers for the complexities of online teaching. Moreover, the quantitative data reveal that the lecturers possess average technical skills, which could hinder the smooth flow of online pedagogy. Hence, it is recommended that university management prioritise training and continuous professional development that equips not only academic lecturers but also administrators with the necessary skills and knowledge in handling online teaching. Including both lecturers and administrators supports each of these groups in appreciating challenges from both the teaching and the management perspective and leads to more holistic outcomes.

5.2. *Administrative issues: Invest in enhancement of digital learning infrastructure*

The recommendations outlined above must be underpinned by an appropriate digital learning infrastructure. Based on the experiences of a lack of appropriate infrastructure and connectivity during the pandemic, it is apparent that access to reliable technology and resources is paramount in ensuring that all individuals involved in the educational process have equal opportunities to engage meaningfully in online education. Without adequate infrastructure and connectivity, students and lecturers may encounter barriers that impede their ability to fully access and benefit from online learning experiences. Therefore, it is suggested that university management recognise the views and experiences of both lecturers and administrators and invest accordingly in the enhancement of digital learning infrastructure to promote equitable access via reliable technology and resources for education.

5.3. *Teaching and learning issues: Implement strategic curriculum adaptation*

Aligned with the need for professional development is the need for continual development in online learning itself. *Suitability for Learning* emerged as the top-rated factor about online learning among lecturers, highlighting their positive perception of online teaching as an effective mode of education delivery. Nevertheless, insights from university administrators in this study suggest that while online teaching is deemed satisfactory, opportunities for enhancement exist. Furthermore, for online teaching and learning to reach full potential, it is imperative that teaching materials and content are tailored to align seamlessly with the online learning environment. Consequently, university management is encouraged to implement the strategic adaptation of curriculum in ways that appreciate the viewpoints of both lecturers and administrators and are underpinned by adequate training. The outcome is teaching methods aligned with the unique modalities of online learning.

5.4. *Teaching and learning issues: Implement flexible learning assessment strategies*

The prominence of the theme of Online System Flexibility among lecturers underscores the value placed on the adaptable nature of online teaching and learning. This also has positive implications for administrators. Drawing on the enhanced online learning environments supported by previous recommendations and by harnessing online system flexibility, university management is encouraged to support the implementation of flexible learning assessment approaches that cater for the diverse needs of students and foster fair educational outcomes. By embracing flexible assessment strategies, institutions can provide learners with varied avenues to showcase their understanding and skills, thus enhancing inclusivity and personalised learning experiences. These recommendations are intended to foster a more resilient and responsive higher education system in Malaysia, capable of adapting to the evolving needs and challenges of modern education.

5.5. *Teaching and learning issues: Incorporate interactive online tools in learning*

To address concerns about low student engagement and mental well-being in online learning, as expressed in this study and underpinned by the actions outlined in the previous recommendations in this paper, including that of professional development, it is

recommended that university management prioritise training that integrates online tools that foster engagement and interactivity among students and lecturers. By incorporating tools such as collaborative platforms, interactive whiteboards, polls, quizzes, and video conferencing with chat and Q&A features, lecturers can create dynamic and inclusive learning environments that support student well-being and active participation. This approach aligns with the goal of establishing conducive and efficient online learning environments that cater to diverse student needs. The ultimate effect is the enhancement of academic outcomes and the overall learning experience, for the benefit of lecturers and administrators with teaching quality and outcomes.

6. Limitations and future research

This research explored the perspectives of the providers of higher education, specifically lecturers and university administrators, towards online teaching, and integrated these in an ecosystemic manner into guidelines for online educational enhancement. This study, while important, would be enhanced with further work on the perspectives of students who are the receivers of higher education, to form a complete narrative of the online teaching and learning scenario in Malaysian HEIs. Therefore, other researchers should explore the perspectives of the receivers of higher education through comparative studies or even replicate this study in a different setting or population to identify similarities and differences in the findings.

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References

- Abazi-Bexheti, L., Kadriu, A., Apostolova-Trpkovska, M., Jajaga, E., & Abazi-Alili, H. (2018). LMS solution: Evidence of Google classroom usage in higher education.

- Business Systems Research Journal*, 9(1), 31–43. <https://doi.org/10.2478/bsrj-2018-0003>
- Aboagye, E., Yawson, J. A., & Appiah, K. N. (2020). COVID-19 and e-learning: The challenges of students in tertiary institutions. *Social Education Research*, 2(1), 1–8. <https://doi.org/10.37256/ser.212021422>
- Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students perspectives. *Journal of Pedagogical Sociology and Psychology*, 2(1), 45–51. <https://doi.org/10.33902/jpsp.2020261309>
- Afshan, G., & Ahmed, A. (2020). Distance learning is here to stay: Shall we reorganize ourselves for the post-covid-19 world? *Anaesthesia, Pain & Intensive Care*, 24(5), 487–489. <https://doi.org/10.35975/apic.v24i5.1353>
- Agung, A. S. N., Surtikanti, M. W., & Quinones, C. A. (2020). Students' perception of online learning during COVID-19 pandemic: A case study on the English students of STKIP Pamane Talino. *Soshum: Jurnal Sosial dan Humaniora*, 10(2), 225–235. <https://doi.org/10.31940/soshum.v10i2.1316>
- Alawamleh, M., Al-Twait, L. M., & Al-Saht, G. R. (2020). The effect of online learning on communication between instructors and students during covid-19 pandemic. *Asian Education and Development Studies*, 11(2), 380–400. <https://doi.org/10.1108/aeds-06-2020-0131>
- Al-Ansi, A. M., & Fatmawati, I. (2023). Integration of ICT in higher education during COVID-19 pandemic: A case study. *International Journal of Learning and Change*, 15(4), 430–442. <https://doi.org/10.1504/ijlc.2023.132132>
- Alfadda, H. A., & Mahdi, H. S. (2021). Measuring students' use of zoom application in language course based on the technology acceptance model (TAM). *Journal of Psycholinguistic Research*, 50(4), 883–900. <https://doi.org/10.1007/s10936-020-09752-1>
- Al Kurdi, B., Alshurideh, M., Salloum, S. A., Obeidat, Z. M., & Al-dweeri, R. M. (2020). An empirical investigation into examination of factors influencing University students' behavior towards Elearning acceptance using SEM approach. *International Journal of Interactive Mobile Technologies*, 14(2), 19–41. <https://doi.org/10.3991/ijim.v14i02.11115>
- Alshahrani, S., Ahmed, E., & Ward, R. (2017). The influence of online resources on student-lecturer relationship in higher education: A comparison study. *Journal of Computers in Education*, 4(2), 87–106. <https://doi.org/10.1007/s40692-017-0083-8>
- Annamalai, N. (2021). Online learning during COVID-19 pandemic. Are Malaysian high school students ready? *Pertanika Journal of Social Sciences and Humanities*, 29(3), 1571–1590. <https://doi.org/10.47836/pjssh.29.3.06>
- Arias, M. B. (2018). *Internet disparity challenges: Schooling for all*. Center for Applied Linguistics. Retrieved from <https://www.cal.org/publications/cc-internet-disparity-6-2020/>
- Atwa, H., Shehata, M. H., Al-Ansari, A., Kumar, A., Jaradat, A., Ahmed, J., & Deifalla, A. (2022). Online, face-to-face, or blended learning? Faculty and medical students' perceptions during the COVID-19 pandemic: A mixed-method study. *Frontiers in Medicine*, 9: 791352. <https://doi.org/10.3389/fmed.2022.791352>
- Azizan, S. N., Lee, A. S. H., Crosling, G., Atherton, G., Arulanandam, B. V., Lee, C. E. C., & Abdul Rahim, R. B. (2022). Online learning and COVID-19 in higher education: The value of IT models in assessing students' satisfaction. *International Journal of Emerging Technologies in Learning*, 17(3), 245–278. <https://doi.org/10.3991/ijet.v17i03.24871>
- Barr, B. A., & Miller, S. F. (2013). *Higher education: The online teaching and learning*

- experience. Department of Education. Retrieved from <https://eric.ed.gov/?id=ED543912>
- Bryson, J. R., & Andres, L. (2020). Covid-19 and rapid adoption and improvisation of online teaching: Curating resources for extensive versus intensive online learning experiences. *Journal of Geography in Higher Education*, 44(4), 608–623. <https://doi.org/10.1080/03098265.2020.1807478>
- Caliskan, S., Kurbanov, R. A., Platonova, R. I., Ishmuradova, A. M., Vasbieva, D. G., & Merenkova, I. V. (2020). Lecturers views of online instructors about distance education and Adobe connect. *International Journal of Emerging Technologies in Learning*, 15(23), 145–157. <https://doi.org/10.3991/ijet.v15i23.18807>
- Cardullo, V., Wang, C., Burton, M., & Dong, J. (2021). K-12 teachers' remote teaching self-efficacy during the pandemic. *Journal of Research in Innovative Teaching & Learning*, 14(1), 32–45. <https://doi.org/10.1108/jrit-10-2020-0055>
- Castelli, F. R., & Sarvary, M. A. (2021). Why students do not turn on their video cameras during online classes and an equitable and inclusive plan to encourage them to do so. *Ecology and Evolution*, 11(8), 3565–3576. <https://doi.org/10.1002/ece3.7123>
- Chan, R. Y., Bista, K., & Allen, R. M. (2021). Is online and distance learning the future in global higher education?: The faculty perspectives during COVID-19. In R. Chan, K. Bista, & R. Allen (Eds.), *Online Teaching and Learning in Higher Education During COVID-19: International Perspectives and Experiences* (pp. 3–12). Routledge. <https://doi.org/10.4324/9781003125921-2>
- Coman, C., Tîru, L. G., Mesesan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective. *Sustainability*, 12(24), 10367. <https://doi.org/10.3390/su122410367>
- Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19(2), 189–211. <https://doi.org/10.2307/249688>
- Costley, J., Fanguy, M., Lange, C., & Baldwin, M. (2020). The effects of video lecture viewing strategies on cognitive load. *Journal of Computing in Higher Education*, 33, 19–38. <https://doi.org/10.1007/s12528-020-09254-y>
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods Approaches*. SAGE.
- Crosling, G., Nair, M., & Vaithilingam, S. (2015). A creative learning ecosystem, quality of education and innovative capacity: A perspective from higher education. *Studies in Higher Education*, 40(7), 1147–1163. <https://doi.org/10.1080/03075079.2014.881342>
- Crosling, G., Lee, A. S. H., Passey, D., & Azizan, S. N. (2023). A study of the use of blended learning/online learning tools in a higher education institution in an ASEAN Country. *Journal of Educators Online*, 20(3). Retrieved from <https://eric.ed.gov/?id=EJ1393981>
- Dontre, A. J. (2020). The influence of technology on academic distraction: A review. *Human Behavior and Emerging Technologies*, 3(3), 379–390. <https://doi.org/10.1002/hbe2.229>
- Dwivedi, T., Prajapati, V., Jariwala, C. H., Prajapati, A., & Murthy, G. V. K. (2024). Analyzing the benefits and drawbacks of online learning in higher education. *African Journal of Biological Sciences*, 6(2), 1115–1125. Retrieved from <https://gnanaganga.alliance.edu.in/entities/publication/c92f3d39-025e-444c-81ab-3ab79e360375>
- Eloff, I., O'Neil, S., & Kanengoni, H. (2021). Students' well-being in tertiary environments: Insights into the (unrecognised) role of lecturers. *Teaching in Higher Education*, 28(7), 1777–1797. <https://doi.org/10.1080/13562517.2021.1931836>

- Elshami, W., Taha, M. H., Abuzaid, M., Saravanan, C., Al Kawas, S., & Abdalla, M. E. (2021). Satisfaction with online learning in the new normal: Perspective of students and faculty at medical and health sciences colleges. *Medical Education Online*, 26(1): 1920090. <https://doi.org/10.1080/10872981.2021.1920090>
- Enakrire, R. T. (2024). The usefulness of computer skills for enhanced teaching and learning among lecturers in an open distance e-learning (ODEL) environment. *Education and Information Technologies*, 29(13), 16597–16612. <https://doi.org/10.1007/s10639-024-12519-z>
- Erlangga, D. T. (2022). Student problems in online learning: Solutions to keep education going on. *Journal of English Language Teaching and Learning*, 3(1), 21–26. <https://doi.org/10.33365/jeltl.v3i1.1694>
- Franchi, T. (2020). The impact of the COVID-19 pandemic on current anatomy education and future careers: A student's perspective. *Anatomical Sciences Education*, 13(3), 312–315. <https://doi.org/10.1002/ase.1966>
- Gherhes, V., Simon, S., & Para, I. (2021). Analysing students' reasons for keeping their webcams on or off during online classes. *Sustainability*, 13(6): 3203. <https://doi.org/10.3390/su13063203>
- Gopal, R., Singh, V., & Aggarwal, A. (2021). Impact of online classes on the satisfaction and performance of students during the pandemic period of COVID 19. *Education and Information Technologies*, 26(6), 6923–6947. <https://doi.org/10.1007/s10639-021-10523-1>
- Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3, 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>
- Heng, K., & Sol, K. (2021). Online learning during COVID-19: Key challenges and suggestions to enhance effectiveness. *Cambodian Journal of Educational Research*, 1(1), 3–16. <https://doi.org/10.62037/cjer.2021.01.01.02>
- Hollister, B., Nair, P., Hill-Lindsay, S., & Chukoskie, L. (2022). Engagement in online learning: Student attitudes and behavior during COVID-19. *Frontiers in Education*, 7: 851019. <https://doi.org/10.3389/feduc.2022.851019>
- Hoong, A. L. S., Thi, L. S., & Lin, M. (2017). Affective technology acceptance model: Extending technology acceptance model with positive and negative affect. *Knowledge Management Strategies and Applications*, 147, 1–15. <https://doi.org/10.5772/intechopen.70351>
- Jaarsveld, G. M. V. (2020). The effects of COVID-19 among the elderly population: A case for closing the digital divide. *Frontiers in Psychiatry*, 11: 577427. <https://doi.org/10.3389/fpsyt.2020.577427>
- Jalongo, M. R. (2021). The effects of COVID-19 on early childhood education and care: Research and resources for children, families, teachers, and teacher educators. *Early Childhood Education Journal*, 49(5), 763–774. <https://doi.org/10.1007/s10643-021-01208-y>
- Junus, K., Santoso, H. B., Putra, P. O., Gandhi, A., & Siswantining, T. (2021). Lecturer readiness for online classes during the pandemic: A survey research. *Education Sciences*, 11(3): 139. <https://doi.org/10.3390/educsci11030139>
- Khong, H., Celik, I., Le, T. T., Lai, V. T., Nguyen, A., & Bui, H. (2022). Examining teachers' behavioural intention for online teaching after COVID-19 pandemic: A large-scale survey. *Education and Information Technologies*, 28(5), 5999–6026. <https://doi.org/10.1007/s10639-022-11417-6>
- Khyzhniak, O., Zhovnir, A., Mikhno, N., Stadnik, O., Folomiciev, M., & Shapoval, A. (2021). E-learning efficiency in an age of global risks and changes. *Postmodern*

- Openings*, 12(4), 197–209. <https://doi.org/10.18662/po/12.4/369>
- Kohnke, L., Zou, D., & Zhang, R. (2023). Zoom supported emergency remote teaching and learning in teacher education: A case study from Hong Kong. *Knowledge Management & E-Learning*, 15(2), 192–213. <https://doi.org/10.34105/j.kmel.2023.15.011>
- Koskela, M., Kiltti, P., Vilpola, I., & Tervonen, J. (2005). Suitability of a virtual learning environment for higher education. *Electronic Journal of e-Learning*, 3(1), 23–32. Retrieved from <https://eric.ed.gov/?id=EJ1099351>
- Kostaki, D., & Karayianni, I. (2022). Houston, we have a pandemic: Technical difficulties, distractions and online student engagement. *Student Engagement in Higher Education Journal*, 4(2), 105–127. Retrieved from <https://sehej.raise-network.com/raise/article/view/1063>
- Lasekan, O. A., Pachava, V., Godoy Pena, M. T., Golla, S. K., & Raje, M. S. (2024). Investigating factors influencing students' engagement in sustainable online education. *Sustainability*, 16(2): 689. <https://doi.org/10.3390/su16020689>
- Lee, A. S., & Lim, T. (2011, July). Enhance task-technology fit model by task categorization characteristics for a proposed knowledge creation and sharing model via weblogs. In *Proceedings of the 2011 7th International Conference on Information Technology in Asia*. IEEE. <https://doi.org/10.1109/cita.2011.5999505>
- Lee, A. S., Wang, S., Yeoh, W., & Ikasari, N. (2020). Understanding the use of knowledge sharing tools. *Journal of Computer Information Systems*, 61(5), 458–470. <https://doi.org/10.1080/08874417.2020.1752850>
- Lestyanawati, R. (2020). The strategies and problems faced by Indonesian teachers in conducting e-learning during COVID-19 outbreak. *CLLiENT Journal of Culture, Literature, Linguistics, and English Teaching*, 2(1), 71–82. <https://doi.org/10.32699/cllient.v2i1.1271>
- Liesa-Orús, M., Latorre-Coscolluela, C., Vázquez-Toledo, S., & Sierra-Sánchez, V. (2020). The technological challenge facing higher education professors: Perceptions of ICT tools for developing 21st century skills. *Sustainability*, 12(13): 5339. <https://doi.org/10.3390/su12135339>
- Lim, Z. H. (2020). Evaluating lecturers' satisfaction towards online teaching in AHIBS, UTM, Kuala Lumpur, Malaysia. *International Journal of Innovation and Business Strategy*, 14(2), 78–93. Retrieved from <https://ijibs.utm.my/index.php/ijibs/article/view/90>
- Marasi, S., Jones, B., & Parker, J. M. (2020). Faculty satisfaction with online teaching: A comprehensive study with American faculty. *Studies in Higher Education*, 47(3), 513–525. <https://doi.org/10.1080/03075079.2020.1767050>
- Mardiana, H. (2020). Lecturers' adaptability to technological change and its impact on the teaching process. *Jurnal Pendidikan Indonesia*, 9(2), 275–289. <https://doi.org/10.23887/jpi-undiksha.v9i2.24595>
- Martín-Sómer, M., Moreira, J., & Casado, C. (2021). Use of Kahoot! to keep students' motivation during online classes in the lockdown period caused by COVID 19. *Education for Chemical Engineers*, 36, 154–159. <https://doi.org/10.1016/j.ece.2021.05.005>
- Martin, F., Wang, C., & Sadaf, A. (2020). Facilitation matters: Instructor perception of helpfulness of facilitation strategies in online courses. *Online Learning*, 24(1), 28–49. <https://doi.org/10.24059/olj.v24i1.1980>
- Mohamad, F. F., & Yusuf, S. (2022). COVID-19 and the impact of online learning on the higher institution students' health. *Malaysian Journal of Social Sciences and Humanities*, 7(9): e001756. <https://doi.org/10.47405/mjssh.v7i9.1756>

- Mohd Basar, Z., Mansor, A. N., Jamaludin, K. A., & Alias, B. S. (2021). The effectiveness and challenges of online learning for secondary school students – A case study. *Asian Journal of University Education*, 17(3), 119–129.
- Mohd Salleh, N., Amir, A.L., Shukri, A. H. S. A., & Zulkifli, N. (2021). Students perceptive towards online learning during Covid-19 pandemic: A case study in MiCoST. *Journal of Advanced Computing Technology and Application*, 3(2), 51–56. Retrieved from <https://jacta.utm.edu.my/jacta/article/view/5264>
- Niemi, H. (n.d.). *What is an educational eco-system?* The University of Helsinki MOOC Center. Retrieved from <https://courses.mooc.fi/org/uh-edu/courses/uncover-finnish-education/chapter-1/what-is-an-educational-eco-system>
- Nørgård, R. T. (2021). Theorising hybrid lifelong learning. *British Journal of Educational Technology*, 52(4), 1709–1723. <https://doi.org/10.1111/bjet.13121>
- Ntim, S., Opoku-Manu, M., & Addai-Amoah Kwarteng, A. (2021). Post COVID-19 and the potential of blended learning in higher institutions: Exploring students and lecturers perspectives on learning outcomes in blended learning. *European Journal of Education and Pedagogy*, 2(6), 49–59. <https://doi.org/10.24018/ejedu.2021.2.6.162>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*. McGrawHill.
- Nuraziza, N., Oktaviani, L., & Sari, F. M. (2021). EFL learners' perceptions on zoom application in the online classes. *Jambura Journal of English Teaching and Literature*, 2(1), 41–51. <https://doi.org/10.37905/jetl.v2i1.7318>
- Paudel, P. (2020). Online education: Benefits, challenges and strategies during and after COVID-19 in higher education. *International Journal on Studies in Education*, 3(2), 70–85. <https://doi.org/10.46328/ijonse.32>
- Reyes-Chua, E., Sibbaluca, B. G., Miranda, R. D., Palmario, G. B., Moreno, R. P., & Solon, J. P. T. (2020). The status of the implementation of the e-learning classroom in selected higher education institutions in Region IV-A amidst the COVID-19 crisis. *Journal of Critical Reviews*, 7(11), 253–258. Retrieved from <https://jcreview.com/archives/volume-7/issue-11/9668>
- Richards, K., & Thompson, B. M. (2023). Challenges and instructor strategies for transitioning to online learning during and after the COVID-19 pandemic: A review of literature. *Frontiers in Communication*, 8: 1260421. <https://doi.org/10.3389/fcomm.2023.1260421>
- Rodriguez, M. C., Ooms, A., & Montañez, M. (2008). Students' perceptions of online-learning quality given comfort, motivation, satisfaction, and experience. *Journal of Interactive Online Learning*, 7(2), 105–125. Retrieved from <https://eric.ed.gov/?id=EJ1092297>
- Rotas, E., & Cahapay, M. B. (2020). Difficulties in remote learning: Voices of Philippine university students in the wake of COVID-19 crisis. *Asian Journal of Distance Education*, 15(2), 147–158. <https://doi.org/10.5281/zenodo.4299835>
- Sadaf, A., Newby, T. J., & Ertmer, P. A. (2015). An investigation of the factors that influence preservice teachers' intentions and integration of Web 2.0 tools. *Educational Technology Research and Development*, 64, 37–64. <https://doi.org/10.1007/s11423-015-9410-9>
- Salinda Premadasa, H. K., Kapila Tharanga Rathnayaka, R. M., Waruni Thiranagama, A., & Walpita, C. N. (2018). Remodeling the educational usage of Facebook in smart-mobile age. *Education and Information Technologies*, 24, 41–61. <https://doi.org/10.1007/s10639-018-9759-6>
- Samat, M. F., Awang, N. A., Hussin, S. N., & Mat Nawi, F. A. (2020). Online distance learning amidst covid-19 pandemic among university students. *Asian Journal of University Education*, 16(3), 220–233. Retrieved from

- <https://files.eric.ed.gov/fulltext/EJ1274172.pdf>
- Santoso, H. B., Lawanto, O., Setiasih, S., Sugoto, S., Kesumaningsari, N. P. A., & Yunita, A. (2024). Undergraduate students' learning experiences and strategies in online learning during the pandemic: An Indonesian perspective. *Knowledge Management & E-Learning*, 16(1), 110–133. <https://doi.org/10.34105/j.kmel.2024.16.005>
- Sarder, M. D. (2014, June). Improving student engagement in online courses. In *Proceedings of the 2014 121st ASEE Annual Conference & Exposition*. American Society for Engineering Education. <https://doi.org/10.18260/1-2--20611>
- Schlenz, M. A., Schmidt, A., Wöstmann, B., Krämer, N., & Schulz-Weidner, N. (2020). Students' and lecturers' perspective on the implementation of online learning in dental education due to SARS-Cov-2 (COVID-19): A cross-sectional study. *BMC Medical Education*, 20: 354. <https://doi.org/10.1186/s12909-020-02266-3>
- Selvanathan, M., Hussin, N. A. M., & Azazi, N. A. N. (2020). Students learning experiences during COVID-19: Work from home period in Malaysian higher learning institutions. *Teaching Public Administration*, 41(1), 13–22. <https://doi.org/10.1177/0144739420977900>
- Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments. *Computers & Education*, 55(4), 1721–1731. <https://doi.org/10.1016/j.compedu.2010.07.017>
- Sia, J. K. M., & Abbas Adamu, A. (2020). Facing the unknown: Pandemic and higher education in Malaysia. *Asian Education and Development Studies*, 10(2), 263–275. <https://doi.org/10.1108/aeds-05-2020-0114>
- Sit, J. W. H., Chung, J. W. Y., Chow, M. C. M., & Wong, T. K. S. (2005). Experiences of online learning: Students' perspective. *Nurse Education Today*, 25(2), 140–147. <https://doi.org/10.1016/j.nedt.2004.11.004>
- Soh, M. C., Kamarunzaman, N. Z., Nen, Z. M., Yaacob, N. A., & Rahmat, N. H. (2024). Online learning: Is there a relationship between learning performance with flexibility and study-life balance? *International Journal of Academic Research in Business and Social Sciences*, 14(1), 2457–2472. <https://doi.org/10.6007/ijarbss/v14-i1/17193>
- Svihus, C. L. (2023). Online teaching in higher education during the COVID-19 pandemic. *Education and Information Technologies*, 29(3), 3175–3193. <https://doi.org/10.1007/s10639-023-11971-7>
- Tajuddin, A. J. A., Romly, R., Hamzah, Y., Hussin, W. R. W., & Muda, W. M. W. (2021, March). Lecturers' readiness and emotional presence on online teaching data in a Malaysian university during COVID-19. In *Proceedings of the First International Conference on Science, Technology, Engineering and Industrial Revolution (ICSTEIR 2020)* (pp. 548–556). Atlantis Press. <https://doi.org/10.2991/assehr.k.210312.088>
- Teo, T., & Koh, J. H. L. (2010). Assessing the dimensionality of computer self-efficacy among pre-service teachers in Singapore: A structural equation modeling approach. *International Journal of Education and Development Using Information and Communication Technology*, 6(3), 7–18. Retrieved from <https://www.learntechlib.org/p/42385/>
- Tseng, C. H., Wang, C. T., Hsu, C. H., & Liu, J. W. (2022). Behavioral intention to use distance teaching in the pandemic era. *Frontiers in Psychology*, 13: 879316. <https://doi.org/10.3389/fpsyg.2022.879316>
- Utomo, H., & Rachmawati, M. (2021). Teaching performance of lecturers during pandemic based on knowledge and expertise in Salatiga. *Konfrontasi: Jurnal Kultural, Ekonomi dan Perubahan Sosial*, 8(3), 178–185. <https://doi.org/10.33258/konfrontasi2.v8i3.155>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of

- information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- Viner, R., Russell, S., Croker, H., Packer, J., Ward, J., Stansfield, C., ... Booy, R. (2020). School closure and management practices during coronavirus outbreaks including COVID-19: A rapid systematic review. *The Lancet Child & Adolescent Health*, 4(5), 397–404. <https://doi.org/10.2139/ssrn.3556648>
- Voelkel, S., Bates, A., Gleave, T., Larsen, C., Stollar, E. J., Wattret, G., & Mello, L. V. (2023). Lecture capture affects student learning behaviour. *FEBS Open Bio*, 13(2), 217–232. <https://doi.org/10.1002/2211-5463.13548>
- Weldon, A., Ma, W. W. K., Ho, I. M. K., & Li, E. (2021). Online learning during a global pandemic: Perceived benefits and issues in higher education. *Knowledge Management & E-Learning*, 13(2), 161–181. <https://doi.org/10.34105/j.kmel.2021.13.009>
- Woldeab, D., & Brothen, T. (2021). Video surveillance of online exam proctoring: Exam anxiety and student performance. *International Journal of E-Learning & Distance Education / Revue internationale du e-learning et la formation à distance*, 36(1). Retrieved from <https://www.ijede.ca/index.php/jde/article/view/1204>
- Wu, C., Kao, S. C., & Shih, C. H. (2018). Task-technology fit in knowledge creation: The moderating role of cognitive style. *VINE Journal of Information and Knowledge Management Systems*, 48(1), 83–102. <https://doi.org/10.1108/vjikms-01-2017-0005>
- Wut, T. M., & Xu, J. (2021). Person-to-person interactions in online classroom settings under the impact of COVID-19: A social presence theory perspective. *Asia Pacific Education Review*, 22(3), 371–383. <https://doi.org/10.1007/s12564-021-09673-1>
- Yarmand, M., Solyst, J., Klemmer, S., & Weibel, N. (2021, May). “It feels like I am talking into a void”: Understanding interaction gaps in synchronous online classrooms. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*. ACM. <https://doi.org/10.1145/3411764.3445240>

Appendix A

Research interview questions

1. How would you evaluate the online learning experience in your institution?
2. What are the criteria of successful online learning in higher education? 1697
3. What are the issues which impact the success of online learning in your institution?
4. Overall, what were the attitudes of your lecturers of their use of online learning in supporting teaching practices?
5. What are your criteria in evaluating the performance of a lecturer in conducting online classes and facilitates student learning?
6. What is your view about the role of lecturers as facilitators for online learning in comparison to traditional/conventional lectures before the COVID-19 pandemic?
7. Were the lecturers given sufficient training before or while embarking upon online learning?
8. How effective are the online tools for teaching and facilitating student learning?
9. What are the challenges on how online programmes affect student learning and outcomes?
10. What are your possible resolutions to the above challenges?

Appendix B

Table B

Interview participants' information

Participant	Position	Department	University Type
P1	Programme Chairman	Accounting	Public
P2	Head of Department	Computer Science & Information Technology	Public
P3	Head of Department	Psychology & Clinical Language Sciences	Foreign branch
P4	Head of Department	Built Environment	Foreign branch
P5	Associate Dean	Department of Computing and Information Systems	Private
P6	Head of Centre	Centre for American Education	Private
P7	Head of School	Accounting and Finance	Private
P8	Head of Department	Electric and Electrical Engineering	Foreign branch
P9	Head of Department	Science & Technology Studies	Public
P10	Head of Department	Dance	Public
P11	Head of Department	International & Strategic Studies	Public
P12	Associate Dean	Computing and Information Systems	Private
P13	Head of Unit	Finance	Private
P14	Associate Provost	Psychology	Private
P15	Head of Department	Science and Technical Education	Public
P16	Head of Department	Liberal Arts and Sciences	Private
P17	Head of School	Pharmacy	Private
P18	Head of School	Education	Private
P19	Head of Department	Management	Private
P20	Head of Department	Communication	Private
P21	Deputy Dean	Creative Industries	Private
P22	Head of Department	Electrical & Robotics Engineering	Foreign branch
P23	Head of Department	Civil Engineering	Foreign branch
P24	Head of Department	Economics and Finance	Private

Appendix C

The items in this questionnaire were adopted from previous studies (Hoong et al., 2017; Koskela et al., 2005; Lee & Lim, 2011; Lee et al., 2020; Sadaf et al., 2015; Salinda Premadasa et al., 2018; Rodriguez et al., 2008; Teo & Koh, 2010; Venkatesh et al., 2003; Wu et al., 2018).

Table C

Survey questionnaire

Factor 1: User Computer Self-Efficacy	i) Basic Computer Skills
	1. I am able to use the internet and email (e.g., Hotmail, Outlook, Yahoo, Gmail, Unimail) to search for information and resources, and for communication.
	2. I am able to use word processor to create, edit and format documents for specific purposes (e.g. Microsoft Word), and use spreadsheet to record data, compute simple calculations and represent data in the form of tables and graphs (e.g. Microsoft Excel).
	3. I am able to use Microsoft Softwares (e.g., Microsoft PowerPoint) for classroom delivery (presentation, documentation, notes).
	ii) Media-Related Skills
	4. I am able to use website editors (e.g. Microsoft FrontPage, and Macromedia Dreamweaver) to create and/or modify web pages.
	5. I am able to use video editing software (e.g. Microsoft MovieMaker, Adobe Premier, and Ulead VideoStudio) and graphic editors (e.g., Microsoft Paint, Adobe Photoshop) to create and/or modify resources for teaching.
	6. I am able to use animation software (e.g., Macromedia Flash, Authorware, and Director) to create animations.
	iii) Web-Based Skills
Factor 2: Online System Flexibility	7. I use blogging for personal use.
	8. I am able to use conferencing Software (e.g., Yahoo, IM, MSN Messenger, ICQ, Skype) for collaboration purposes.
	9. I am able to use a learning management system (e.g. Blackboard, IVLE, WebCT, Moodle) to support teaching.
Factor 3: Suitability for Learning	10. Online teaching allows me flexibility in terms of time and place.
	11. Flexibility teaching through online has improved my teaching.
Factor 4: Perceived Usefulness	12. Flexibility in online teaching allows me to teach at my own pace and independently.
	13. I have been provided with enough support for online teaching to support quality and effective teaching.
Factor 5: Perceived Ease of Use	14. I have enough support from my Head of Department and administrative staff for online teaching.
	15. Online teaching allows me to communicate with more people in a shorter time period compared with face-to-face teaching.
	16. Online teaching allows me to share my work in a short period of time (speedily).
Factor 6: Perceived Fit	17. Online teaching makes it easier to establish, maintain, control and improve my personal relationships with the students.
	18. My interaction with students using online learning tools is clear and understandable, without any experts' help.
	19. I find it easy with very little mental effort to use the features of online learning.
Factor 7: Task-Technology Fit	20. In general, I accommodate to online teaching tools with ease.
	21. I can complete my teaching tasks satisfactorily by using different types of online tools and features.
	22. I am able to get support for any technical challenges I face during my online teaching.
	23. I feel confident AFTER I use online teaching tools to enhance my teaching skills.
	24. The functionalities of the online teaching tools were adequate.
	25. I believe the functionalities of the online teaching tools were appropriate.
	26. In general, I believe the functionalities of online teaching tools best fit the task.
	27. I believe using online teaching tools fits into my teaching style.
	28. I believe it is easy to understand which online teaching tools to use in a given situation.
Factor 8: Lecturers' Attitudes	29. I believe online teaching tools fit for the requirements of my teaching.
	30. I believe I can obtain information that are accurate and reliable with the use of online teaching tools.
	31. I believe I can gather data with the use of online teaching tools that meets my information needs.
	32. I believe I can solve academic tasks through active engagement with facilitators and peers using online teaching tools.
	33. I believe I gain critical thinking skills with the use online teaching tools.
	34. I believe I get timely feedback with the use of online teaching tools.
	35. I believe I can teach anytime and anywhere with online teaching tools.
	a) Communication (CM)

	36. The use of online teaching tools (using educational technology for teaching) improves communication between the teacher and the students. 37. The use of online teaching tools (using educational technology for teaching) improves the delivery of course material and resources, and classroom discussions. 38. The use of online teaching tools (using educational technology for teaching) improves the communication of announcements about courses, classes or school. b) Collaboration (C) 39. The use of online teaching tools encourages people with the same academic interests and needs to form groups and communities. 40. Online teaching tools are appropriate platforms for the exchange of course related information. 41. The use of online teaching tools improve student group work, especially in terms of delivery, student understanding and overall quality. c) Resource / Material Sharing (RMS) 42. Online teaching tools provide the resources to share a wide variety of resources and learning materials. 43. Online teaching tools provide rich multimedia resources and media support to improve the educational experience. 44. Online teaching tools provide me with a variety of freedom to access unlimited resources.
Factor 9: General Attitude	45. Using online teaching tools is a good idea. 46. Online teaching tools make my work more fun and interesting. 47. I like using online teaching tools in teaching.
Factor 10: Behavioural Intention Of Using Online Tools For Teaching Outcomes	48. I intend to use educational technology in this and the coming semester. 49. I predict I would use educational technology in this and the coming semester. 50. I have actual plans to use educational technology in this and the coming semester.
Effectiveness And Satisfaction Of Online Teaching	51. Overall, to what extent are you dissatisfied or satisfied with the online course(s) you have taught for this semester?
Open Ended Questions	1. How much has your experience with learning during the COVID-19 pandemic influenced your decision to use online learning tools in your learning now? 2. In the space below, please let us know any comments you have about online teaching.

Appendix D

Table D1

Survey participants' gender breakdown

Gender	Frequency	Percentage
Female	62	62%
Male	38	38%
Total	100	100%

Table D2

Survey participants' type of university breakdown

Type of University	Frequency	Percentage
Private	40	40%
Foreign Branch	30	30%
Public	30	30%
Total	100	100%

Appendix E

Table E

Responses related to the RQ1 ‘What are the impacts and educational challenges for online learning in higher education institutions in Malaysia as a result of the on-going COVID-19?’

Theme	Sub-theme	Illustrative quote
Theme 1: Role of lecturers and educational responsibilities	Technology integration	‘We keep stimulating them with using...technology effectively and you need a different set of skills in online teaching that’s quite different from the face-to-face teaching’ (P19). ‘So the real digital education is to think natively how to use technology in a, in a very meaningful way. So learning could be far different once in the future with the, with proper implementation of the digital technology’ (P18). ‘The role now will be more of a facilitator of discussion, exchange of ideas during the, the so-called live session compared to the traditional way in face-to-face’ (P5).
	Transition to facilitator	‘You know they just come in and teach because it’s their ... expertise. You know they’ve done the preparation. So I think in terms of that changing of roles, I don’t think that people feel that much of a change’ (P3). ‘You have to create a very, very interactive and active environment and again lastly you have to manage the discussion like a moderator’ (P4). ‘I don’t think the role changes, but the role expanded so meaning that when we want to make sure that our students are okay. Now we have to take it ... because more students will probably need a little bit more attention’ (P16).
	Mental health support	‘So all we could do is to encourage them to speak to our well-being officer or counsellor, but it really relies on them to engage with the material’ (P3).
Theme 2: Challenges and Solutions in Online Learning	Infrastructure and connectivity	‘I think the infrastructure must be ready. So the Internet speed, the maturity of the platform, like what we’re using now’ (P12). ‘Certain people even, even lecturers, you know, sometimes they have power cut and that, that disturbs [online teaching sessions]... And the same thing goes to students where students don’t have access to good Wi-Fi, for example, good Internet connection’ (P7). ‘We did introduce an initiative on donating devices to students. Even at the faculty level we collect funding from lectures and we give to selected students who, who were really, really struggle to get into online learning environment’ (P15). ‘They (lecturers) also do congratulate those who switch it (cameras) on and... just telling them, you know how great it is to see other people’ (P16).
	Engagement and interaction	‘I think the engagement is really important. So when it’s just purely online, if that social experience is missing, whether it’s between students or student and lecturer, so I think that, that would be a disadvantage to online learning’ (P5). ‘A lot of student actually talk about how they felt a little bit, kind of like they know they should focus but they, they can’t help it, but you know, get distracted’ (P12). ‘In online learning I will say that students must engage more by you know interacting them with many activities, learning activities’ (P15). ‘As long as students keep their motivation and focus on the, the goal and purpose for the, the learning objectives, they, they can do the good performance’ (P19). ‘game-based learning’ (P4, P19), ‘breakout rooms’ (P6, P19), ‘videos, quizzes and demonstrations’ (P10, P19).
	Labs and practical sessions	‘Our problem was running difficult tutorial questions and running difficult procedural practical labs. This has no substitutes online. So it was a struggle to carry out these labs online using online tools’ (P8). ‘virtual lab’ (P4), ‘simulation software’ (P8) and ‘live streaming’ (P18). ‘Traditional subjects like engineering, medicine...where this involves a lot of practices, practical and labs. So I, I don’t think we can substitute with an online model teaching because it needs an expert supervision one to one’ (P8).

Theme 3: Effectiveness of Online Tools	Training and preparation	<i>'I don't think at the moment, the technology is anywhere near delivering online lesson in the way that you would deliver a face-to-face lesson. To get to that you would have to have full virtual reality in which people could act and talk and interact together and see each other' (P14).</i> <i>'We teach lecturers on how to use the whiteboard. We teach them how to do live online classes. We teach them how to prerecord videos using PowerPoints by using Teams or using Zoom or using whatever technology. We also teach them how to use flipped classroom. We also teach them game based teaching' (P4).</i> <i>'The teachers were not trained, they were not prepared. So a lot of them suffered because, not because e-learning failed, but because they were not trained and prepared' (P18).</i> <i>'A lot of us are not really prepared for that. Both sides, the lectures as well as students, you know, so at that moment, at that time...The whole thing is that we are not ready to go for, for online learning' (P9).</i> <i>'One has to be trained in term of using all this technology. I mean, not only from the lecture side, but the students too because it is no longer just about generation gap' (P11).</i> <i>'Senior lecturers who need training can request ongoing training conducted by the Centre for Development and Academic Excellence' (P1).</i> <i>'There were also other things like uhm, how do you uh, maintain mental health, a positive, you know, positive mental health or ... how do you ensure that you're not overworked. You know managing your time effectively, managing work life balance' (P3).</i>
	Convenience and functionality	<i>'We also ... auto record. So the moment the student finish the lecture, they can play back. Those who [are] weak in English can then record, use certain app to translate, get in their native language' (P18).</i> <i>'Online teaching is very good especially when lecturers/students are not healthy and not able to meet physically or even when some of the students who are trapped abroad due to visa renewal issues, they can still attend online classes' (P2).</i> <i>'It is quite effective in terms of the functions, even the free version also give an ample opportunities for the lectures to sort of using the breakout room session to engage students' (P15).</i>
	Gradual improvement	<i>'Maybe at that time there were very little features. I don't think that we had breakout rooms and all that. So those are the features that were introduced later, which I think cater for a lot more different type of activities. So yes, a lot of features were only available on the later stages, but not in the beginning' (P17).</i> <i>'It comes back to the creativity of the lectures on how they, how they want to explore all these little, little things to enhance the learning experience' (P6).</i>
	Sufficiency for online teaching	<i>'Sufficient. Lectures, general lectures is sufficient, or sometimes it can be even good or better' (P8).</i> <i>'They are sufficient because we use two tools; we use what is called Blackboard collaborate ultra. You can do your video teaching. You can use the whiteboard. It records attendance automatically' (P4).</i>

Appendix F

Table F

Responses related to the research question ‘What is the current perceived satisfaction of lecturers and university administrators with online teaching and learning in its support for life-long learning in higher education institutions in Malaysia?’

Theme	Sub-theme	Illustrative quote
Theme 1: Adaptation to Online Teaching	Difficulty in the beginning	‘Positive (attitudes of lecturers towards online teaching) but stress among lecturers to figure out how to conduct online teaching in short time’ (P10). ‘Since unexpected lockdown was imposed, stress level among staff increased’ (P3). ‘At the beginning of the, um, the online learning, so then we’re finding some difficulties, but as [lecturers] get used to the technology they were able to kind of, know how to manoeuvre and the, uh, they had no issues at all’ (P4). ‘I think that it is a silver lining where it pushes everybody to sort of digitalise their teaching learning experience to enable the students to also be, be able to manoeuvre that digitalised world in a comfortable way which would place them at an advantageous position’ (P16) ‘With COVID it created a unprecedented advantage where people know there’s no choice that allow people to try. Before, they probably complain or decline. That again accelerated the whole adoption that becomes, in my opinion now is pretty acceptable and understood that we can actually use this means to carry out teaching and learning’ (P12).
		‘I think some of the criteria that we look is whether they use a variety of e-learning tools, whether they design the activities accordingly and whether it’s engaging’ (P17). ‘The item itself didn’t change. But the, the importance of certain item changes. So how (the lecturers) engage or the, the lecturer has enough knowledge and skills, (they) provide ... sufficient information’ (P19).
Theme 2: Evaluation and Performance	Evaluation criteria	‘Not really [no changes to criteria], except for when we ask feedback from students, we tuned some of the questions from students response to ask, how did the lecturers perform during the online, how did they prepare for online, were they uh, entertaining questions online? That sort of thing. Just retuning the questions from students based on online platforms’ (P8).
	Maintained performance	‘I think the performance [of lecturers] should be similar actually in my opinion’ (P12). ‘In terms of teaching, I think, to me it’s still the same’ (P2).
Theme 3: Preference and Hybrid Teaching	Preference for traditional teaching	‘Teaching in the classroom or face-to-face, physical is much better for me’ (P2). ‘It’s actually much better for face to face than online. That’s obvious’ (P19). ‘There are definitely advantages and disadvantages. That’s why the ... hybrid approach would be pretty good’ (P12).
	Preference for hybrid approach	‘You take the positives from online learning and you take the positive from traditional learning and then you mix the two and then apply it. So let’s get the best, the best from both worlds, right?’ (P4).
Theme 4: Satisfaction towards Online Teaching	Satisfied	‘I would say that I’m satisfied. I actually think that, that was actually something good for us as academics or for us to contribute in the academic setting’ (P16).
	Room for improvement	‘I am satisfied so far with the online learning environment. However, there are room for improvements in terms of making sure that the students learns better in online learning and I think the opportunities are out there’ (P15).
	Long-term impact	‘Moving forward, I think online learning is here to stay, but it’s not for everything. It has to be designed for things that are suitable to be done online, can be done online’ (P17). ‘The tools definitely have potential to make a session effective, but we need to know how to use it and the stakeholders or the, the learners must also respond’ (P12). ‘Even though now that we’re doing things face-to-face, we are still continuously falling back onto this online platform either for student activities or engagement with experts around the world’ (P16)