

## **STUDENTS' PERCEPTION OF ONLINE LEARNING AND INSTITUTION'S ENGAGEMENT DURING THE COVID-19 PANDEMIC: A SURVEY STUDY OF TAYLOR'S DESIGN, ARCHITECTURE AND ENGINEERING STUDENTS**

POULINE C. L. KOH<sup>1,\*</sup>, SOOK KHUAN WONG<sup>2</sup>

<sup>1</sup>The Design School, Taylor's University, Taylor's Lakeside Campus,  
No. 1 Jalan Taylor's, 47500, Subang Jaya, Selangor DE, Malaysia

<sup>2</sup>School of Social Science, UOW Malaysia KDU University College,  
Jalan Kontraktor U1/14, Seksyen U1, Glenpark U1, 40150, Shah Alam, Selangor DE, Malaysia

\*Corresponding Author: [pouline.koh@taylors.edu.my](mailto:pouline.koh@taylors.edu.my)

### **Abstract**

The COVID-19 pandemic has disrupted teaching in almost all higher education institutions globally and online learning quickly become the core method of delivery. Despite the flexibilities that online learning can offer, there might be challenges in fulfilling the needs of the students' learning especially those among the disciplines of design, architecture, and engineering where hands-on classes are essential. This study aims to examine the students' perception of online learning and the university's engagement during the COVID-19 pandemic. After one semester of fully online learning, a cross-sectional survey was conducted through online questionnaire among 716 design, architecture, and engineering students from Taylor's University to further examine the perception of online learning and its institution engagement during the COVID-19 pandemic. Study shows that the pandemic has minor effect on their university plan where 84% are keen to re-enrol for the term and only 6% prefer to wait out the pandemic. Findings further show that the amount of time spent on completing assignments has increased compared to previous term (52%), yet students raised the concern about keeping up with the coursework in online learning environment (56%). Despite the majority of students associate their feelings of online learning with worried (49.6%), distracting (31.6%), and nervous (24.3%), results revealed 49% of students appreciate the university's effort in their academic initiative followed by 31% feeling thankful for the timely updates and hardship fund set up by the management and 20% are pleased with the university engagement related to well-being. Policymakers and higher education institutions worldwide may benefit from these findings when formulating contingency plans and tactics on how to support students during the pandemic.

Keywords: COVID-19 pandemic, Higher education, Institution engagement, Online learning.

## 1. Introduction and Background

The spread of COVID-19 has sent shockwaves across the globe. The public health crisis, unprecedented in our lifetimes, has experienced profound changes in the way we work, live, learn, and communicate in both our professional and personal lives. Apart from the major shifts on how industries are being impacted, higher education is one sector that has gone through tremendous changes globally. Such changes include closure of campus overnight, swift transition to online learning replacing the impediment of hands-on classes, international students have to make immediate arrangement to return to home countries, convocations are postponed and many graduations showreels are cancelled [1].

Malaysia, alongside its neighbours Singapore and Thailand, were among the first few countries in Asia to report incidents of COVID-19 outside of China between mid-January and mid-February. It was at the end of February, the rise in COVID active cases was monumental and a rapid increase of community transmission was detected. This has quickly led the Malaysian government to implement Movement Control Order (MCO) beginning March 18 [2]. Closure of universities has been ordered with immediate effect, affecting 4.9 million in schools and 1.2 million in higher education institutions [3].

In order to keep the learning going, not only university grappled with how best to serve their students from operation through to academic year amid the pandemic, but online learning also became the new norm for all higher learning institutions. The pandemic demanded lecturers to quickly shift to online teaching, revising, and adapting course syllabi and requirements as they shifted to alternative or remote teaching modalities, both synchronous and asynchronous [4]. From the confined of their homes, lecturers have to incorporate varied platforms and digital tools or devices to enable students' learning are disrupted at the minimal.

Regardless of all the flexibilities that online learning, varied platforms and digital tools can offer, there might be challenges in fulfilling the needs of the students' learning especially those among the disciplines of design, architecture, and engineering where hands-on classes are essential. After 14 weeks of fully online learning at one of the top private institutions in Malaysia – Taylor's University, this study set out with the main objective to further examine the students' perception of online learning and the university's engagement with them during the COVID-19 pandemic. This study is guided by three research questions:

RQ1: What is the students' continuity plan during the COVID-19 pandemic?

RQ2: What is the students' perception of online learning during the COVID-19 pandemic?

RQ3: What is the students' perception of institution's engagement during the COVID-19 pandemic?

## 2. Impact on Students and University

### 2.1. Continuity of university plan

While universities are shifting towards online learning and implementing strict guidelines to limit socialization, the gap year looks set to become an increasingly popular route for students who prefer to wait for the improvement of the pandemic situation to return to university life. Recent reports underlined that at

least 4 of 5 students faced disruptions from COVID-19 and were likely to change their plans to re-enrol in university for the following semester [5]. According to the survey, students' top concern was financial issues and managing financial pressure was the biggest factor in their decision making on whether to re-enrol. The second largest factor was juggling between priorities and studies. In Malaysia, local news reported that some higher education students were affected by the strict physical distancing guidelines that many look forward to are significantly diminished, and the non-reduction of hefty fees was another concern for many to reconsider continuing their university plan [6].

In addition, with the continuous spread of the virus, almost all countries including Malaysia had closed their borders to mitigate the outbreak. As a result, any student's mobility decision be it inbound or outbound seemed to be made more conscientiously than in the past [7]. Amidst the uncertainties, universities recognise the importance of students including international students to continue their education. In this aspect, online learning has made accessibility possible especially for international students to follow and finish their courses.

## **2.2. Online teaching and learning**

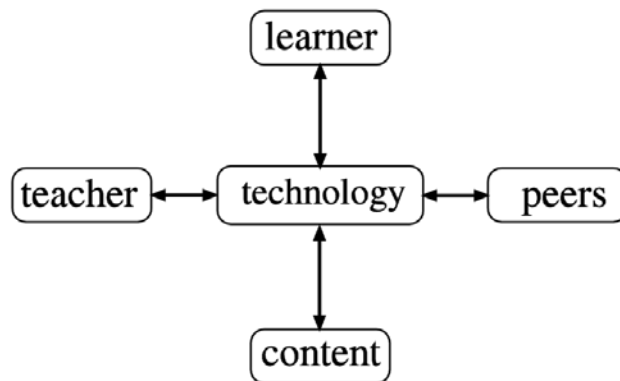
Online teaching is hardly a new feature in Malaysia private higher education and has been developed to supplement classroom teaching. However, during the COVID-19 epidemic, it has become the main mode of instruction and is being widely used in almost all colleges and universities in Malaysia. Online learning consists of technologies including the worldwide web, email, chat, new groups and texts, audio and video conferencing delivered over computer networks to impart education. More importantly, online learning required a great deal of resources and careful planning where lecturers act as facilitators rather than transmitters of content knowledge, and Information Communication and Technology (ICT) was regarded as resource that enhanced the learning experience of students [8].

Some institutions in Malaysia had an "online forward" approach to teaching and learning before the COVID-19 pandemic such as Taylor's University. For example, each of its courses has its own virtual site (similar to a learning management system), allowing online engagement relating to assessments, assignments, peer support, and communication channels with peers and lecturers. Students are kept engaged in their learning by a progress-tracking bar and by earning digital badges. In addition, students have access to a Lecture Capture System (ReWIND), containing a variety of lecture recordings, and other learning materials. Large-scale courses also use live streaming and lightboard video technology to record lectures [9].

While many lecturers quickly adapted to using digital tools and incorporate effective online lessons and engagement into its curriculum, study reported that the learning curve has been steepest for students who were required to attend hands-on courses such as design, architecture, engineering, culinary art, medical science, music and performing arts [10]. According to his report, many do not translate the learning in these disciplines so well through online learning because these disciplines were mostly designed to be hands-on or more experiential learning centric. Demonstrations from all views and studio time to work on projects were often the key activities compared to pre-recorded lectures and word-based assignments [11]. Such concerns are even more accentuated especially the online teaching and learning in higher education is forecasted to be continued until 2021.

Any effort to strengthen the effectiveness of online learning need the understanding of the perception of the users. Several studies showed that students had documented both favourable and unfavourable perceptions on online learning especially instructor's interaction with students had considerable impact on the student's perceptions of online learning. In addition, consistency in course design [12], the extent of instructional emphasis on learning through interaction, chances of engaging with teachers and peers in online setting [13, 14] and competencies required to use the technology [15] were identified as the perceived strengths of online learning. Hence an effective online class would depend on well-structure course content, well-prepared instructors, clear feedback, and instructions [16].

In addition, learning theory suggests that learning is promoted or enhanced (i) when students are actively involved in the learning, (ii) when assignments reflect real-life contexts and experiences, and (iii) when critical thinking or deep learning is promoted through applied and reflective activities [17]. As Driscoll [18] observed, many new technologies and web-based activities are interactive, online coursework has the potential to create environments between teacher, learners, and peers where they actively engage with material (i.e., content) and learn by doing, refining their understanding as they build new knowledge [19]. Each of these aspects shown in Fig. 1 are briefly reviewed, with a subsequent discussion drawing on how design, architecture and engineering students perceived and participate in the online learning.



**Fig. 1. Engagement of online learning among teacher, learner, peers and content with the control of technology [18].**

### 2.3. University engagement during outbreak

Social services are part of important functions in universities where support for outbreak control is generally needed in both a university function and as a responsibility [20]. As we continue to witness the outbreak unfolding globally, the epidemic has created intense volatility in the financial market. Some institutions acted quickly to develop policies guiding teaching and learning, assessment, continuity of campus operations and other practices. Some institutions in Malaysia are using disaster relief funds to support students who were locked in on campuses and distributing food and other necessities to ensure their well-being [21]. Other types of funding such as hardship fund, student emergency support fund, student support package and financial hardship grant were subsequently introduced by the Malaysian, Australian as well as UK universities to assist students who were facing financial hardship.

While this pandemic has signified a time of momentous change, university engagement with the students became more crucial than ever. According to recent survey conducted by Lederman [22], maintaining student engagement was a top priority and posed as a leading challenge to many institutions. When students have less contact with the physical institution, it becomes paramount for faculty or university to reach out to their students [22]. Thus, to communicate frequently their cares, to ensure students are well-informed regularly with the institution's purpose and values to help maintain their academic excellence and social well-being are deemed vital.

### **3. Materials and Methods**

#### **3.1. Study population**

To examine the students' perception of online learning and its institution engagement during the outbreak of COVID-19, an exploratory study using cross-sectional online survey was conducted. This study was carried out between June and July 2020, with a targeted respondent from Taylor's University where the samples were selected using purposive sampling. Local and international students who studied design, architecture and engineering undergraduate programmes were invited to participate in the survey.

Such sampling was made on the basis of the similarity in the learning approach between the three courses where project-based learning is often introduced across semesters. To that end, hands-on classes remain essential practices on the online learning among design, architecture, and engineering students despite the outbreak of COVID-19 [11]. In addition, criteria such as gender, nationality and age were not part of the selection consideration in this study.

A survey invitation through google forms was sent to a total of 1,000 students via university portal and WhatsApp messages assisted by the faculty office and with periodic reminders. Participation in the survey was voluntary and the students' consents were obtained prior to the start of the survey. During this process, participants were assured regarding the confidentiality of their responses.

#### **3.2. Study instrument**

The instrument of this study consists of an online questionnaire by using a three-point Likert scales [23], the contents was adapted from Pearson [24] whereby it was used to address students' perception of the use of online learning and the effects of the COVID-19 pandemic. After sorting out the questions that existed in the questionnaire of Pearson [24], the researchers along with the expert judgement have taken the decision to only include 10 questions due to some of the questions were not appropriate to be used in this study. The questionnaire had undergone rewording and were redesigned in three sections.

Section one encompassed basic demographics, nationality, field of study and their university continuity plan. In section two, respondents were asked to rate their experience on online learning in the current term compared to the previous term including: time spent on completing assignments; interaction with lecturers; interaction with peers; and exposure to learning. In addition, respondents were tasked to compare using three-point Likert scale (1 = least concern, 3 highly concern) with the shift from in-person classes to online learning and followed by a

question assessing their feelings association to positive and negative words about online learning experience [25, 26].

In the third section, respondents were asked to rate their perception of the university when managing the COVID-19 pandemic, particularly in the aspect of handling the issues of outbreak; communicating with students about the outbreak; the frequency and clarity of communication; and the quality of teaching and learning. In the last part, respondents were asked to highlight the things that the university had done which they most appreciate or least appreciate during this challenging time.

The questionnaire was designed in English language. Initially, the questionnaire was piloted for 10 faculty members and 30 students to ensure appropriate wording, and areas were checked for improvements. As a result of piloting, a few minor changes were made in wording to fit with the objective of this research. This process was deemed necessary to allow minimising measurement error. The instrument was first developed followed by members of the research team designing the online survey. Online survey was properly administered by other team members for presentation and accuracy before sending the URL (uniform resource locator) to participants. An introduction was written to clarify the purpose of the research and participants were informed of confidentiality.

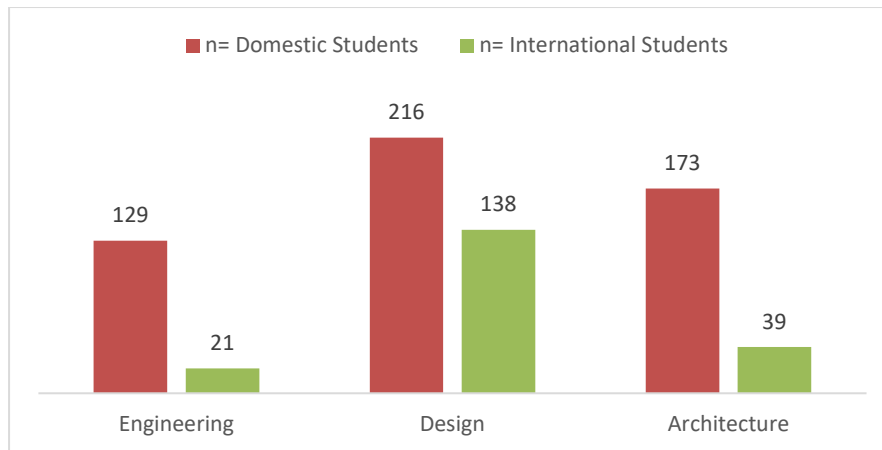
### 3.3. Data treatment and analysis

The computed data entry was transferred into Statistical Package for Social Sciences (SPSS) version 25 and analysed through a univariate statistical analysis to provide a synthetic description of the basic features. Research study regard univariate analysis as part of descriptive statistics which is one common approach used in studies to enhance understanding of individual variable in a sensible way as well as studies to examine perceptions [27]. In addition, it is worth noting that this study had only performed descriptive analysis because the subject studied did not intend to imply specific pattern of correlation taken on the same unit at different times.

However, the findings presented still do not alter the fact that the results cover a good deal of control over the subject studied. Secondly, data gathered from the last part of the survey examining respondents' opinion about its institution engagement during the outbreak of COVID-19 were analysed manually by qualitative content analysis [28]. Data were then categorised under three arrays including (i) management related initiatives, (ii) academic related initiatives and (iii) well-being related initiatives. Additionally, the frequency of words mentioned by respondents were further highlighted and presented using word cloud which served as a graphical representation to the frequency of common words appeared in the responses. The frequency charts for the common words can be referred to in the Appendix A.

## 4. Results and Discussion

This paper examines Taylor's University design, architecture and engineering students' perception of online learning and university's engagement with them during the COVID-19 pandemic. With the online questionnaires designed and distributed, a total of 716 surveys were collected between June and July 2020. On the overall, 49.4% ( $n=354$ ) respondents were from design, 21% ( $n=150$ ) architecture and 29.6% ( $n=212$ ) from engineering. Among the respondents, 72% ( $n=516$ ) were domestic students while 28% ( $n=200$ ) were international (Fig. 2).



**Fig. 2.** This study consists of 516 domestic and 200 international students.

#### 4.1. Students' continuity plan

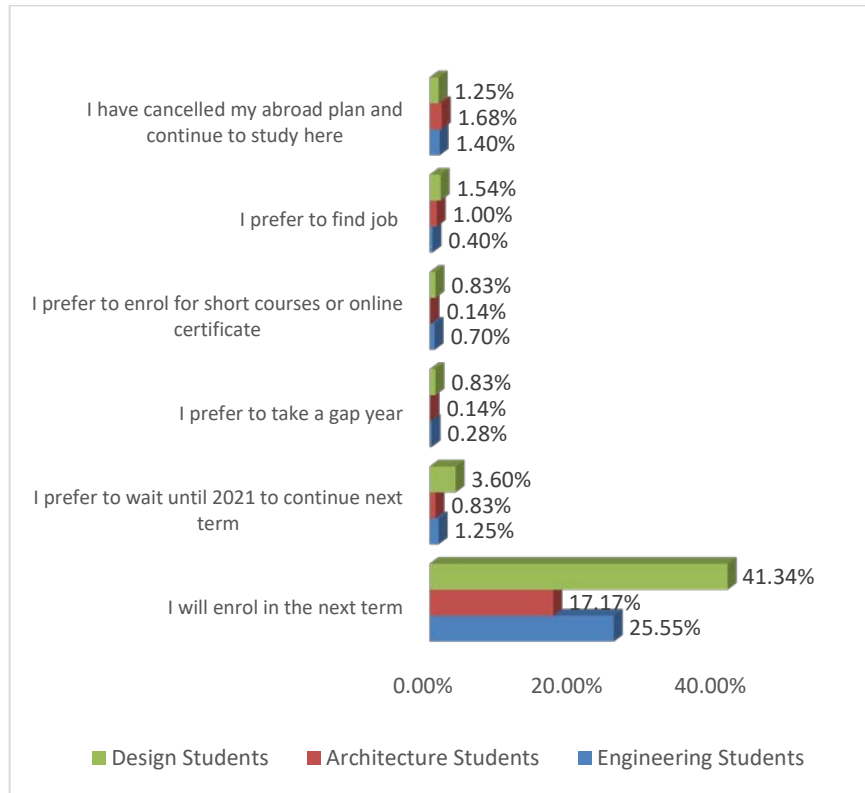
While the gap year is forecasted to become an increasingly popular route for students who need to wait out the pandemic to return to university, Fig. 3 shows that the COVID-19 pandemic seemed to have a minor effect on the respondents' university continuity plan. 84% ( $n=601$ ) of the respondents highlighted that they would continue to enrol into the next term and only 6% ( $n=43$ ) prefer to wait until 2021 to re-join university. Finding further shows that a small number of design and architecture respondents (2.5%;  $n=18$ ) prefer to work full-time instead. Overall, 4% ( $n=31$ ) of the respondents express that they have cancelled their abroad plan, whereby the options to enrol for short courses or online certificates is seen as the least preferred to substitute the university continuity plan.

In spite of the pandemic has forced the closure of millions of schools in Malaysia, students' desire to continue their university plan was apparent. A similar report conducted by Aziz [29] uncovered the key motivations for Malaysian students wanting to go to university was reflective to what many prospective students plan to do after they graduate, namely finding a job or studying at the postgraduate level (57%). Similarly, on the international outlook, recent news reported a large number of new applications is showing an upward trend since May where thousands of foreign students were in the process of waiting to enter Malaysia to continue their studies despite the border closure. Report also further showed that a total of 6,088 out of 14,949 students had applied from January to July this year to enrol in degree programmes [30].

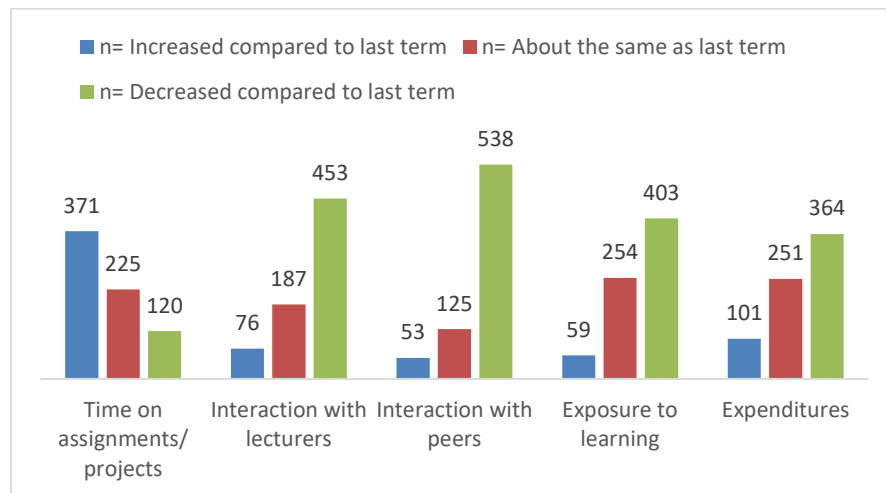
#### 4.2. Students' perception of online learning

In this study, students were asked to compare five areas of changes from face-to-face classes to online learning between current and previous term (Fig. 4). Results discover that more than half of the respondents (52%;  $n=371$ ) expressed the time spent on assignments and projects has significantly increased compared to previous term. On the contrary, respondents have pointed out a decrease in four areas including their interaction with peers (75%;  $n=538$ ), interaction with lecturers (63%;  $n=453$ ) as well as exposure to learning had significantly decreased when

compared with last term (56%;  $n=403$ ). Additionally, a decrease in expenditure is found least affected when compared across all items with last term.



**Fig. 3. A total of 84% respondents choose to continue to enrol in the current programme despite the disruption of COVID-19.**



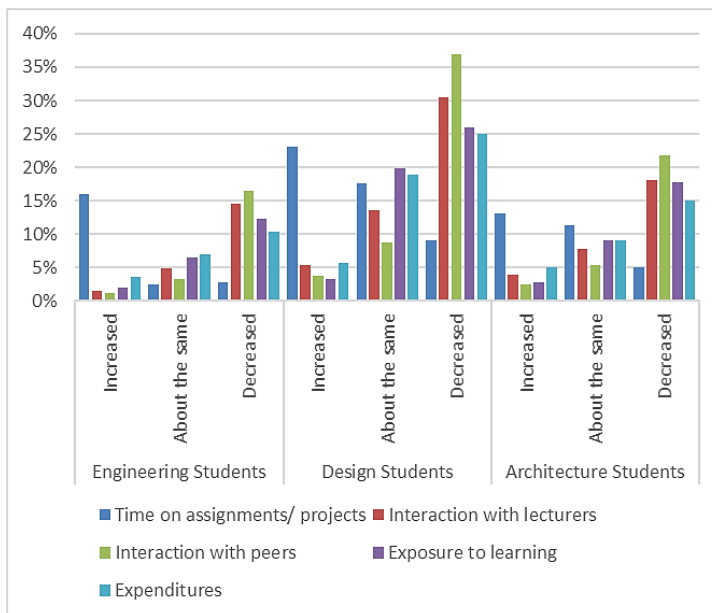
**Fig. 4. When compared with last term, students perceived the time spent on assignments and projects increased significantly while expenditure decreased the least.**



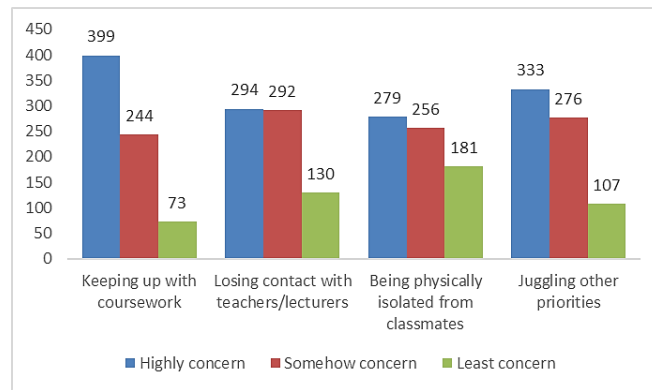
Further comparison is observed in Fig. 5 that in the online learning experience, the percentage of engineering students perceived an increase of time spent on assignments and projects (16%;  $n=112$ ) are almost parallel to the percentage of reduction in interaction with friends (16.4%;  $n=105$ ). Design students on the other hands, are the largest number of respondents who perceived online learning a significant cause of reduction in interaction with friends (37%;  $n=264$ ). On the contrary, architecture students perceived the exposure to learning (17.7%;  $n=127$ ) and interaction with lecturers (18%;  $n=129$ ) have decreased simultaneously via online learning.

In this study, respondents were asked to rate their concerns associated with online learning (Fig. 6). The results of our study reveal that, a total of 399 (56%) respondents pointed out their major concern is keeping up with coursework where design students project with the highest concern compared to architecture and engineering students. Findings also showed that a total of 46% ( $n=333$ ) are highly concerned with juggling other priorities, especially among engineering students compared to design and architecture students. With regards to the concern of losing contact with their lecturers, design and architecture students shared the similar concern among the 41% ( $n=294$ ) of total respondent. Whether the respondents are concerned about being physically isolated from classmates, only 36% perceived it as a concern.

With the sudden shift from traditional classrooms and face-to-face learning to online learning has resulted in a completely different learning experience for students. Majority of the surveyed higher education students have reservations about online learning. However, one of the less discussed areas of online learning during pandemics was the time spent on completing assignments [31]. The results in this study showed a positive sign among overall students when compared to traditional classes where students are usually expected to actively participate in academic activities due to face-to-face engagement with lecturers and class fellows.



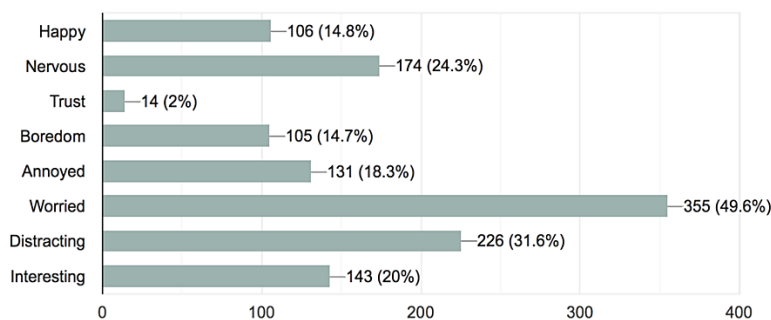
**Fig. 5. Comparison of online learning experience among engineering, design, and architecture students.**



**Fig. 6. Students' were more concerned about keeping up with coursework than being physically isolated from classmates in online learning.**

In the final part of section two, respondents were asked to associate their feelings about online learning experience this term, and eight options were presented which include annoyed, boredom, distracting, happy, interesting, nervous, trust and worried. As shown in Fig. 7, 50% ( $n=355$ ) of the total respondents tend to feel worry and 24.3% ( $n=174$ ) are feeling nervous. To compare further, majority of them are from the discipline of design and architecture, followed by a small group of engineering students. In addition, study shows that a total of 32% feel distracted ( $n=266$ ) where the data is mostly contributed by architecture and engineering students. There are only 20% ( $n=143$ ) find online learning interesting, 15% ( $n=106$ ) are feeling happy and only 2% ( $n=14$ ) trust the online learning.

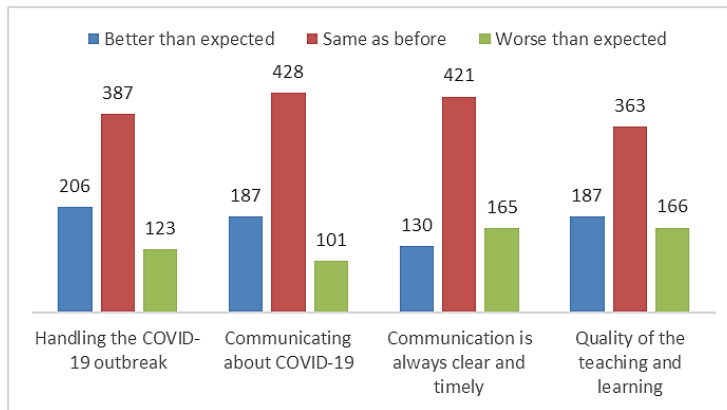
Shifting from the usual face-to-face classes to online learning amid the pandemic, a student's learning experience can be stressful, let alone the concern of catching up on coursework in the midst of the pandemic. The accompanying effects of COVID-19 will continue to influence students' emotional profoundly; meanwhile, emotional serves a crucial role to help them deal with their continuity in learning and combating the epidemic [32]. This implies that government, health professionals, higher education institutions, students' organisations and NGOs should collaborate in the process of designing timely and efficient support services for students.



**Fig. 7. Half of the respondents felt worried and distracted in the online learning experience amid the pandemic.**

### 4.3. Students' perception of institution's engagement

The third part of the survey unravels students' perception on university engagement during outbreak. Figure 8 shows that the perception towards university has been maintained since the outbreak of COVID-19. The results revealed that the students, regardless of programmes, are most satisfied with the way how the university handled the sudden outbreak (29%;  $n=206$ ) followed by communicating the news and maintain the quality of teaching and learning (26%;  $n=187$ ). On the overall, the engagement through clear and timely communication between university and respondents are perceived same as before COVID-19 hit the university.



**Fig. 8. Overall students' perceptions on university engagement during COVID-19 outbreak.**

Similar findings were also highlighted in previous studies investigated institution's engagement with students during crisis played vital roles not only to affect the learning of students but also would affect their satisfaction level that will eventually influence their perception towards the university's leadership and image [33]. That said, it is no doubt that a complex adaptive challenge such as that posed by the COVID-19, a global scale challenge, cannot be successfully navigated by the charismatic academic leader acting alone [34]. Equivalently, teaching and support staff have also played a key role in maintaining students' satisfaction with the university. Despite that the attributes of an effective academic leader when facing adaptive challenges include accountability, trustworthiness, integrity and communicating clearly [35, 36], past research has also showed that in a crisis, having emotional intelligence and emotional stability will allow academic leaders to place the interest of others above their own in servant leadership [37].

With regards to the students' perception of university engagement during the outbreak, Fig. 9 shows almost half of the respondents (49%;  $n=351$ ) highlighted that they appreciate university engagement related to academic initiatives. 31% ( $n=222$ ) speak about their appreciations towards university management related initiatives follow by engagement initiatives related to well-being (20%;  $n=143$ ).

As shown from the word cloud visualisation (Fig. 10), the most commonly used terms among the respondents which reflect their perceptions on university engagement in academic related initiatives were 'online learning', 'software', 'care', 'time', 'best',



situations. In this study, the findings reported that the overall students are satisfied with the university engagements in the time of COVID-19. Similar findings were also underlined in some empirical surveys [38]. It is apparent that during this time, universities introduced different support measures for their students in order to minimise their distress, specifically in the aspects of academic, socio-economic, and emotional well-being. When summarising the above findings as a basis for universities decision making on the next term, it is important for the authorities to take note of the recognition by majority of students who had good perceptions on the work done by their universities [39].

## **5. Conclusions**

A total of 716 participated in the study, 49.4% were design students, 21% were architecture students and 29.6% were engineering students. Majority of the respondents were local students pursuing bachelor's degree. The study found out that despite the impact of pandemic, majority of the respondents will continue to enrol into the next term. Although the respondents acknowledged that the time spent on assignments and projects have significantly increased through online learning, their concern to keeping up with coursework yielded the highest compared to the concern about losing contact with lecturers or being physically isolated from classmates. Based on the findings, it is clear that students perceived positively of the online learning and university engagement during the outbreak, despite few challenges identified.

## **Implications of the Study**

Throughout the study, it was discovered that the desire to continue and excel at higher education level are seemingly evident among the undergraduate students despite there were options to wait out the pandemic. Despite more than half of the students acknowledged the time spent on assignment and projects had significantly increased, students at the same time were feeling worried and distracting about their online learning experience. We, therefore, saw the importance of both lecturers and students coming together to formulate ways of interacting and collaborating to create a trustful online learning experience.

According to Wang et al. [40], successful and effective online learning is mainly depended on how the contents of the course are designed and more importantly, the interaction between the students and lecturers as well as the availability of learning materials. It should be understood that most online courses are dictated by technology. Thus, in order to be able to enhance online learning experience, the mode of teaching should be able to keep the students engaged [41].

Apart from online teaching and learning experience, this paper stresses one particular area that the crisis has disrupted and altered to a great extent - the way how university is communicating and engaging with their students. The results demonstrate that the students were satisfied with the way how university handled the sudden outbreak and were pleased with the university approach such as communicating the news in a timely and clear manner. To this end, it is undoubtedly that this study importantly underlined the concerns, perceptions, and opinions of students about the role of universities in guiding and educating young graduates has become more important than ever before.

Thus, for higher education institutions around the world to be competitive again, it is imperative that institutions listen to students' needs and concerns. Additionally, online teaching is an essential part of professional preparedness but not the only one. Universities, now more than ever, should consider investing in teacher professional development of their faculty, for them to be updated on effective pedagogical methods with or without the use of online technologies.

### Limitations and Future Research

Although the current study has a commendable contribution to the literature and practice, however, this study also has a few limitations which could be the future directions. First, the global market for online learning is expected to set to grow at high speed especially after the hit of pandemic worldwide. In that case, future research could further identify students' intentions and reasons to continue online learning, the different types of engagement methods and problems faced by the university in online learning along with the possible solutions. Second, this study is based on questionnaire survey, however, in order to get an in-depth comparison of online learning experience among different disciplines, future studies should also include interviews of students and higher authorities in universities.

### References

1. Huang, R.H.; Liu, D.J.; Tlili, A.; Yang, J.F.; and Wang, H. (2020). Handbook of facilitating flexible learning during educational disruption: the Chinese experience in maintaining undisrupted learning in covid-19 outbreak. Retrieved September 2, 2020, from <https://iite.unesco.org/wp-content/uploads/2020/03/Handbook-on-Facilitating-Flexible-Learning-in-COVID-19-Outbreak-SLIBNU-V1.2-20200315.pdf>.
2. Chang, W. (2020). Malaysia – An unexpected disruption to teaching and learning. *Human Capital and Education for Asian Development*, Singapore, 19-21.
3. New Straits Times. (2020). 14-day movement control order begins nationwide on Wednesday. Retrieved May 17, 2020, from <https://www.nst.com.my/news/nation/2020/03/575180/14-day-movement-control-order-begins-nationwide-wednesday>.
4. Banoo, S. (2020). Education – education disrupted. Retrieved August 21, 2020, from <https://www.theedgemarkets.com/article/education-education-disrupted>.
5. Amour, M. (2020). Survey: 4 of 5 students face disruption from virus. Retrieved July 8, 2020, from <https://www.insidehighered.com/quicktakes/2020/05/12/survey-4-5-students-face-disruption-virus>.
6. Ren, C.G. (2020). Gap year gains popularity as covid-19 upends university life. Retrieved September 30, 2020, from <https://www.theedgemarkets.com/article/gap-year-gains-popularity-covid19-upends-university-life>.
7. Bilecen, B. (2020). Commentary: covid-19 pandemic and higher education: international mobility and students' social protection. *International Migration*, 58(4), 263-266.
8. Dhull, I.; and Sakshi, M.S. (2017). Online learning. *International Education and Research Journal*, 3(8), 32-34.

9. Chin, C. (2020). Learning mustn't stop with covid-19. Retrieved May 27, 2020, from <https://www.thestar.com.my/news/education/2020/03/29/learning-mustnt-stop-with-covid-19>.
10. Keilman, J. (2020). Covid-19 presents challenges for hands-on education. Retrieved September 24, 2020, from <https://www.govtech.com/health/COVID-19-Presents-Challenges-for-Hands-On-Education.html>.
11. Schmid, E. (2020). Teaching online during a pandemic is hard, and it's harder for these kinds of classes. Retrieved September 24, 2020, from <https://news.stlpublicradio.org/education/2020-04-23/teaching-online-during-a-pandemic-is-hard-and-its-harder-for-these-kinds-of-classes>.
12. Swan, K.; Shea, P.; Fredericksen, E.; Pickett, A.; Pelz, W.; and Maher, G. (2000). Building knowledge building communities: consistency, contact and communication in the virtual classroom. *Journal of Educational Computing Research*, 23(4), 359-383.
13. Wise, A.; Chang, J.; Duffy, T.; and Valle, R. (2004). The effects of teacher social presence on student satisfaction, engagement, and learning. *Journal of Educational Computing Research*, 31(3), 247-271.
14. Kim, K.; Liu, S.; and Bonk, C.J. (2005). Online MBA students' perception of online learning: benefits, challenges, and suggestions. *The Internet and Higher Education*, 8(4), 335-344.
15. Wagner, R.; Wener, J.; and Schramm, R. (2002). An evaluation of student satisfaction with distance learning courses. *Proceedings of the Annual Conference on Distance Teaching and Learning*. Madison, Wisconsin, 1-5.
16. Sun, A.; and Chen, X. (2016). Online education and its effective practice: a research review. *Journal of Information Technology Education: Research*, 15, 157-190.
17. National Research Council. (2000). *How people learn: brain, mind experience, and school: expanded edition*, The National Academies Press, Washington, DC.
18. Driscoll, M.P. (2002). How people learn (and what technology might have to do with it). Retrieved December 7, 2020, from <https://www.ericdigests.org/2003-3/learn.htm>.
19. Johnston, J.; Killion, J.; and Oomen, J. (2005). Student satisfaction in the virtual classroom. *The Internet Journal of Allied Health Sciences and Practice*, 3(2), 1-7.
20. Wang, C.; and Zha, Q. (2017). Measuring systemic diversity of Chinese universities: a clustering method approach. *Quality and Quantity*, 52, 1331-1347.
21. Jun, S.W. (2020). Cancellation of matriculation semester II exams creates unfair university admissions advantage for some, says parent group. Retrieved June 26, 2020, from <https://www.malaymail.com/news/malaysia/2020/04/13/cancellation-of-matriculation-semester-ii-exams-creates-unfair-university-a/1856138>.
22. Lederman, D. (2020). Presidents fear financial, and human, toll of coronavirus. Retrieved June 2, 2020, from <https://www.insidehighered.com/news/survey/college-presidents-fear-financial-and-human-toll-coronavirus-their-campuses>.
23. Jacoby, J.; and Matell, M.S. (1971). Three-Point Likert Scales are Good Enough. *Journal of Marketing Research*, 8(4), 495-500.
24. Pearson. (2020). The global learner survey. Retrieved April 14, 2020, from [https://www.pearson.com/content/dam/one-dot-com/one-dot-com/global/Files/news/gls/Pearson\\_Global-Learners-Survey\\_2020\\_FINAL.pdf](https://www.pearson.com/content/dam/one-dot-com/one-dot-com/global/Files/news/gls/Pearson_Global-Learners-Survey_2020_FINAL.pdf).

25. Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion*, 6(3/4), 169-200.
26. D'Mello, S.; Picard, R.; and Graesser, A. (2007). Towards an affect-sensitive autotutor. *IEEE Intelligent Systems*, 22(4), 53-61.
27. Loeb, S.; Dynarski, S.; McFarland, D.; Morris, P.; Reardon, S.; and Reber, S. (2017). *Descriptive analysis in education: a guide for researchers*, Department of Education, Institute of Education Sciences, National Centre for Education Evaluation and Regional Assistance, Washington, DC.
28. Boettger, R.K.; and Palmer, L.A. (2010). Quantitative content analysis: its use in technical communication. *IEEE Transactions on Professional Communication*, 53(4), 346-357.
29. Aziz, H. (2019). How Malaysian students make decision on tertiary studies. Retrieved August 30, 2020, from <https://www.nst.com.my/education/2019/09/524414/how-malaysian-students-make-decisions-tertiary-studies>.
30. The Straits Times. (2020). Coronavirus: foreign students waiting to enter Malaysia. Retrieved August 30, 2020, from <https://www.straitstimes.com/asia/se-asia/coronavirus-foreign-students-waiting-to-enter-malaysia>.
31. Mailizar.; Almanthari, A.; Maulina, S.; and Bruce, S. (2020). Secondary school mathematics teachers' views on e-learning implementation barriers during the covid-19 pandemic: the case of Indonesia. *Eurasia Journal of Mathematics, Science and Technology Education*, 16(7), 1-9.
32. Zhai, Y.; and Du, X. (2020). Addressing colligate mental health amid covid-19 pandemic. *Psychiatry Research*, 288, 1-2.
33. Azoury, N.; Daou, L.; and Khoury, C.E. (2014). University image and its relationship to student satisfaction-case of the middle eastern private business schools. *International Strategic Management Review*, 2(1), 1-8.
34. Heifetz, R.; and Laurie, D.L. (2001). The work of leadership. Retrieved August 2, 2020, from <https://hbr.org/2001/12/the-work-of-leadership>.
35. Fernandez, A.; and Shaw, G. (2020). Leadership in higher education in an era of new adaptive challenges. *Proceedings of the 14<sup>th</sup> International Technology, Education and Development Conference*. Valencia, Spain, 61-65.
36. Edmondson, A.C. (2020). Don't hide bad news in times of crisis. Retrieved August 2, 2020, from <https://hbr.org/2020/03/dont-hide-bad-news-in-times-of-crisis>.
37. Doraiswamy, I.R. (2012). Servant of leader? who will stand up please? *International Journal of Business and Social Science*, 3(9), 178-182.
38. Aristovnik, A.; Keržič, D.; Ravšelj, D.; Tomaževič, N.; and Umek, L. (2020). Impacts of the covid-19 pandemic on life of higher education students: a global perspective. Retrieved August 21, 2020, from <https://www.preprints.org/manuscript/202008.0246/v1>.
39. Huckins, J.F.; DaSilva, A.W.; Wang, W.; Hedlund, E.; Rogers, C.; Nepal, S.K.; Wu, J.; Obuchi, M.; Murphy, E.I.; Meyer, M.L.; Wagner, D.D.; Holtzheimer, P.E.; and Campbell, A.T. (2020). Mental health and behaviour of college students during the early phases of the covid-19 pandemic: longitudinal smartphone and ecological momentary assessment study. *Journal of Medical Internet Research*, 22(6), 1-13.



40. Wang, H.; Pi, Z.; and Hu, W. (2018). The instructor's gaze guidance in video lectures improve learning. *Journal of Computer Assisted Learning*, 35(1), 42-50.
41. Donitsa-Schmidt, S.; and Topaz, B. (2018). Massive open online courses as a knowledge base for teachers. *Journal of Education for Teaching*, 44(5), 608-620.

### Appendix A

#### Frequency Charts of the Common Words

In this study, word cloud was generated based on the frequency of words mentioned by the respondents. A sample of most common 30 words is shown in figure A-1. Such tool is often used for understanding the respondents' thinking in which the size of each word indicates its frequency or importance.

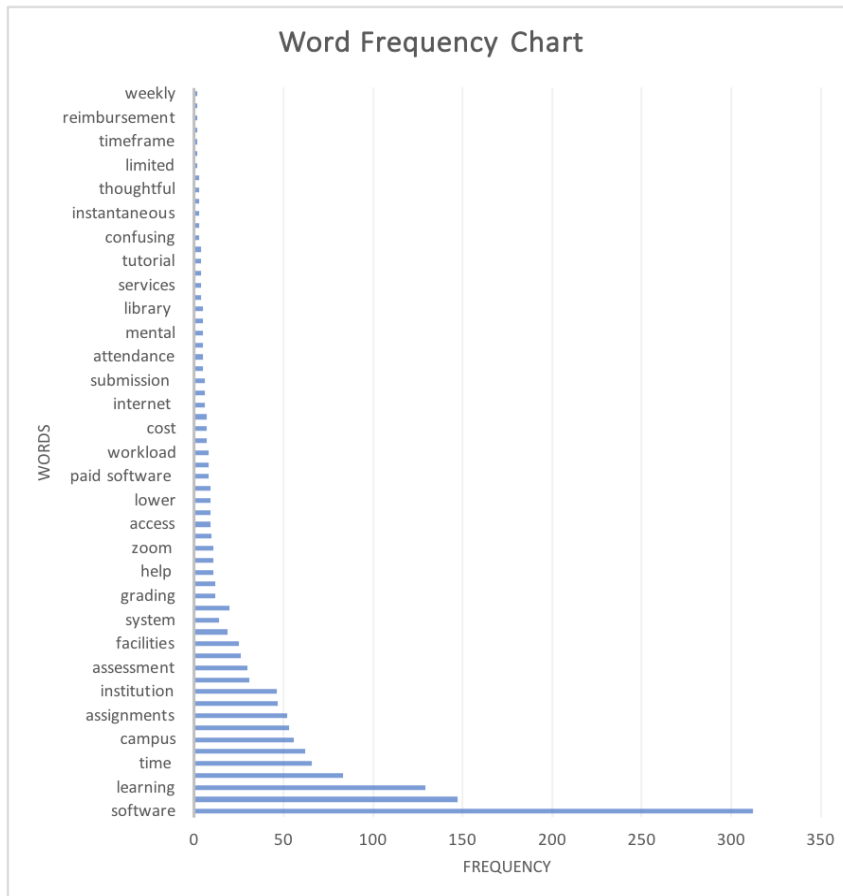


Fig. A-1. Frequency of most common 30 words.