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COVID-19 Effects on Students' Teaching and Learning Perspectives in Malaysian Varsities

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ABSTRACT

The COVID-19 pandemic has had dramatic effects on the socio-economic and well beings of Malaysians. The objective of the study is to find the effects of the pandemic on university students both on the technical side, such as the sufficiency of infrastructure and the internet to support online teaching and learning (T&L), as well as on the social side, such as stress level and focus on the study. The nationwide study on the effect of the pandemic on Malaysian varsities students was conducted at the end of 2020. There are many important issues uncovered in this study ranging from the technical

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side, such as internet-ready programs, socio-economic side, to the psychological perspectives. It shall provide invaluable insights to the related ministries while preparing appropriate reactions during the recovery period. The survey revealed that almost 74% of students highlighted that internet coverage and connectivity was the main issue in online T&L. Although statistics show that 90% of Malaysian households have access to the internet, 49% of students reported that their internet connections were poor. The effects of the pandemic are far-reaching, students belonging to the most vulnerable category find themselves in the most non-conducive place to learn, and they are disturbed by siblings. The socio-economics impacts brought about by the pandemic cause ripple effects onto their families. The government distribution of relief aids has lessened the burden of many people, including students; nevertheless, much improvement could be made, especially in the internet facility and coverage.

Keywords: COVID-19 Effects on teaching, digital learning divide

INTRODUCTION

On 16 March 2020, the Prime Minister of Malaysia, Muhyiddin Yassin, officially promulgated the Movement Control Order (MCO) under constitutional provisions the Prevention and Control of Infectious Diseases Act 1988 and the Police Act 1967 to be effective on 18 March 2020 for two weeks with provisions for extensions. Locally known as Perintah Kawalan Pergerakan (PKP), the order was a *cordon sanitaire,* i.e., restricting people's movements into or out of a defined geographic area, such as a community, region, or country (Rothstein, 2015). These orders, later known as MCO 1.0, covered the following main restrictions ("Covid-19: Movement Control Order", 2020), i.e., no mass gathering, 14 days quarantine, border shut-down, closure of all teaching institutions, closure of all government and public premises except for essential services.

The MCO 1.0 was extended a few times until 3 May 2021. The main purpose was to flatten the curve of new infection cases (Umair et al., 2021). The curve refers to cumulative active cases. During this period, generally, Malaysians adhered to the order, and it was seen as a success because the infections tally were able to be reduced from low triple-digit in early middle May 2020 (Md Shah et al., 2020) to low double-digit in early May 2020. However, since schools and universities were closed for face-to-face teaching and learning (T&L) and many were not familiar with delivering online T&L, there was a period of preparation and reflection for about one month starting on the promulgation MCO 1.0 on 18 March 2021. Eventually, schools and universities found appropriate ways to conduct online T&L.

The Conditional Movement Control Order (CMCO or Conditional MCO), a relaxation of regulations regarding the

MCO, with its main goal, was to reopen the national economy in a controlled manner. The CMCO was scheduled to start from 4 May 2021 with the following main orders ("Essence of conditional Movement Control Order", 2020), i.e., economic sectors restrictions were relaxed, non-contact sport in large groups was allowed, social events were still banned, and interstate travels were still banned.

Although faced with initial skepticism against relaxing the movement rules either by some state governments (Joni, 2020), politicians, and even the public, CMCO was implemented gradually throughout the country over then the next few months. The CMCO was reinstated by 17 November 2020. Although MCO 1.0 was welcome by many quarters, MCO 3.0 did not get the same warm welcome, although generally, the latter was seen as the only way forward. The daily positive infection pattern 3 March 2020–15 May 2021 shows unprecedented infection rates as soon as rules (CMCO implementations) were relaxed on 5 March 2021. The important dates during MCO are listed in Table 1, with some notes about the implementation of the MCO-CMCO.

Table 1

Important effective Movement Control Order (MCO) and Conditional Movement Control Order (CMCO) dates

Dates	Type	Notes
18 Mar. 2020	MCO 1	Promulgation by the Prime Minister on 16 Mar. 2021 for nationwide MCO
17 Nov. 2020	CMCO	Gradual ease starting on 4 May 2021, the states of Kedah, Kelantan, Pahang, Sabah, and Sarawak decided not to implement the CMCO by 4 May 2021 initially.
13 Jan. 2021	MCO 2	On 11 January 2021, the PM announced that MCO would be re-introduced in many states. It was dubbed as MCO 2.0 widely.
5 Mar. 2021	CMCO	Selangor, Johor, Penang, and Kuala Lumpur exited the Movement Control Order lockdown and entered the CMCO. It coincided with the launch of the Malaysia National COVID-19 Immunisation Programme, which commenced in the previous week.
12 May 2021	MCO 3	The Malaysian Government reimposed a two-week MCO in Johor, Kuala Lumpur, Penang, Sarawak, and Selangor to curb the spike of COVID-19 cases. On 11 May 2021, the PM announced MCO to be reinstated starting 12 May 2021–7 Jun. 2021, known as MCO 3.0.

There are many major impacts when any type of movement control is implemented. The main impacts discussed elaborately are the impacts on the economy and healthcare systems (Ibn-Mohammed et al., 2021). Popularly known as lockdown and border closure, these efforts are aimed to isolate cases and limit the transmission rate of the virus. The education system has not been categorized as the most severely affected, thanks to ongoing distance learning and other online learning initiatives in the last few decades. Notwithstanding, many pressing issues need to be addressed appropriately. An alarming 71% of student-respondents indicated increased stress, anxiety, and depressive thoughts among students due to the COVID-19 outbreak in the study on the effects of COVID-19 on college students' mental health at the Texas A&M University, United States (Son et al., 2020). The study further provided other strong data on mental issues, such as respondents feelings on the pandemic; 91% fear and worry about their health and of their loved ones, 89% difficulty in concentrating 86% disruptions to sleeping patterns, decreased social interactions due to physical distancing, and 82% increased concerns on academic performance.

Online learning provides advantages in independent learning and developing new skills leading to life-long learning (Dhawan, 2020). The author further elaborated that online learning reduces the entire learning costs as it is reduced or required no transportation, accommodation costs, and the overall cost of institution-based learning. However, online learning can be challenging for students categorized as underprivileged and marginalized with limited resources and accessibility to technologies (The Regional Risk Communication and Community Engagement Working Group, 2020). This inability to access and involve in online learning causes disparity and dropout among them (Selvanathan et al., 2020). The UNESCO International Institute for Higher Education in Latin America and the Caribbean (IESALC) highlighted many immediate impacts of the pandemic on the university higher education sector, both for the different actors and the institutions, and the system as a whole (UNESCO IESALC, 2020).

In May 2020, the Malaysian government had imposed T&L to be conducted online starting May 2020 until the end of the year (Landau, 2020). The Ministry of Education said all face-to-face T&L activities were not allowed, and those exceptions will only be given to a few categories of students. It appeared that governments in the entire world must instruct relevant ministries to change from physical classes to online too.

However, online T&Ls have already gained momentum even before the COVID-19 pandemic. In the United States, according to the National Center for Education Statistics (NCES), between 2012 and 2016, online enrollment expanded by 16%, and in 2018 NCES estimates that there were about 6.3 million students enrolled in online courses (Miller et al., 2016). Through these learning methods and environments, students have freedom in learning and get

connected with their teachers anywhere they want (Singh & Thurman, 2019). Among the two mains learning methods, the synchronous and asynchronous, Singh and Thurman (2019) further discussed many distinct and overlapping terms, such as e-learning, blended learning, online education, online courses, and the ambiguity and confusion around the interpretation of the concept of online learning.

In the Malaysian context, the government responded to online T&L quite elaborately. There are many instances of examples where the government encourages T&L, and these include the National Caring Aid (Bantuan Prihatin Nasional or PRIHATIN; Md Shah et al., 2020):

1. 15–50% electricity bill discount beginning on 1 April 2020, for six months and
2. Free internet from all telcos from 1 April 2020, until the end of the MCO (when it comes to users, this is practically the 1 GB of data/day from the main telcos),

which benefits B40 (bottom 40%) and M40 (middle 40%). The private sectors' contributions also play significant roles in this testing time. The YTL Foundation gave away free mobile phones to government school students under its Learn from Home Initiative, on top of free Yes 4G SIM cards with 40 GB of data and free learning resources that have already been made available earlier (Shankar, 2020), this helps the B40 group.

In responding to the pandemic, the Malaysian's Engineering Accreditation Council (EAC), the body delegated by the Board of Engineers Malaysia (BEM) for accreditation of engineering degree programs, has issued a very clear yet accommodative guiding principle EAC/ETAC Guiding Principles on Teaching-Learning and Assessment Implementation During Covid19 Pandemic (2020)–(Engineering Accreditation Council/ Engineering Technology Accreditation Council, 2020). In this guiding principle (GP) circular, it is clear that the EAC ensures that all program outcomes (PO) are attained no matter in which situations the nation is in (e.g., Harun et al., 2017). The GP encourages the implementation of substantial equivalent assessments to the current assessments. Continuous assessments implemented could be continued with take-home exams and assignments. The program is expected to undertake precautionary measures in handling *integrity issues*. The final year project (FYP) can be conducted using computer-based simulation and presenting literature critique, extension of time is allowed to support the government's intention for limited face-to-face interaction with university staff or the industries. e-lab or simulation-based laboratory experiments could replace the course with heavy laboratory content. The teamwork effort and complex engineering activities characteristics should continue accordingly for the Integrated Design Project (IDP, Harun et al., 2016). The scope may be considered complete to the

extent of producing prototyping design and equivalent. Precautionary measures in handling integrity issues must be ensured in the final examination (FE). One way to do this is by replacing it with take-home or open-book examinations. Despite the facilitation given by the government and higher learning authorities in assisting students in online teaching and learning during the pandemic, the actual implementation and the effect to students in terms of both technical and psychological are yet to be determined. Thus, this study aims to investigate the effects of the pandemic on university students on both the technical side, such as the sufficiency of infrastructure and the internet to support online T&L, as well as on the psychological side, such as stress level and their ability to focus during the teaching and learning processes. In this study, questionnaires regarding places of study and family member annoyance are added to elaborate discussions on the learning process during the pandemic.

METHODOLOGY

A survey was conducted among students in Malaysia from 10 November 2020 to 20 December 2020. The survey was conducted using an electronic system employing Google Forms, this way, and it would save many resources because a target of 1000 minimum respondents was set. The surveys were conducted mostly during the CMCO period. All public and private HEIs held all their classes virtually in response to the COVID-19 pandemic. As the survey must get data from all over Malaysia, including in less developed areas like central Sarawak and Sabah as well as Kelantan, many co-researchers were appointed. Co-researchers distributed the survey questions and encouraged students to participate via their learning management system (LMS). Co-researchers also used other promotional methods to get large turnouts. The only inclusion criteria for participation were that participants should be enrolled as undergraduate students in the university at the time of the survey. The objective, time duration, procedure, prospective research benefit, potential risks/discomfort/adverse effects, informed consent declaration, and right to ask a question were available. The following notes were also made available at the start of the survey to ensure the integrity of the study:

1. Incentives for participation

Your participation in this study is strictly voluntary. There are no incentives for participation.

2. Right to decline participation

Participation in this study is purely voluntary. You have the right to refuse to participate and withdraw without penalty.

3. Right to withdraw once participation has begun

Participation in this study is purely voluntary. You have the right to withdraw participation once participation has begun without penalty. In the case of withdrawal, the information you provided will be destroyed.

4. Foreseeable consequences of declining and withdrawing from participation

There are no foreseeable consequences of declining and withdrawing from participation.

The participant must provide a pin so that their information can be tracked if a participant would like to withdraw from the survey at a later stage.

The survey covers the first two levels in Maslow's Theory of Needs (Maslow, 1943), as outlined in the online education framework (Milheim, 2012). The first two levels are psychological needs and safety needs. In the first level, students need to fulfill psychological needs, such as the appropriate internet infrastructure and LMS system, to have the ability and motivation to learn. These basics must be identified and supplied to students for successful learning to occur. In the second level, it is reasoned that the virtual classroom can also be stressful to students. Other issues, such as getting familiar with online classroom features, knowing each other, and course format, can be matters of concern (Milheim, 2012). These two levels serve as the basis of the questionnaire design because these issues address students' basic needs.

The questionnaires were divided into three categories. In the first category, students were asked basic questions on demography. It was also to ensure the student familiarize themselves with the electronic system. The next section was on the *main learning issue during Movement Control Order (MCO)* and the last one on *participants evaluations on different effects for different subjects (technical versus humanity subjects) or environment (what would it be participant was at campus with better internet facility)*. Before proceeding with the analysis, some statistical analysis shall be performed on the data.

A total of 1410 participants of the survey were received, and the distribution by ethnic composition is shown in Figure 1. The breakdown closely follows Malaysia's ethnic composition. It is important to have substantial responses from Sabah and Sarawak as this will reflect the correct situation. At slightly more than 8% of survey participation, it appears that participation from these two regions does not follow the current national demography—Sabah and Sarawak populations make up 11.95% and 8.62%, respectively, of the national estimated population in quarter four of 2020 (Department of Statistics Malaysia [DOSM], 2019). The total number of student enrolments in Malaysian higher education has increased steadily from 2003–2019; see Table 2 for details.

It is important to establish 'an appropriate response' to a survey, i.e., the minimum response. Table 2 shows the composition of students in the country. The available data is only up to 2019; therefore, a projection for 2020 and 2021 can be made for statistical analysis. According to the Malaysian Association of Private Colleges and Universities (MAPCU), the international student population is estimated at 52,000 students by the end of 2020 (92,415 in 2018—a big drop; Y. Sharma, 2020).

Table 2

Student enrolment at public and private HEIs

Year	Public HEI	Private HEI	International student	Postgraduate Private HEI	Postgraduate Public HEI	Postgraduate to overall student enrolment
2003 (Abd Aziz & Doria, 2014)	294,359	314,344	30,397			
2011 (Abd Aziz & Doria, 2014)	508,256	428,973	71,101	17,496	5009	2.23%
2019 (DOSM, 2019)	533,946	633,344	92,415 (Y. Sharma, 2020)			
Increase 2011-2019	5.1%	47.6%	30.0%			

However, this drop did not significantly contribute to the overall student enrolment in Malaysia in 2020. Based on Table 2, postgraduate students' enrolment in 2019 is only 2.23%, which would not change much in 2020, although international postgraduate students' enrolments are expected to shrink dramatically due to travel restrictions. The student enrolment population size in 2020 is estimated to be the same as in 2019, i.e., 1.25 million. Therefore, the minimum required sample size of 384 is met (Krejcie & Morgan, 1970). Interestingly, Table 2 also shows that student registrations at private HEI remarkably outpace public HEI over the 2011–2019 period. It is set to reverse because international students stay away during the pandemic (Y. Sharma, 2020). Despite some closures to some of the private HEIs anticipated (Y. Sharma, 2020), this would not affect the study's outcome as the questions do not differentiate students' countries of origin.

The details of participation according to HEI involvement are shown in Table 3. Apparently, participation from private institutions is low. For example, participation from UNITEN is at 1.21%, and there are only a couple of participation from UTP, Mahsa University, University of Reading, and Sunway College, i.e., other private institutions.

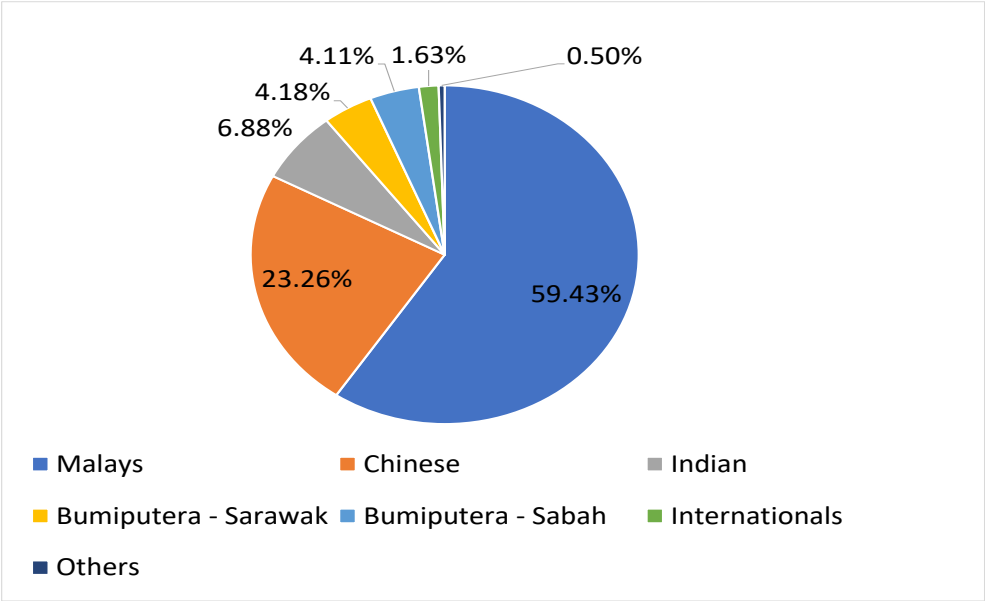

Figure 1. Students' participation in the survey by ethnic composition

Table 3

Student participation

HEI	Participation	HEI	Participation
UiTM	4.04%	UNITEN	1.21%
UKM	7.59%	UPNM	8.23%
UM	0.28%	USM	20.43%
UMK	0.92%	UTEM	0.21%
UMP	2.13%	UTM	38.94%
UNIMAS	13.97%	Others	2.06%

The reliability of the items is tested, and the results indicate that the internal consistency as the Cronbach's Alpha is greater than 0.7. A chi-square test is used to determine the significant association between two categorical variables formally. The regions of students and types of internet connection problems are chosen as the two variables in this study. For a chi-square goodness-of-fit test, the test statistics is defined as:

$$\chi^2 = \Sigma|O\text{-}E|^2 / E,$$

where O and E are observed and expected frequency, respectively, the test has approximately a chi-square distribution

if the null hypothesis is true. The number of degrees of freedom is one less than the number of possible values for the variable under consideration.

RESULTS AND DISCUSSIONS

The Association of Region and Perception of Internet Connection Problem

Figure 2 shows a segmented bar graph for the conditional and marginal distributions of students' perception of the internet connection problem of two regions in Malaysia. The result indicates that most of the students from both areas agree with the internet problem. The highest number of students agree with the problem, as shown in Figure 2, in which 529 and 108 students are from Peninsular Malaysia and Sabah, Sarawak, and Labuan, respectively. In contrast, only a few students strongly disagree with the internet problem, with 84 and 9 of them being from Peninsular Malaysia and Sabah, Sarawak, and Labuan, respectively.

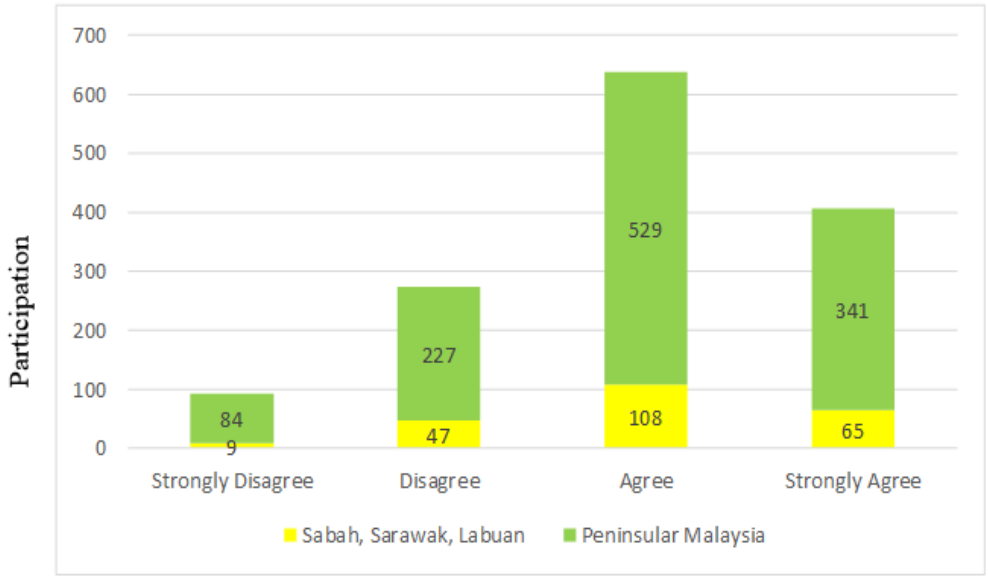

Figure 2. Clustered bar chart of perception on internet problem by regions

A formal analysis is carried out to determine the association between the regions and students' perception of internet problems from the above exploratory analysis. A chi-square test is used for the above purpose. The results show that the chi-square statistic is 3.367 with the corresponding *p*-value of 0.338. Therefore, there is no sufficient evidence that region and student perception are associated, which indicates that the level of perception on the internet problem is not influenced by the region of students.

Main Learning Issues

There are two-level questions in this section on main learning issues during Movement Control Order (MCO). After answering three main questions of main learning issues, which are i) internet coverage, ii) place of study, and iii) focus, respondents must answer each category in detail. The responses for the first three questions are shown in Figure 3, while the responses for the remaining detailed questions are shown in Figures 4–6.

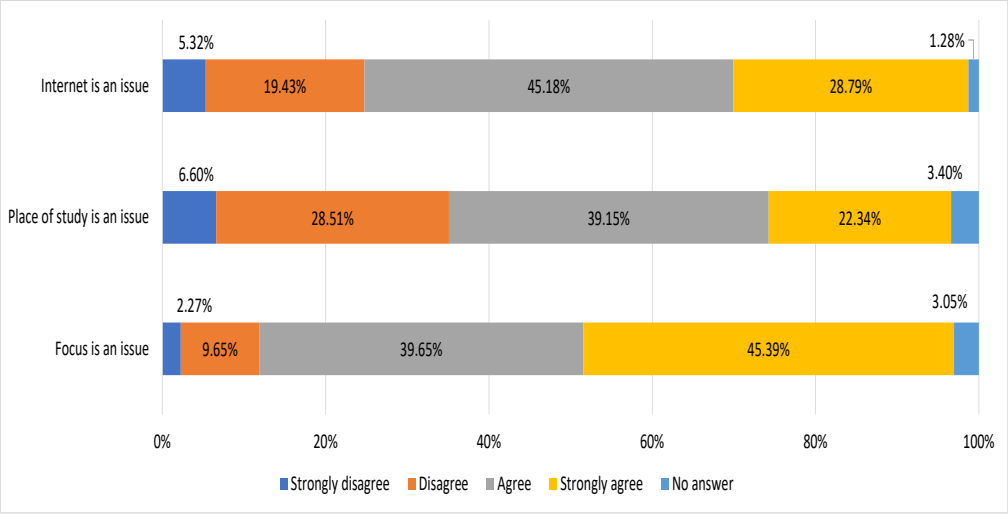

Figure 3. Three main issues learning issues during Movement Control Order (MCO)

A Likert scale is used for these questionnaires, and participants could choose not to answer. A small percentage of participants did not answer the three questions comprising 1.28%, 3.40%, and 3.05% for i) internet coverage, ii) place of study, and iii) focus, respectively. 5.32% strongly disagree, and 19.43% disagree that the internet is an issue. It adds up to 24.75%, i.e., a quarter, while participants who agree and strongly agree make up 73.97%. It provides strong evidence that internet connections could cause the implementation of online learning T&L to be affected badly, causing waste of time in waiting and students to lose out. Although it is every government's wish to provide good internet coverage and slogans, such as *online learning serves as a panacea in the time of crisis* and *online teaching is no more an option, it is a necessity* (Dhawan, 2020) seem to be accepted, not only in Malaysia but to many countries, major infrastructural improvements are urgently needed.

The breakdown of internet issues collected from this study is shown in Table 4, and for better visualization, a pie-chart is shown in Figure 4. As mentioned earlier, although the government of Malaysia has pledged *free internet from all telcos from 1*

April 2020 until the end of the MCO (Md Shah et al., 2020), the issues of low internet coverage have been plaguing Malaysia. Modernization initiatives in the last few decades have opened many opportunities. Sabah and Sarawak are the two states with low population densities of 52/km^2 and 22/km^2 against the entire nation at 86/km^2 (DOSM, 2020a). It is almost impossible for Telcos to provide any telecommunication infrastructure because such investments are uneconomic. As locals and tourists visit neighboring towns, they will also find many important facilities, such as health care centers and fuel stations, which are missing in many areas, and one thing for sure is internet connectivity.

This situation is similar to many years ago, as there were massive development projects, small towns grew. However, there are just insufficient conditions for these facilities to be provided yet. Therefore, local folks will have to deal with no internet coverage. Weird as it sounds, students' requests to take some examinations, which require an online system on a certain date and time, are usually agreed upon by lecturers (e.g., Selvanathan et al., 2020). As a result, many students whose houses are in longhouses in rural Sarawak need to travel two hours to get to the nearest town where internet coverage is sufficient for an online system. Imagine if the examination finishes at 5 pm, there is simply no return boat trip in the late evening in many areas.

Table 4

Breakdown of internet issues

Internet issues	Percentage
No internet	0.99%
Low internet coverage	48.94%
Limited data < 1G/day	10.43%
Limited data < 5G/day	7.80%
No internet problem	29.72%
Sudden disruptions	1.13%
Problem on rainy days	0.57%
Others	0.43%

The Government of Malaysia launched the Jalinan Digital Negara (JENDELA) Program as internet traffic increases by 30%–70% due to work from home (WFH) orders during MCO. In comparison, internet speed has dropped by 30%–40% (Malaysian Communications and Multimedia Commission, 2021). Therefore, among the aggressive targets of the JENDELA program are to upgrade 4,589 existing 2G/3G base stations to 4G and expand coverage and increase speed.

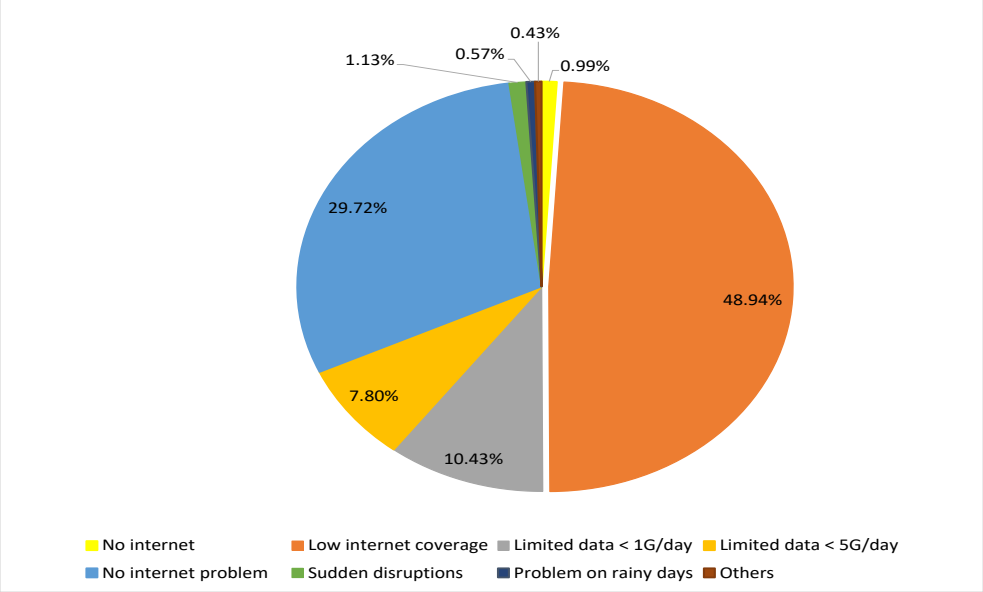

Figure 4. Breakdown of internet issues

According to the Department of Statistics Malaysia again, household internet penetration increased from 87% in 2018 to 90.1% in 2019 (DOSM, 2020b). The increasing trend of household penetration since many years ago was supposed to be great news for WFH and students from primary schools to tertiary levels. However, the remaining 9.9% who do not have internet access must find ways to deal with no internet access. The scenario faced by the student living in a longhouse in Sarawak is not an isolated case. The scenario of *tree-top* student Veveonah Mosibin who attended the pre-university science program at Universiti Malaysia Sabah (UMS), provides a clearer situation for rural areas generally in Sabah and Sarawak. Ms. Mosibin hails from Kampung Sapatalang, Pitas, Sabah. She had to sit for examinations at 9 am and at 2 pm on 9 June 2020. Therefore, early on the day, she checked a hut she had prepared a few weeks earlier at a hilltop to get a good internet connection. To her dismay, the hut was broken, most probably because of strong winds and rains over the weeks. Therefore, she took the online examination on a big tree, to get a good internet connection using broadband data from her handphone, thus earning herself a *tree-top* student (BBC Monitoring, 2020). After setting a mosquito net, she took the chemistry examination for the morning session and Malaysia Studies for the evening session. The entire activity was recorded and was apparently made for a challenge, including an overnight outing, alone at the hilltop—it was viral for many reasons. Although the immediate response was to have telecommunication facilities improved in the area—this certainly will not

increase the remaining 9.9% of households who have no internet access -discussed earlier (DOSM, 2020b). In this study, we allocated questions addressing issues regarding the internet quite sufficiently.

Participants who chose 'limited data < 1G / day constitute 10.43%' of the overall respondents. Many synchronous lectures last about two hours. Many of the LMS employed by universities offer exchanges of video transfer as well. It is normal that if a student allows a complete video transfer in one hour, which is usually required to get a full grasp of the lecture, the 1G data is fully utilized (Rohan-pal, 2020). The 1G data by the major telcos in the PRIHATIN pledge will support the first-hour usage but not after that. 'Sudden disruptions'— 1.13% and 'problem on rainy days'—0.57% are seemingly low but should not be neglected. Many reports have been made by students who highlighted that there they could not submit their examination in time because there were 'sudden disruptions.'

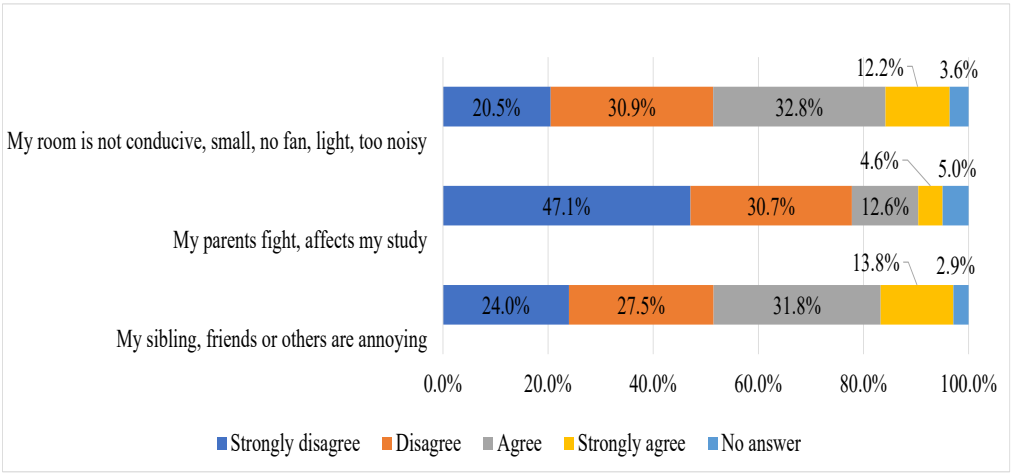

Figure 5. Disturbances at the place of study

Figure 5 shows the breakdown of the disturbances at the place of study. Generally, students stay in dormitories in the first year, and the majority rent accommodations in nearby areas in subsequent years until the completion of their studies. 3.6% did not provide an answer. 32.8% and 12.2% of students agree and strongly agree that their rooms are not conducive, small, has no fan, have appropriate lighting, or are too noisy. Generally, family size in Malaysia is relatively large. In rural areas, although rare, there are many places where electricity supply is not available, just like in Ms. Mosibin's case. Rural folks can rely on generator sets for electricity for essential items, but is it too costly to run generator sets into midnight.

As MCO periods are entended, stress levels among family members increase. The second results in Figure 5 show the extent of the MCO effect on relationships among family members. 12.6% and 4.6% chose to agree and strongly agree with the question 'my parents fight, affects my studies,' with 5.0% not choosing an answer. The total number here, 17.2%, is annoying, but it reflects the situation among the lower-income groups. Women's rights groups in Malaysia have reported a substantial spike in domestic violence and abuse. The MCOs and increased economic and social stresses combined with conditions in crowded homes, substance abuse, limited access to services, and reduced peer support exacerbate the conditions for violence and abuse (Lim, 2020). Interestingly, a study conducted at Universiti Kebangsaan Malaysia conducted at about the same time revealed 78% of students are of the view that activity increased online learning load is among the factors that cause students stress to spiral out (W Zamri et al., 2021). The addition of online learning activities worsens students' already unmanageable stress level due to crowded places of stay and other issues described above.

The most immediate effect of MCO is a contraction in economic activities. Having learned the hard way from the freeze in economic activities in the first implementation of MCO, which caused the GDP in 2020 to contract by 5.6%—the worst performance since 1998, the government is seen to only resort to the same freeze order as the last option. 3.8% and 18.1% of the total Malaysian labor force are *unpaid family workers* and *self-employed/own accounts*. A freeze in economic activities quickly finds its way to affect these categories officially classified most vulnerable employments. *An unpaid family worker* is a person who works without pay or wages on a farm, business, or trade operated by another member of the family. As the rate of domestic violence rises, support has been less forthcoming. Judicial, police, and health services that normally are the first responders for women are overwhelmed, have shifted priorities, or are otherwise unable to help (Lim, 2020). These cause much stress among family members. Through various statistics gathered by A. Sharma and Borah (2020), clear evidence is established to relate the significant reduction in economic activities due to COVID-19 and domestic violence occurrences. Two examples of cases from A. Sharma and Borah (2020) are rewritten here on how disturbances at places of study can directly impact losses of incomes and domestics violence. Firstly, even in a family with no history of domestic violence, economic distress due to financial strain and a lack of social support can fuel violence. Secondly, having too much time among family members during the pandemic can be the source of domestic's violence, especially when it is not compatible with the family setup. These authors added that this environment causes student education and their development to be affected; adding the related questions on these items will shed some light on the extent of COVID-19 effects.

A total of 45.6%, i.e., 31.8% and 13.8%, chose to agree and strongly agree that 'my sibling, friends or others are annoying.' Generally, the entire online T&L and the broader WFH concept are new. At the start of the first MCO implementation, the government announced a 15–50% electricity bill discount beginning on 1 April 2020 for six months (Md Shah et al., 2020). It has since been extended. Therefore, a lot of middle-income earners had to accept the new concept of WFH. However, many households did not have a separate room for works and T&L, thus the disturbances from most likely kids for working adults or younger siblings for school-going children and teenagers.

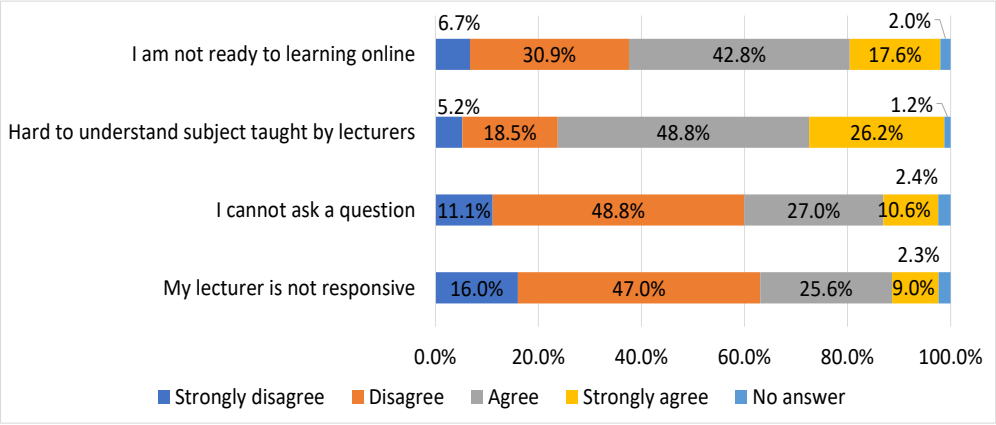

Figure 6. Focus of study

Figure 6 shows the detailed breakdown for the focus on studies. The students could choose to skip the questions; however, a very small number of them skip the question, ranging between 1.2%–2.4%. 42.8% and 17.6% choose to agree and strongly agree with the question 'I am not ready to learn online.' It is alarming because there are many assumptions and webinars on online teaching techniques and approaches. Gonzales et al. (2018) revealed that roughly 20% of students have trouble with basic technology needs. Their data plans are capped, outdated devices and internet connectivity. The lower socio-economic group and students of color disproportionately experienced hardships, and reliance on old devices was associated with lower grade point averages (GPA).

The shift toward the non-conventional pedagogical method, although necessary, should not yet be accepted as a *victor ludorum* as in Dhawan (2020). More than two-thirds of students, i.e., 48.8% and 26.2%, chose 'hard to understand subject taught by lecturer' in online modes. There are many reasons for that; students need that access to lecturers like in the old-school

model, open hours tutorials, face-to-face explanation sessions where constructing calculations surrounded by friends in a tutor's room and performing other learning activities were possible. Notwithstanding, most students chose strongly disagree (11.1%) and disagree (48.8%) with 'I cannot ask a question.' It is probably a relief to learn that 16.0% and 47% of students choose strongly disagree and disagree with the question 'my lecturer is not responsive.' The guideline released by EAD Malaysia clearly supports students' difficulties during this painful period; a student can send in their final year report later than the normally prescribed times for the final year report (FYP). It will assist students who need to undertake their project in the laboratory, which is mostly closed during the pandemic. Computer-based simulation and presentation of critical design problems can replace the traditional prototype and are considered to have met complex problem solving (CPS) requirements (EAC/ ETAC, 2020). Adding questions on non-conventional teaching methods would greatly provide important information on the COVID-19 effects on education.

CONCLUSIONS

The nationwide study on students' difficulties during pandemics revealed that the digital divide, such as access to the appropriate device, internet access, and knowledge to use these techniques, are not only the main issues. More complex issues that need to be addressed, such as students' readiness for this non-conventional pedagogical approach. Students still need that old-school approach, such as meeting with tutors during open hours. Furthermore, the effects of the pandemic have far-reaching effects on the socio-economics; students belonging to the most vulnerable groups found themselves in the least conducive place to study, their rooms are small with few basic facilities, such as fans and adequate lighting. In addition, they face disturbances among family members. The impacts on increased stress levels are also discussed, although beyond the main objectives of the study. Although the past year has seen increased effectiveness of online T&L, its way toward *victor ludorum* may face many more obstacles than earlier thought. With appropriate coverage of the study regarding the number of HEIs, students' location, and region, this study shall provide HEIs and the relevant ministries with the appropriate responses.

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REFERENCES

Abd Aziz, M. I., & Doria, A. (2014). Finding the next 'wave' in internationalisation of higher education: Focus on Malaysia. *Asia Pacific Education Review, 15*(3), 493-502. https://doi.org/10.1007/s12564-014-9336-7

BBC Monitoring. (2020, Jun 18). Malaysian student sits exams in a tree to ensure good wifi. *BBC News.* https://www.bbc.com/news/blogs-news-from-elsewhere-53079907

Covid-19: Movement Control Order imposed with only essential sectors operating. (2020, March 16). *New Straits Times*. https://www.nst.com.my/news/nation/2020/03/575177/covid-19-movement-control-order-imposed-only-essential-sectors-operating

Department of Statistic Malaysia. (2019). *Education Malaysia 2019.* https://www.dosm.gov.my/v1/index.php?r=column/cthree&menu_id=Z1hCMUVLQWVOL2tScVlhSmo5eEd3QT09

Department of Statistic Malaysia. (2020a). *Demographic Statistics Fourth Quarter 2020, Malaysia.* https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=430&bul_id=Szk0WjBlWHVTV2V1cGxqQ1hyVlppZz09&menu_id=L0pheU43NWJwRWVSZklWdzQ4TlhUUT09

Department of Statistic Malaysia. (2020b). *ICT use and access by individuals and households survey report, Malaysia, 2019.* https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=395&bul_id=SFRacTRUMEVRUFo1Ulc4Y1JlLzBqUT09&menu_id=amVoWU54UTl0a21NWmdhMjFMMWcyZz09

Dhawan, S. (2020). Online learning: A Panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems, 49*(1), 5-22. https://doi.org/10.1177/0047239520934018

Engineering Accreditation Council/ Engineering Technology Accreditation Council. (2020). *EAC / ETAC Guiding principles on teaching-learning and assessment implementation during Covid-19 pandemic* (*Guidelines No. 005).* https://www.eac.org.my/web/document/EAC-ETAC%20CovidGuidelines.pdf

Essence of conditional Movement Control Order. (2020, May 2). *Bernama*. https://www.bernama.com/en/general/news.php?id=1837487

Gonzales, A. L., McCrory, C. J., & Lynch, T. (2018). Technology problems and student achievement gaps: A validation and extension of the technology maintenance construct. *Communication Research, 47*(5), 750-770. https://doi.org/10.1177/0093650218796366

Harun, Z., Arshad, I., Yaakob, Z., Nordin, R., & Hashim, H. (2016). The effectiveness of health and safety topics in an engineering course syllabus. *Pertanika Journal of Social Sciences and Humanities, 24*(S), 155-166.

Harun, Z., Saibani, N., Rasani. M. R., & Sajuri, Z. (2017). How realistic are the EAC measurements? *Journal of Engineering Science and Technology,* (12), 58-66.

Ibn-Mohammed, T., Mustapha, K. B., Godsell, J., Adamu, Z., Babatunde, K. A., Akintade, D. D., Acquaye, A., Fujii, H., Ndiaye, M. M., Yamoah, F. A., & Koh, S. (2021). A critical analysis of the impacts of COVID-19 on the global economy and ecosystems and opportunities for circular economy strategies. *Resources, Conservation, and Recycling, 164*, 105-169. https://doi.org/10.1016/j.resconrec.2020.105169

Joni, F. (2020, May 3). Ini tujuh negeri yang tidak laksana, atau tangguh PKPB [These are seven states that do not implement, or delay CMCO]. *Astro Awani*. https://www.astroawani.com/berita-malaysia/ini-tujuh-negeri-yang-tidak-laksana-atau-tangguh-pkpb-241303

Krejcie, R. V., & Morgan D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement,* 30, 607-610. https://doi.org/10.1177/001316447003000308

Landau, E. (2020, May 27). University lectures to go online until Dec 31, except for 5 groups. *New Straits Times*. https://www.nst.com.my/news/nation/2020/05/595758/university-lectures-go-online-until-dec-31-except-5-groups

Lim, L. L. (2020). The socio-economic impacts of COVID-19 in Malaysia: Policy review and guidance for protecting the most vulnerable and supporting enterprises. ILO Report. https://www.ilo.org/asia/publications/WCMS_751600/lang--en/index.htm

Malaysian Communications and Multimedia Commission. (2021, April 7). *JENDELA: 2nd Quarterly Report.* https://myjendela.my/Sitejendela/media/Doc/2nd_Quarterly_Report_of_JENDELA.pdf

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370-396. https://doi.org/10.1037/h0054346

Md Shah, A. U., Nur Azrie Safri, S., Thevadas, R., Noordin, N. K., Abd Rahman, A., Sekawi, Z., Ideris, A., & Hameed Sultan, M. T. (2020). COVID-19 outbreak in Malaysia: Actions taken by the Malaysian government. *International Journal of Infectious Diseases, 97,* 108-116. https://doi.org/10.1016/j.ijid.2020.05.093

Milheim, K. L. (2012). Toward a better experience: Examining student needs in the online classroom through Maslow's hierarchy of needs model. *MERLOT Journal of Online Learning and Teaching, 8*(2), 159-171.

Miller, A., Topper, A. M., & Richardson, S. (2016). *Suggestions for improving IPEDS distance education data collection.* (NPEC 2017). National Postsecondary Education Cooperative. https://nces.ed.gov/ipeds/pdf/NPEC/data/NPEC_Paper_IPEDS_Distance_Education_2017.pdf

Rohan-pal. (2020, March 23). Data consumed for 1-hour of video conferencing on Skype, Microsoft team, Google Hangout, Slack? *The Mobile Indian*. https://www. themobileindian.com/news/how-much-data-is-consumed-for-1-hour-of-video-conferencing-on-skype-microsoft-team-google-hangout-slack-30319

Rothstein, M. A. (2015). From SARS to Ebola: Legal and ethical considerations for modern quarantine. *Indiana Health Law Review, 12*(1), 227-278. https://doi.org/10.2139/ssrn.2499701

Selvanathan, M., Mohamed Hussin, N. A., & Nor Azazi, N. A. (2020). Students learning experiences during COVID-19: Work from home period in Malaysian higher learning institutions. *Teaching Public Administration*. https://doi.org/10.1177/0144739420977900

Shankar, A. J. (2020, April 7). YTL Foundation to give away free mobile phones to B40 students under Learn from Home Initiative. *The Edge Markets*, https://www.theedgemarkets.com/article/ytl-foundation-give-away-free-mobile-phones-b40-students-under-learn-home-initiative

Sharma, A., & Borah, S. B. (2020). Covid-19 and domestic violence: An indirect path to social and economic crisis. *Journal of Family Violence*. https://doi.org/10.1007/s10896-020-00188-8

Sharma, Y. (2020, December 2). Private universities at risk as foreign students stay away. *University World News*. https://www.universityworldnews.com/post.php?story= 2020120216283461

Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). *American Journal of Distance Education, 33*(4), 289-306. https://doi.org/10.1080/08923647.2019.1663082

Son, C., Hegde, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *Journal Medical Internet Research, 22*(9), Article e21279. https://doi.org/10.2196/21279

The Regional Risk Communication and Community Engagement Working Group. (2020). COVID-19: How to include marginalized and vulnerable people in risk communication and community engagement. https://reliefweb.int/sites/reliefweb.int/files/resources/COVID-19_CommunityEngagement_130320.pdf

Umair, S., Waqas, U., & Faheem, M. (2021). COVID-19 pandemic: Stringent measures of Malaysia and implications for other countries. *Postgraduate Medical Journal, 97*, 130-132. http://doi.org/10.1136/postgradmedj-2020-138079

UNESCO IESALC. (2020). *COVID-19 and higher education: Today and tomorrow; Impact analysis, policy responses and recommendations.* http://www.guninetwork.org/publication/report-covid-19-and-higher-education-today-and-tomorrow-impact-analysis-policy-responses

W Zamri, W. F. H., Abidin, Z. Z., & Harun, Z. (2021). Cabaran pembelajaran ketika pandemik: Simptom stres di kalangan pelajar Program Kejuruteraan Mekanikal UKM [Learning challenges during a pandemic: Symptoms of stress among students of the UKM Mechanical Engineering Program]. *Prosiding K-Novasi 2021*, 159-162. https://www.aktivukm.my/copy-of-pembentangan-makalah