Determinants of future preference for e-learning and its implications: A study of Malaysian business students

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To mitigate adverse consequences of campus closure caused by the Covid-19 pandemic, many higher education institutions shifted from traditional to one hundred percent e-learning overnight. This study aims to identify salient determinants of business undergraduates' future preferences for e-learning and discuss its implications. 251 business undergraduates from a private university in Malaysia participated in an online survey conducted in July 2020, during campus closure. Data were analysed using multiple regression analysis to empirically identify salient determinants of future preference for e-learning. Multiple regression results inferred that the two most significant determinants of business undergraduates' future preference for e-learning were the disadvantages of e-learning, followed by learning outcomes. Limitations of this study include: (1) the survey was carried out in July 2020 when all courses were conducted using one hundred percent e-learning for the first time; (2) some salient determinants may not be captured because literature on e-learning during Covid-19 is evolving rapidly; and (3) the findings are not generalisable to other contexts. E-learning, whether in the form of one hundred percent e-learning or hybrid learning, is expected to be the new norm post-pandemic. As such, a better understanding of the determinants of business undergraduates' future preference for e-learning will enable stakeholders to overcome barriers to e-learning and improve learning outcomes.

Introduction

Public places closure is a primary non-pharmaceutical intervention at the population level to reduce transmission of the Covid-19 virus. To date, the scale and duration of closure of institutions of learning is unprecedented in history (UNESCO, 2020c) and carry high social and economic costs (UNESCO, 2020a). Interrupted learning deprives students of opportunities for learning, growth and development (Almaiah, Al-Khasawneh & Althunibat, 2020). Moreover, extended interruption of study causes suspension of learning time, loss of knowledge and skills gained (Reimers & Schleicher, 2020) due to decay, forgetting and lack of practice. The impact of closure of institutions of learning can also create adverse consequences, especially for vulnerable and marginalised students (UNESCO, 2020a).

The tertiary education industry responded swiftly to this sudden interruption of educational processes by switching to e-learning as an alternative mode of learning (Crawford et al., 2020; UNESCO, 2020c; Zhou, Wu, Zhou & Li, 2020) to protect students' educational opportunities (Reimers & Schleicher, 2020). In other words, although classes were disrupted, learning remained undisrupted (Huang et al., 2020).

Advances in information and communications technology (ICT) have facilitated new methods of learning, allowing for access to e-learning and enhanced learning. Under

normal circumstances, e-learning can be an effective way to complement, supplement and reinforce learning experiences within the broader education context (Zhou et al., 2020). E-learning is defined as applying ICT to learn in synchronous and/or asynchronous environments (Huang et al., 2020). In synchronous e-learning, courses are scheduled and conducted in live virtual classroom settings. Using synchronous e-learning, learners benefit from real-time interactions, instant messages and feedback. Using asynchronous online learning, learning contents are provided via learning management systems or forums but there are no live virtual classes (Huang et al., 2020). However, learners face various challenges with sudden switches from conventional classroom learning to e-learning. Learners may be unprepared to handle e-learning and may suffer negative outcomes, such as disengagement with learning content (Day, 2015; Regehr, Nelson & Hildyard, 2017) and difficulties in meeting academic demands (Jarrell, Dennis, Jackson & Kenney, 2008), resulting in a higher probability of dropping out (Jarrell et al., 2008; SchWeber, 2008). Other challenges arise from learning style and culture (Islam, Beer & Slack, 2015).

Prior to the Covid-19 pandemic, many institutions of higher learning were already exploiting digital innovation to enhance teaching and learning. Existing literature on the adoption of e-learning is underpinned by provision of choices, for example, the community of inquiry (Garrison, Cleveland-Innes & Fung, 2010; Lee, Looi, Faulkner & Neale, 2020). However, after a sudden, involuntary and disruptive change in the mode of delivery for higher education, what will be undergraduates' preferences for e-learning post Covid-19? Will undergraduates abandon e-learning once the Covid-19 pandemic is over, or prefer some combination of conventional learning and e-learning (i.e., hybrid or blended learning)?

Presently, there is limited understanding of the involuntary adoption of e-learning during the crisis. The key research question is: what are the challenges experienced by business undergraduates using e-learning during the Covid-19 pandemic? The purposes of this study are to empirically identify salient determinants of business undergraduates' future preferences for e-learning during campus closures and to discuss the implications.

Literature review

The unprecedented scale and rapid adoption of e-learning during closures of institutions of learning posed enormous challenges in terms of human and technical aspects (Choong, 2020; Crawford et al., 2020; Reimers & Schleicher, 2020; UNESCO, 2020a, 2020c). The education priorities in response to the Covid-19 pandemic are to ensure continuity of academic learning for learners and to support learners lacking independent study skills (Reimers & Schleicher, 2020). At the same time, e-learning pedagogy, learners' readiness and psychological well-being are essential in e-learning (Almaiah et al., 2020). Success factors in a conventional education environment may not predict success in an e-learning environment because new behaviours and habits are expected of learners. Reviews of recent literature suggest the following challenges in e-learning, especially during closure of institutions of learning.

Infrastructure for e-learning

ICT equipment (hardware such as desk top computers, laptops, tablets or smart phones and software) and good Internet connections are paramount pre-requisites for e-learning (Abbasi, Ayoob, Malik & Memon, 2020; Almaiah et al., 2020; Choong, 2020; Wang, Cheng, Yue & McAleer, 2020). The "digital divide" creates inequities of access to ICT and Internet connections (Almaiah et al., 2020; UNESCO, UNICEF & The World Bank, 2020), leading to a loss in educational opportunities (Choong, 2020; Wang et al., 2020; World Health Organization, 2020; Zhou et al., 2020) for learners from poor families or those living in remote or rural areas (economically or socially disadvantaged learners). Parenthetically, e-learning can be based on a variety of software and learning management systems, even within the same institution of learning, raising serious technical challenges or technophobia of e-learning (Choong, 2020; Wang et al., 2020).

Technical training, technical support and resources for e-learning

Ideally, learners should attend online workshops on e-learning tools, techniques and guidance for self-directed e-learning (Reimers & Schleicher, 2020; Zhou et al., 2020), prior to e-learning classes. Although learners may be known as the digital generation, they may lack digital skills especially related to e-learning (UNESCO, 2020c). Another critical challenge in switching to e-learning is resistance to change as learners are accustomed to conventional learning methods (Almaiah et al., 2020). Training programs and technical support can alleviate resistance to change. Additionally, e-learning can fail as a result of the lack of technical support, such as unavailability of technical staff and lack of support to perform various e-learning activities such as installation, operation, maintenance, network administration and security (Almaiah et al., 2020; UNESCO, 2020b; Zhou et al., 2020). Last but not least, sufficiency of e-learning resources is critical for e-learning (Almaiah et al., 2020; Zhou et al., 2020).

Discipline for e-learning

There are high diversity among learners in terms of discipline, resilience, motivation and skills to learn online independently (Reimers & Schleicher, 2020; UNESCO, 2020c). Factors for effective e-learning found in extant literature include motivation (Huang et al., 2020; Reimers & Schleicher, 2020; UNESCO, 2020b), independent learning (Huang et al., 2020; Reimers & Schleicher, 2020), self-discipline, self-direction, self-regulation, self-organisation skills (Huang et al., 2020; McPherson & Bacow, 2015; UNESCO, 2020c), good study habits (Zayapragassarazan, 2020) and good study skills (UNESCO, 2020c). E-learners should assume learning responsibilities in terms of goal-setting, self-monitoring and making adjustments (Huang et al., 2020). Banerjee and Duflo (2014) argued that noncognitive capacity for self-control is paramount in online learning. For example, e-learners can be easily distracted by Internet activities other than their higher education tasks.

Actual or perceived advantages of e-learning

With e-learning, learners can study anywhere and anytime (24/7) as long as there is access to ICT equipment and the Internet, breaking the limitations of study space and time (Zhou et al., 2020). In other words, e-learning offers flexibility (Abbasi et al., 2020; MacFadden, Maiter & Dumbrill, 2002; Zayapragassarazan, 2020; Zhou et al., 2020) and more learner control (Abbasi et al., 2020; MacFadden et al., 2002).

The flexibility of e-learning is underpinned by a learner-centred constructivism philosophy (Lewis & Spencer, 1986). E-learning is a "learner-centric" education model (Zayapragassarazan, 2020; Zhou et al., 2020), meaning that the emphasis is on learners' learning autonomy (Reimers & Schleicher, 2020; UNESCO, 2020c; Zhou et al., 2020). This "learner-centric" education model offers rich learning choices and allows learners to take more responsibility for their own learning (Zayapragassarazan, 2020), resulting in improved learning effectiveness and efficiency (Almaiah et al., 2020; Reimers & Schleicher, 2020) and enhanced higher-order thinking skills, such as questioning, creativity and problem solving (UNESCO, 2020b).

Actual or perceived disadvantages of e-learning

Advantages of e-learning are accompanied by disadvantages. The sudden and one hundred percent adoption of e-learning may cause learners to feel overloaded and confused (UNESCO, 2020b). Furthermore, disruptions resulting from the Covid-19 pandemic impose mental and financial distress on learners (Choong, 2020; UNESCO, 2020a). Learners with deficiencies in motivation and self-discipline will most likely suffer boredom, stress and depression (McPherson & Bacow, 2015). Without strong social support, they will be susceptible to burnout and eventually give up e-learning or simply drop out from the course or university (Choong, 2020; MacFadden et al., 2002; UNESCO, 2020a).

Closure of institutions of learning reduces face-to-face interaction between learner and teacher (Abbasi et al., 2020; Choong, 2020; MacFadden et al., 2002), creates a physical and psychological separation and distance (UNESCO, 2020c) and amplifies a sense of disengagement (UNESCO, 2020c). In addition, the autonomous (individualistic) nature of e-learning aggravates social isolation (Abbasi et al., 2020; MacFadden et al., 2002; UNESCO, 2020a).

Learning outcomes

Despite various challenges posed by sudden and one hundred percent adoption of e-learning, it is imperative to achieve learning outcomes (UNESCO, 2020c), albeit not at the same level as conventional classroom learning. Achieving learning outcomes may enhance learners' future preference for e-learning. Given the context of this study, which is e-learning in Malaysian higher education, this study adopts the five clusters of learning outcomes developed by the Malaysian Qualifications Agency (MQF, 2017), namely,

knowledge and understanding, cognitive skills, functional work skills (practical, interpersonal, communication, digital, numeracy, leadership, autonomy and responsibility), personal and entrepreneurial skills, and ethics and professionalism.

Demographic and socioeconomic factors

The Covid-19 pandemic has differential impacts on individuals, contingent upon demographics and socioeconomic status, with poor and female learners likely to be affected disproportionately (World Health Organization, 2020). Economically or socially disadvantaged learners, for example, from lower income households (Crawford et al., 2020) or residing in rural or remote areas (Almaiah et al., 2020) will be particularly affected by one hundred percent e-learning due to closure of institutions of learning because such learners do not have access to ICT equipment and sufficiently good Internet connections. In addition, some learners may not have a quiet space to study at home or may be distracted by family responsibilities. These learners will likely suffer a higher risk of being left behind in e-learning (Choong, 2020). Ideally, e-learning should provide an inclusive learning for economically or socially disadvantaged learners (Huang et al., 2020).

Brosnan (1998) contended that females perceive computer usage as masculine, which is incongruent with their feminine image. This gender incongruence suggests that females are likely to experience higher levels of technophobia than males.

Method

This study was approved by the Research Ethics Committee of Xiamen University Malaysia, Malaysia (REC-2005.02).

Participants

This study selected a narrowly defined sample (Davidsson, 2005), namely full time undergraduates majoring in business from a private university in Malaysia who normally attended conventional classroom learning prior to the outbreak of the Covid-19 pandemic. None has had any prior experience of one hundred percent e-learning.

Measurement

Review of extant literature found mostly conceptual discussion of challenges related to e-learning during closure of institutions of higher learning. In this study, the procedures to develop a multi-item measurement tool followed the recommendations in measure development literature (Churchill Jr., 1979; Malhotra, 2010; Zaichkowsky, 1985), which included theoretical underpinnings, assessment of reliability and validity.

Multi-item questions were used to ensure that there were no priming and no overlapping of questions for different predictors (Spector & Brannick, 2011). Ex ante procedural remedies in design and administration of the questionnaire were employed to reduce common method variance (Chang, van Witteloostuijn & Eden, 2010). At the beginning of

the questionnaire, participants were assured anonymity and confidentiality of their responses, that there are no correct or incorrect answers and they should answer as honestly as possible. Moreover, there are no questions that would provoke defensiveness or threaten esteem.

The questionnaire is in English and consists of two parts. Part A collected data on demographics and socioeconomic status, such as gender, family household income (bottom 40% or B40, monthly household income below RM4,000; middle 40% or M40, monthly household income between RM4,001 and RM8,000; top 20% or T20, monthly household income more than RM8,001), and location of residence (rural, semi-urban or urban area). This study utilised quasi-experimental designs (Becker, 2005; Bernerth & Aguinis, 2016) to eliminate the effects of confounding variables. Extraneous variables not related to the theories being examined (Atinc, Simmering & Kroll, 2012; Carlson & Wu, 2012; Spector & Brannick, 2011), such as level of study, major or area of specialisation and one hundred percent e-learning in the current semester are made uncorrelated with future preference for e-learning by holding them constant across samples (Atinc et al., 2012; Becker, 2005; Bernerth & Aguinis, 2016).

Part B collected data on metric predictors. Infrastructure was measured by five items (sample item: "I have access to a laptop, personal computer, tablet or smart phone for e-learning"). Training, support and resources was measured by six items (sample item: "I attended online workshops to make the best out of e-learning"). Discipline was measured by six items (sample item: "I maintained good learning habits, including hours of self-learning before and during e-learning"). Actual or perceived advantages was measured by six items (sample item: "I think e-learning is an undergraduate-centric education model"). Actual or perceived disadvantages were measured by six items (sample item: "I feel socially isolated using e-learning"). Learning outcomes were measured by eight items (sample item: "Using e-learning, I am able to effectively learn the subject knowledge"). Future preference for e-learning was measured by four items (sample item: I prefer e-learning in future semesters). All responses are Likert type with a scale: Strongly disagree =1; Disagree=2; Neutral=3; Agree=4; Strongly agree=5.

Data collection procedures

This survey was carried out in July 2020 when all courses were conducted using one hundred percent e-learning for the first time. A link to the self-administered questionnaire hosted on *Google Docs* was distributed via email. Participation in this survey was on a voluntary basis and participants consented online before answering this questionnaire. This study followed standard survey approaches to minimise response biases, that is, no social pressure to influence responses and no payoff or cost for particular responses.

Data analysis

At the end of data collection period, data in *Excel* format were downloaded from *Google Docs*, cleansed by deleting unqualified participants, recoded into numeric and subsequently transferred 251 valid responses into the *Statistical Package for the Social Sciences* (SPSS)

version 26. Preliminary data analysis checked normality and outlier, examined factor structure of the dataset via exploratory factor analysis (EFA), tested common method bias for variance attributable to the measurement instrument, and checked factors' reliability and validity.

Using enter method in linear regression, gender, family household income, location of residence, infrastructure, training, support and resources, discipline, advantages, disadvantages and learning outcomes were entered as independent variables and future preference for e-learning as dependent variable. Collinearity diagnostics were selected to check collinearity among metric independent variables. Lastly, given that this study explicitly identifies sources of variability in the dependent variable (i.e., causal inference) via survey and regression analysis, therefore, a Durbin-Wu-Hausman test was employed to detect endogeneity problem (Angrist & Pischke, 2009; Hult et al., 2018; Papies, Ebbes & van Heerde, 2017; Sande & Ghosh, 2018).

Results

Initially, data were checked for normality using normal Q–Q plot and results suggested that there was no serious violation. Furthermore, there was no serious threat of outliers in the dataset. Cross-tabulation of gender, household income and location of residence is presented in Table 1.

Table 1: Gender, household income and location of residence (N=251)

Household income	Location of residence	Gender		Total
		Male	Female	
B40	Rural area	0	6	6
	Semi-urban area	3	13	16
	Urban area	5	10	15
	Sub-total	8	29	37
M40	Rural area	5	8	13
	Semi-urban area	31	40	71
	Urban area	20	33	53
	Sub-total	56	81	137
T20	Rural area	1	1	2
	Semi-urban area	12	27	39
	Urban area	12	24	36
	Sub-total	25	52	77
Total	Rural area	6	15	21
	Semi-urban area	46	80	126
	Urban area	37	67	104
	Total	89	162	251

In Table 2, all Cronbach's alphas were above 0.7, indicating reliability of all metric variables. The results of factor analysis were satisfactory with Kaiser-Meyer-Olkin measure of sampling adequacy above 0.5 and Bartlett's test of sphericity significant. In exploratory

factor analysis, using principal component analysis and varimax rotation method, seven components were extracted – consistent with *a priori* theorising – accounting for 68% of total variance explained. Thus, the ex post statistical remedy of Harman one factor analysis indicates that variance in the data was not largely attributed to a single factor (i.e., absence of common method bias). All items were correctly loaded onto their respective metric variables, except thinking skills (originally conceptualised as an item under advantages) and social isolation (originally conceptualised as an item under disadvantages). Consequently, these two items were excluded from subsequent analysis.

Table 2: Means, standard deviations and reliability

	Mean	Std. dev.	Reliability	
			Cronbach's alpha	No. of items
Infrastructure	4.00	.728	.820	5
Training, support and resources	3.38	.738	.845	6
Discipline	3.25	.884	.911	6
Advantages	3.50	.830	.871	6
Disadvantages	3.30	.837	.844	6
Learning outcomes	3.04	.840	.927	8
Future preference for e-learning	2.69	1.091	.913	5

The dependent variable of future preference for e-learning was regressed against the independent variables of infrastructure, training, support and resources, discipline, advantages, disadvantages and learning outcomes. Results from multiple regression revealed that the regression model is significant ($p < 0.01$) with an adjusted $R^2 = .466$. In other words, the independent variables explained 46.6% of variation in the dependent variable of future preference for e-learning. Disadvantages is the most significant negative predictor of future preference for e-learning, followed by learning outcomes and location of residence (negatively) (Table 3). The average variance inflation factor (VIF) is not significantly larger than 1 and tolerance is greater than 0.2, both measures suggested an absence of multicollinearity.

All interaction effects were insignificant ($p > 0.05$). Finally, a Durbin-Wu-Hausman test indicated no endogeneity problem, thus, improved ability of this study to make causal inferences (Angrist & Pischke, 2009; Papies et al., 2017).

Discussion

This study aims to identify salient determinants of business undergraduates' future preference for e-learning and discuss its implications. Household income and gender do not significantly predict future preference for e-learning. Nevertheless, the insignificant finding for gender augurs well for female undergraduates in view of the growing importance of computing in society and prevalence of working from home during and post this Covid-19 pandemic. The most significant (negative) predictor of future

preference for e-learning is disadvantages, followed by learning outcomes and location of residence (negative).

Table 3: Multiple regression

	Standardised coefficients	t	Sig.	Collinearity statistics	
				Tolerance	VIF
Infrastructure	.108	1.919	.056	.680	1.470
Training, support and resources	-.099	-1.739	.083	.657	1.522
Discipline	.081	1.241	.216	.504	1.984
Advantages	.099	1.363	.174	.406	2.462
Disadvantages	-.396	-7.599	.000	.785	1.275
Learning outcomes	.302	4.473	.000	.467	2.140
Household income dummy 1	-.010	-.151	.880	.442	2.263
Household income dummy 2	.005	.065	.948	.435	2.297
Location of residence dummy 1	-.179	-2.025	.044	.273	3.660
Location of residence dummy 2	-.190	-2.151	.032	.273	3.659
Gender dummy	.033	.699	.485	.955	1.048

Dependent variable: future preference for e-learning

Given that e-learning was abruptly adopted in response to the sudden interruption of educational processes caused by the Covid-19 pandemic, it is tenable that many undergraduates were mentally and technically unprepared for their first one hundred percent e-learning for all courses. Actual or perceived disadvantages of e-learning – which include lack of interaction with lecturers and peers, boredom, social isolation, feeling overloaded, confused, stressed, depressed, burnout, wanting to give up and drop out – can be surmounted with efforts from various stakeholders. Higher education institutions should organise regular communications campaigns to maintain interactions with undergraduates during this crisis. Under the new norm, teaching and learning units should have a new mission to assist undergraduates to overcome disadvantages of e-learning, quickly adapt to e-learning and achieve maximum effectiveness from e-learning. E-learning specialists should issue general guidelines about best practices for effective e-learning (Reimers & Schleicher, 2020) and operate a dedicated website for e-learning. At the beginning of each semester, lecturers should teach undergraduates how to overcome disadvantages associated with e-learning during a crisis. In addition, lecturers can adopt a human-centred approach (UNESCO, 2020d) by setting a specific time each week for social interactions with undergraduates, conduct synchronous classes and consultation to clarify any confusion, motivate undergraduates to persevere, understand and help undergraduates facing problems, such as boredom, stress, depression, burnout or the feeling of giving up. Student counsellors should proactively contact all undergraduates on a regular basis for social interaction, to understand their problems, to provide advice on how to cope with academic workload and how to manage physical and emotional well-being, to avoid undergraduates dropping out. If actual or perceived disadvantages of e-learning can be successfully surmounted by stakeholders, undergraduates will develop a more favourable attitude in adopting e-learning during the closure of campuses – despite initial involuntary adoption – and achieve better learning outcomes.

The second salient determinant of future preference for e-learning is achieving learning outcomes. The priority during a crisis is continuation of education. However, it appears that despite the sudden switch to e-learning, undergraduates surveyed in this study were able to achieve learning outcomes, hence, preferring e-learning in the future. Taken together (first and second salient determinants), it can be argued that undergraduates who can overcome the disadvantages of e-learning and achieve learning outcomes will prefer e-learning in the future. Stated differently, the undergraduates surveyed adapted to e-learning by overcoming disadvantages and achieving learning outcomes.

Compared to undergraduates residing in rural area, undergraduates residing in semi-urban and urban areas do not prefer e-learning in the future. These findings were contrary to extant literature and may be attributable to two factors specific to this study. Given that this study surveyed undergraduates, the impact of location may be less severe as compared to students in general (e.g., primary and secondary school students across different regions and countries). Furthermore, the majority of undergraduates surveyed reside in semi-urban and urban areas. It is plausible that due to the proximity of their residence to the campus, coupled with psychological factors of boredom and lack of social interactions resulting from e-learning, they preferred face-to-face learning.

There are three limitations related to this study which pave the way for future research. First, this survey was carried out in July 2020 when all courses were conducted using one hundred percent e-learning for the first time. With the passage of time, future replication studies may produce different results, given that undergraduates become accustomed to e-learning or lecturers improve their e-teaching pedagogy. Second, as literature on e-learning during the Covid-19 pandemic continues to evolve rapidly, some salient determinants may not be captured in this study. Third, findings are not generalisable to other contexts as responses were obtained from Malaysian undergraduates.

In sum, a lot of research is still needed in the immediate future to better comprehend salient determinants and consequences of e-learning during the Covid-19 pandemic and inform various stakeholders to prepare future undergraduates for effective e-learning. For example, have there been unexpected positive educational results from one hundred percent e-learning during the Covid-19 pandemic? What are ways to achieve better learning outcomes using e-learning in the future, especially during a crisis? What are cross-country similarities and differences in terms of determinants and consequences of e-learning during the Covid-19 pandemic?

Conclusion

E-learning is more than digitising teaching materials. Although e-learning is usually related to technological issues such as ICT equipment and Internet connections (i.e., "high tech"), this study highlights the importance of "high touch" to address the disadvantages of e-learning, which are mainly social and psychological. The insights generated will enable stakeholders to overcome barriers to e-learning and improve learning outcomes. Consequently, the roles of various stakeholders should evolve and expand to cope with

high touch challenges encountered by undergraduates in relation to e-learning during a crisis. Teaching and learning units should have e-learning specialists. Student counsellors should be proactive to reach out to all undergraduates regularly during higher education campus closures. Lecturers can function as counsellors during synchronous interactions with their students.

After more than one year of educational disruption caused by the Covid-19 pandemic, higher education should ideally move beyond ensuring continuity of education, to enhancement of e-learning outcomes. Achieving learning outcomes is crucial to e-learning during a crisis. In addition, undergraduates who have become accustomed to e-learning will demand more sophisticated and better e-learning pedagogy in the future, for greater learning efficacy.

At this juncture, the uncertainty surrounding the Covid-19 pandemic continues with new waves and new variants (e.g., delta and lambda variants). The World Health Organisation and United Nations have issued warnings that more lethal viruses will emerge in the future (Parkhill, 2020). The Covid-19 pandemic has had a profound impact on the delivery of education globally and spawned a rethinking of the delivery of education beyond the crisis. Education systems in place for the Covid-19 pandemic can serve as a foundation to deal with more severe crises in the future.

In conclusion, the Covid-19 pandemic serves as a "wake-up call" to build resiliency in the education delivery systems to deal with future unexpected crises. In this respect, e-learning or hybrid learning is a form of emergency preparedness.

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Appendix: Questionnaire

Part A

1. My level of study is: (1) undergraduate; (2) post graduate; (3) others
2. My major/specialisation is: (1) economics; (2) business; (3) others
3. My family's household income is (a household is defined as a person or group of related or unrelated persons who usually live together and make common provision for food and other living essentials): (1) up to RM2,900 per month; (2) between RM2,901 to RM6,500 per month; (3) more than RM6,501 per month
4. My home is located at: (1) rural area; (2) semi-urban area; (3) urban area
5. My gender: (1) male; (2) female
6. I used one hundred percent e-learning: (1) this semester; (2) previous semester; (3) never

Part B

Response scale: 1 = Strongly disagree; 2 = Disagree, 3 = Neutral; 4 = Agree; 5 = Strongly agree

1.1   I have access to a laptop, personal computer, tablet or smart phone for e-learning.
1.2   I have Internet access for e-learning.
1.3   The speed of Internet is satisfactory for my e-learning.
1.4   I am tech-savvy to quickly adapt to e-learning platform(s).
1.5   I can overcome technophobia of e-learning.

2.1   I attended online workshops to make the best out of e-learning.
2.2   I was taught e-learning tools and techniques.
2.3   I received guidance and assistance for e-learning.
2.4   I received technical support services for e-learning.
2.5   I have the necessary digital skills for e-learning.
2.6   I have sufficient e-learning resources.

3.1   I maintained good learning habits, including hours of self-learning before and during e-learning.
3.2   I have good learning strategies before and during e-learning.
3.3   I have self-direction, self-discipline and self-organization skills for e-learning.
3.4   I have good study skills for e-learning.
3.5   I am resilient to learn independently.
3.6   I am motivated for self-learning.

4.1   I think e-learning is an student-centric education model.
4.2   e-learning develops my autonomous (self-regulated) learning ability.
4.3   With e-learning, I take more responsibility for my learning.
4.4   e-learning is more flexible because there is no limitation in terms of time and space (24/7 learning).
4.5   e-learning increases my learning effectiveness (doing the right thing) and efficiency (doing things right).
4.6   e-learning enhances my higher-order thinking skills, such as questioning, creativity and problem solving.

5.1   I feel socially isolated using e-learning.
5.2   I feel lack of interaction with lecturers and other students using e-learning.
5.3   I feel overloaded using e-learning.
5.4   I am confused using e-learning.
5.5   I feel stressed using e-learning.
5.6   I give up e-learning.

6.1   Using e-learning, I am able to effectively learn the subject knowledge.
6.2   Using e-learning, I am able to effectively improve my practical skills.
6.3   Using e-learning, I am able to effectively grow my social skills and responsibilities.

6.4 Using e-learning, I am able to effectively acquire values, attitudes and professionalism.

6.5 Using e-learning, I am able to effectively develop my communication, leadership and team skills.

6.6 Using e-learning, I am able to effectively inculcate my problem solving and scientific skills.

6.7 Using e-learning, I am able to effectively advance my information management and lifelong learning skills.

6.8 Using e-learning, I am able to effectively strengthen my managerial and entrepreneurial skills.

7.1 I prefer e-learning in future semesters.

7.2 In future, if given a choice, I prefer one hundred percent e-learning.

7.3 For next semester, I favour one hundred percent traditional (classroom) learning over e-learning.

7.4 For future semesters, I am interested to continue one hundred percent e-learning.

7.5 I am happy to adopt e-learning for future semesters

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