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Original Research Article

Challenges of online and face-to-face learning and its relationship with learner's motivation among undergraduate students during the post-COVID era

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ABSTRACT

Background: Online and face-to-face learning challenges influence students' motivation. However, limited studies have yet been conducted to correlate students' motivation with online and face-to-face learning challenges, especially in Malaysia. This study examined the challenges faced by learners during face-to-face and online learning and its relationship with learners' motivation.
Methods: This cross-sectional- correlation study was conducted among year-3 to year-5 undergraduate students at the Universiti Malaysia Sarawak irrespective of gender and nationality. A total of 475 students' data were collected using a validated self-administered questionnaire. Collected data were analysed using IBM SPSS version 27.0. Pearson's moment correlation was used to examine the association between students' motivation and online and face-to-face learning. A p value of less than 0.05 was considered statistically significant.
Results: Technological challenge was weakly positively correlated with age ($p<0.05$), gender ($p<0.05$) and amotivation ($p<0.01$). However, no statistically significant correlation was found with extrinsic, intrinsic motivation and CGPA ($p>0.05$). Among the domains of challenges, the technological challenges were strongly positively correlated with the individual ($p<0.001$), domestic ($p<0.001$), institutional ($p<0.001$) and community ($p<0.001$) challenges. This study found that extrinsic motivation was positively correlated with intrinsic motivation, but both extrinsic and intrinsic motivation were negatively correlated with amotivation. All domains of challenges were positively correlated with amotivation of students.
Conclusions: Universities could organise strategies to improve the current teaching and learning methods to boost students' extrinsic and intrinsic motivation.

Keywords: Challenges, Intrinsic motivation, Extrinsic motivation, Amotivation, Online and face-to-face learning

INTRODUCTION

Motivation is one of the key elements that students need to push to do well in their studies. According to Kusurkar et al relative autonomous motivation affects students' academic performance.[1] The most basic distinction between motivation is extrinsic motivation and intrinsic motivation.[2] Challenges that may affect students' extrinsic and intrinsic motivation need to be identified to help improve students' performance in their studies. Amotivation, or lack of motivation, makes it difficult for students to achieve fruitful learning, and they do not take most out of their learning.[3] The COVID-19 outbreak has had a tremendous impact on the world. Governments worldwide temporarily closing educational institutions to stop the coronavirus's spread has severely disrupted the educational system. The advent of online learning, which

has enabled students to continue their education, is sparked by the cancellation of in-person sessions and their relocation online. The abrupt shift from in-person to online learning has presented many difficulties for students, lecturers, administrators, and educational leaders.[4] There are a lot of challenges faced by undergraduate students during both face-to-face and online learning in the post-COVID-19 era. The challenges faced by undergraduate students during online learning in the post-COVID-19 era are technological (internet connection and problems with gadgets), social (diminished social aspect), unconducive learning environment and the inability of students to keep up with their studies. It is undeniable that students also experience problems during face-to-face learning. The challenges include schedule rigidity, financial constraints, study and housing expenses, and the availability of learning resources. The COVID-19 pandemic has had varying effects, such as social isolation, financial strain, loss of some close relatives due to SARS-CoV-19 infection, and the unpredictability of the future, contributing to anxiety and sadness.[5]

The COVID-19 pandemic caused the destabilisation of all educational activities, academic research and professional development. It also severely affecting the educational assessment system, and reduced employment opportunities.[6] One positive impact of COVID-19 on higher education is there were successful entrepreneurship with phenomenal growth in online workshops, webinars, and learning sessions, and many students participated in the short-duration certification programmes.[7,8] However, students' learning was negatively impacted worldwide due to limited resources and unstable teaching and learning activities during the COVID-19 pandemic.[9] Students faced limitations such as unstable Internet, lack of technical facilities, inadequate resources, expensive Internet and so on.[10,11] With a shortest time and a minimal training and preparation, academics learned to use the learning management system and provided online classes, in Malaysia.[12,13] On other side, the students' access to online education and performance suffers with disparity in Internet infrastructure between East and West Malaysia.[14]

Challenges of online learning include inadequate online learning infrastructures, and inadequate internet access.[15] Online learning warranted students' commitment and discipline, particularly for the vulnerable who require engagement to enhance their social skills.[16] Students do not have the flexibility to connect with lecturers and peers.[17] During face-to-face learning, students face financial constraints and schedule rigidity as students need to attend class physically [18] in addition to finances for accommodation and living needs.[19] Some students have difficulty adapting to an unfamiliar environment during face-to-face learning.[20,21]. Another challenge is the inability to follow face-to-face classes with the non-availability of personalized feedback and support from peer group.[22] Current study identifies the differences between face-to-face and online learning challenges. The study could provide information on learners' preferred study modes by identifying the different challenges of face-to-face and online learning. Therefore, this study would help educational institutions decide on a better mode of study to suit their learners. Educational institutions would then provide a more efficient teaching and learning system that can minimise students' challenges during their study process, focus well on learning, and absorb as much knowledge as possible. This study aims to determine the learner's level of motivation and the challenges faced during face-to-face and online learning, and to determine the relationship between students' motivation and face-to-face and online learning challenges.

METHODS

Study population, sample size and sampling procedure

The study population was year-3 and above undergraduate students of UNIMAS, regardless of gender, nationality, and age. The dependent and independent variables were considered continuous, i.e., perceived student motivation as dependent and perceived challenges of face-to-face learning and online learning as independent variables. It was expected to test the variable using the correlation coefficient between the dependent and independent variables. The total sample size was calculated based on the requirement to determine whether a correlation coefficient differs from zero. The following formula was used to obtain the desired sample size: [23]

$$N = [(z\alpha + z\beta) \div C]2 + 3$$

Where, α=Threshold probability to reject the null hypothesis. Type I error rate. The standard normal deviate for α=Zα=1.96, β= Probability of failing to reject the null hypothesis under the alternative hypothesis. Type II error rate. The standard normal deviate for β=Zβ=0.842, C=0.151 and r=The expected correlation coefficient. Considered 0.15 here. The initial sample size was 347 people. It was expected that approximately 20% of the students refuse to participate in the study. After adjusting for non-response, the sample size was increased to 417. A non-probability method was used for the sampling procedure.

Data collection instruments and procedure/variable measure

Data was collected using an online questionnaire on Google Form which was generated in English and Malay. The questionnaire consisted of 4 sections. Part A: Perceived motivation: The open-source student's motivation scale developed by Smith and Onencan was adapted.[24] The questionnaire measures intrinsic, extrinsic, and amotivation. The item questions were 7-points Likert's scale ranging from strongly disagree (1) to strongly agree (7). Part B: Perceived challenges of online learning: To

assess undergraduate students' perceived challenges of online learning, questionnaires were adapted from similar studies.[25,26] The barriers were classified into technological, individual, domestic, institutional and community domains. The answer options were the same as Part A (Likert's scale). Part C: Perceived challenges of face-to-face learning: A questionnaire like those in Part B was developed to assess the barriers of face-to-face learning during COVID-19. Part D: Demographic and personal characteristics: Demographic characteristics such as age, gender, year of study and so on were collected. Data collection was carried out online via sending questionnaire to respondents through email or WhatsApp. Respondents were also approached physically. Responses were collected and organised by Google Form. A copy of the response was generated and sent to the respondents' email.

Data entry and analysis

Data from respondents were automatically organised in Microsoft Excel after they had completed the questionnaire. The information provided was assessed and verified. Following validation, the descriptive analysis was presented in a frequency table followed by bivariate analysis using an independent sample t-test. A Pearson's moment correlation was done to determine the association between challenges of university learning, motivation and selected characteristics of the students. Three domains of motivation and five domains of challenges were standardised into a percentage score for easy interpretation. Each domain of online and face-to-face challenges was combined into five: technological, individual, domestic, institutional and community. The nominal variable, such as gender was dummy coded into 0 and 1 as female and male, respectively. Exploratory data analysis revealed no substantial deviation of Skewness and Kurtosis. Listwise deletion was done for missing values. So, a total of 402 complete data were analysed for the correlation test. Data analysis was done by IBM SPSS version 27.[27] A p value of 0.05 was considered statistically significant. Finally, where applicable, the results were presented in tables. The American Psychological Association style was followed for citation, both in-text and references.[28]

Ethical issues

Voluntary participation was requested with respect to the role of students in this report. During data collection, an online questionnaire survey was provided, and on the first page of the online form, all the guidelines and details about this study were explicitly mentioned to reduce misconceptions. A box was provided for respondents to check to show their acknowledgement. Consent was undertaken before responding to the questionnaires. They were also notified that their engagement throughout this study was voluntary, and their information and identification was kept confidential.

RESULTS

A total of 475 data were analysed with a response rate of 95.8%. The students' socio-demographic characteristics included in this study were age, year of study, gender, and CGPA score of the latest semester.

Table 1: Characteristics of the students (n=475).

Characteristics	N	%	Mean±SD
Age (years)			
19-20	25	5.3	22.59±1.2
21-22	172	36.2	
23-24	252	53.1	
25-26	26	5.5	
Year of study			
Year 3	418	88.0	-
Year 4	44	9.3	
Year 5	13	2.7	
Gender			
Male	131	27.6	-
Female	344	72.4	

Characteristics of the students

The mean age of the student was 22.59 years, with a standard deviation of 1.2 years. The highest percentage of the students (53.1%) were aged 23-24 years, followed by 21-22 years (36.2%). The maximum age of the students was 26 years. The majority (88.0%) of the students were in year 3, followed by year 4 (9.3%) and year 5 (2.7%). The majority of the students were female (72.4%). The summary statistics of motivation for university learning is depicted in (Table 2). The highest mean percentage score was extrinsic motivation, with a mean (SD) was 84.20(12.5), followed by intrinsic motivation (Mean= 82.92, SD=13.9). Lastly, the lowest score was intrinsic motivation, with a mean (SD) was 44.75 (25.0). Data showed a normal distribution having no potential outliers. The Skewness and Kurtosis were within an acceptable range from -1 to +1.

Challenges to online and face-to-face learning

The highest mean for average challenges was individual challenges (mean=60.19, SD=19.0), followed by institutional challenges (mean=60.13, SD=19.0), while the lowest average score was technological challenges (mean=54.43, SD=18.9). The independent sample t-test indicated that the online learning challenges appeared to be highest in all domains compared to face-to-face learning ($p<0.001$). Data analysis revealed that the difference of challenges was highest in institutional challenges for online learning during pandemic situations, followed by personal and community challenges. The domain-wise analysis found that the highest mean score for online learning was institutional challenges (mean=68.33, SD=20.3), while the face-to-face challenges were domestic challenges (mean=53.80, SD=22.4). The lowest mean for

online and face-to-face challenges was technological, with mean (SD) scores of 59.15 (19.6) and 49.76 (22.1), respectively.

Correlation matrix of student's motivation and learning challenges

The analysis found that extrinsic motivation was strongly correlated with intrinsic motivation (r =0.704, p<0.01), however, it negatively correlated with amotivation (r =-0.126, p<0.01). Amotivation also negatively correlated with intrinsic motivation (r =0.177, p<0.01). The extrinsic motivation weakly negatively correlated with age of the students (r=0.105, p<0.05). But it was not correlated with gender (p>0.05) and CGPA (p>0.05). There was similar negative correlation between intrinsic motivation and age of the students (r=-0.112, p<0.05). In terms of amotivation, it was positively correlated with age (0.109, p<0.05) and gender (r=0.147, p<0.05), but negatively correlated with CGPA (r=-0.134, p<0.05), extrinsic motivation (r=-0.129, p<0.05) and intrinsic motivation (r= -0.177, p<0.05).

Analysis of each domain of challenges indicated that technological challenge was weakly positively correlated with age (r=0.098, p<0.05), gender (r=0.116, p<0.05) and amotivation (r=-0.519, p<0.01). However, no statistically significant correlation was found with extrinsic, intrinsic motivation and CGPA (p>.05). Among the domains of challenges, the technological challenges were strongly positively correlated with the individual (r=0.793, p<0.001), domestic (r=0.753, p<0.001), institutional (r=0.788, p<0.001) and community (r=0.760, p<0.001) challenges.

Table 2: Summary statistics of motivation of university learning (n=462).

Motivation	Mean	Median	SD	Skewness	Kurtosis	Min	Max
Extrinsic motivation	84.20	85.71	12.5	-0.84	0.66	31.43	100.00
Intrinsic motivation	82.95	85.71	13.9	-0.62	-0.13	31.63	100.00
Amotivation	44.75	40.82	25.0	0.64	-0.62	14.29	100.00

Table 3: Comparison of online and face-to-face learning challenges.

Challenges	Average challenges (N=402)		Online (N=462)		Face-to-face (N=409)		Difference	P value
	Mean	SD	Mean	SD	Mean	SD		
Technological	54.43	18.9	59.15	19.6	49.76	22.1	9.39	<0.001
Individual	60.19	19.0	66.94	20.5	53.80	22.4	13.14	<0.001
Domestic	56.94	21.2	61.04	23.7	53.40	23.4	7.64	<0.001
Institutional	60.13	19.0	68.33	20.3	52.24	23.8	16.09	<0.001
Community	58.21	19.4	64.97	19.8	51.35	23.4	13.62	<0.001

P value reached from independent sample t-test.

Table 4: Correlation matrix of student's motivation and learning challenges (n=402).

Parameters	1	2	3	4	5	6	7	8	9	10	11
Characteristics											
Age	-	-	-	-	-	-	-	-	-	-	-
Gender	0.126*	-	-	-	-	-	-	-	-	-	-
CGPA	-0.109*	0.073	-	-	-	-	-	-	-	-	-
Motivation											
Extrinsic	-0.105*	-0.082	0.024	-	-	-	-	-	-	-	-
Intrinsic	-0.112*	-0.059	0.024	0.704**	-	-	-	-	-	-	-
Amotivation	0.109*	0.147**	-0.134**	-0.129**	-0.177**	-	-	-	-	-	-
Challenges											
Technology	0.098*	0.116*	-0.027	-0.071	-0.029	0.519**	-	-	-	-	-
Individual	0.043	0.028	-0.094	-0.080	-0.092	0.473**	0.793***	-	-	-	-
Domestic	0.011	-0.009	-0.054	-0.050	-0.020	0.464**	0.753***	0.813**	-	-	-
Institutional	0.079	0.078	-0.063	-0.092	-0.054	0.457**	0.788***	0.856**	0.809**	-	-
Community	0.095	0.000	-0.098*	-0.072	-0.047	0.440**	0.760***	0.792**	0.815**	0.859**	-

P value reached from the Pearson moment correlation test, *p<0.05, **p<0.01, ***p<0.001.

The individual challenge was weakly positively correlated with CGPA score (r=0.473, p<0.01) and strongly correlated among the domains of challenges. However, no statistically significant correlation was found with age, gender, CGPA, extrinsic and intrinsic motivation (p>0.05). The domestic challenge was positively correlated with

amotivation (r =0.464, p<0.01) and with technological (r=0.793, p<0.001), individual (r=0.813, p<0.001), institutional (r=0.809, p<0.001) and community (r=0.815, p<0.001) challenges. Similarly, institutional challenges were positively correlated with amotivation (r=0.457, p<0.01) and with technological (r= 0.788, p<0.001), individual (r=0.856, p<0.001), institutional (r=0.809, p<0.001) and community (r=0.859, p<0.001) challenges. Finally, the community challenge showed a similar pattern of correlation with amotivation (r=0.440, p<0.01) and with technological (r=0.760, p<.001), individual (r =0.792, p<0.001) and institutional (r= 0.859, p<0.001) challenge (Table 4).

DISCUSSION

It was found that with regards to learning motivation, extrinsic motivation has the highest mean score with 6.29, indicating that student's study to obtain knowledge from university education to prepare themselves for their future careers. Extrinsic motivation could contribute to well-being and performance of any. When it mixed with values then the person identifies or is fully integrated within the person, even though the person was not intrinsically motivated.[2] Institutional challenges were the highest mean of online learning barriers because online learning from home caused less interaction among course mates. This statement is consistent with Gillett-Swan [29] and Daniel.[30] The researchers stated that online or distance learning amid the pandemic has created stress, frustration, and isolation for students. This lost the opportunity for peer interactions. Individual challenges to face-to-face learning have the highest mean, as evidenced by a study that reveals that individual challenges may be linked to the lack of organisational and technical support, and software and hardware capabilities.[31,32]

Our analysis found that extrinsic motivation was strongly correlated with intrinsic motivation but negatively correlated with amotivation. Intrinsic motivation is also negatively correlated with amotivation. This shows that extrinsic motivation is intertwined with intrinsic motivation. If any of them is affected, the other is affected too. There are four motivational strategies teachers can use to stimulate interest in learning: supplying extrinsic motivation and capitalising on existing intrinsic motivation.[33] According to the results, all domains of challenges are strongly positively correlated. Challenges of all domains are also found to be positively correlated to amotivation. This shows that challenges faced during learning contribute to amotivation of students. Therefore, to overcome amotivation among students, the university should look into the most significant challenges in different learning modes and develop strategies to aid students in overcoming their challenges. Strategies to help students to boost extrinsic and intrinsic motivation would also give students better abilities to overcome the challenges faced since all domains of challenges are negatively correlated with extrinsic and intrinsic motivation even though the correlation is not statistically significant. Leduc-Cummings et al argued that the want-to motivation, have-to motivation, and trait of self-control are related to how individuals set up and perceive obstacles in their environment.[34]

Limitations

There were several limitations encountered in this study. Firstly, only year-3 and above students experienced online and face-to-face learning during this study. This study could not observe findings in younger undergraduate students who just started their university studies compared to older students who were more advanced in their studies. Secondly, this research did not collect data regarding the income of the respondent's family, which might hold some importance in certain challenges, such as challenges in the technological domain where a higher family income would enable the student to afford better gadgets and internet plans for their learning process. Thirdly, the data was collected from undergraduate students in one university. Thus, this research is only applicable to undergraduates. It does not represent other public or private universities or the general population.

CONCLUSION

Most of the respondents are female students, while most are year-3 students. This study found that extrinsic motivation was the highest among the respondents and was positively correlated with intrinsic motivation. Extrinsic and intrinsic motivation are negatively correlated with amotivation. All domains of challenges are positively correlated with amotivation of students. The most significant domain of challenges for online learning was institutional challenges, whereas, for physical learning, the most significant were individual challenges. The university should organise strategies to boost students' extrinsic and intrinsic motivation and look into the appropriate subjects to be taught online or physically.

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