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DEPRESSION, ANXIETY, AND STRESS RELATED TO ONLINE DISTANCE LEARNING
(ODL) DOES NOT INFLUENCE ACADEMIC PERFORMANCE: FINDINGS FROM AN
ONLINE SURVEY AMONG UNDERGRADUATES IN MALAYSIA

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Abstract

While there has been widespread reporting of a negative impact on students' mental health and academic performance because of ineffective online learning systems during COVID, Malaysian data remained scarce. In this online survey, the correlation between online distance learning (ODL), mental health status and academic performance of Malaysian undergraduates during COVID-19 pandemic were examined. Academic performance was measured using self-reported questionnaires in which respondents were also asked to state their cumulative grade points average (CGPA). Reduction in CGPA was considered as a decline in academic performance. Data on ODL readiness and satisfaction as well as mental health status were obtained. Among 256 respondents of this study with mean age (SD) 22.10 (1.05), a total of 27.3% reported to have decline in CGPA during Covid-19 pandemic. Female undergraduates were more likely to perform better as more had maintained or improved their academic performance. Self-directed learning, learning control, learning motivation, and satisfaction

were significantly associated with academic performance ($p < 0.05$) but not computer-internet self-efficacy and online communication self-efficacy. There were also significant negative correlations between ODL and Mental Health Status. However, mental health status does not appear to be significantly associated with decline in academic performance. Our study findings suggest that ODL preference and satisfaction have an impact on the academic performance. While, mental health status related to ODL was not associated with academic performance. Students getting used to the shift into remote learning over time may explain why mental health status had no effect on their academic performance. Future studies should focus on the know how to deliver effective ODL techniques to improve undergraduates' satisfaction with the hope to further improve their academic performance.

Keywords: Academic performance, COVID-19, Malaysia, Mental health status, Online distance learning, Undergraduates.

1.0 INTRODUCTION

Covid-19 pandemic have an impact on the world's socio-economic situation, forcing most activities to be conducted on online platforms. Similarly, education was delivered via online distance learning (ODL). ODL can be defined as some form of instruction occurring between two parties (lecturers and students) at different times or places, by using a variety of instruction methods such as virtual learning, web-based learning, and e-learning (Moore et al. 2011 & Conrad 2006). Complete ODL may affect lecturers and university students negatively due to the sudden changes in teaching and learning modes, an uncondusive learning environment, and unsatisfactory internet access that may lead to mental health status and academic performance changes. The closure of education institutions, led to fear among university students about taking longer time to graduate (Sahu et. al. 2020).

In a cross-sectional study by Mahdy, (2020), it was found that in 1,392 participants from 92 different countries, 96.7% ($n = 1,346$) of them believed that COVID-19 pandemic lockdowns affected their academic performance with varying degrees. According to Gonzalez et al. (2020), at the end of face-to-face learning and at the start of confinement, students' scores were significantly higher than in the previous academic years. In contrary, no significant difference was shown in students' grades between traditional learning and ODL of the same course taught during the semester prior and COVID-19 lockdown respectively (El Said 2021). While, a significant impact on students' mental health due to ineffective online learning systems was reported among 400 college students in Bangladesh (Hasan et al. 2020). In another study, about 68% of students were worried about their studies and lengthening of their

academic year (Acharya et. al. 2020). In addition, more than half of them were dissatisfied with ODL and preferred offline classes (Acharya et. al. 2020). Notably, 42.4% of the students were having increase in psychological distress during the lockdown of Covid-19 outbreak (Acharya et. al. 2020).

In contrast, first year university students' depression levels in year 2020 were found to be lower compared to year 2019 (Horita et al. 2020). The authors deduced the main cause of this result to be the process of students being able to adapt to a new and unfamiliar mode of learning (Horita et al. 2020). Online education during Covid-19 pandemic is believed to have a negative impact on the learning of the students (Shakeel et al., 2020) probably due to higher focus on delivery of the education.

Mental health status of students, ODL and their academic performance may be interrelated with each factor affecting the other. It is possible for mental health status of students and ODL to affect academic performance directly. In addition, ODL might affect academic performance indirectly by affecting students' mental health. Therefore, mental health status of the students may be the mediating factor in the association between ODL and academic performance, but has yet to be demonstrated. It is rather unclear whether academic performance among undergraduates during COVID-19 pandemic was affected by ODL and their mental health status. Therefore, the objective of our study was to determine the correlation between online distance learning, mental health status, and academic performance of Malaysian undergraduates during COVID-19 pandemic.

2.0 METHODS

2.1 Study Participants

Convenience sampling method was used in this online survey. The inclusion criteria were undergraduates aged 19 to 25 years and currently registered in Malaysian universities. For the exclusion criteria, our study excluded undergraduates who were not fully implementing ODL and had no experience in face-to-face teaching and learning prior to Covid-19 period, particularly the 1st years.

2.2 Data Collection

An online survey via google form was conducted within 20 days from 5th of May until 25th of May 2021; duration after the recovery movement control order (RMCO) and before the implementation of national recovery plan. Link to the google form was disseminated via recruitment poster posted on social media such as facebook, WhatsApp, and Instagram.

Participants were asked to complete online questionnaire comprising of four sections, which included their demographic data, perceptions on readiness, challenges and satisfaction towards ODL, their mental health status and academic performance.

Demographic Data

Participants' demographic data consisting of age, gender, race, marital status, state they live in, and student status (household income, internet accessibility, clinical/non clinical student, and electronic device used in ODL) was obtained.

Perceptions on Readiness, Challenges and Satisfaction towards ODL

Online Learning Readiness Scale (OLRS) was used to measure students' perception of readiness towards ODL. OLRS, developed by Hung et al., (2010) includes five dimensions that assesses the following factors: a) self-directed learning, b) motivation for learning, c) computer/internet self-efficacy, d) learner control, and e) online communication self-efficacy. This tool has been reported to have acceptable composite reliability and convergent validity (Hung et al, 2010) and have been widely used to measure students' perceptions on readiness, challenges and satisfaction towards ODL.

Mental Health Status (DASS-21)

Depression, anxiety, and stress levels of the undergraduates were assessed using the Depression Anxiety Stress Scale (DASS-21). DASS-21 has good reliability and validity to screen for depression, anxiety and stress among undergraduates (Osman et al, 2012). DASS-21 consists of 3 subscales which are Depression (DASS-21-D), Anxiety (DASS-21-A) and Stress (DASS-21-S). Each subscale consists of 7 items. Scores ranges from 0 to 21 are generated from each subscale. The summed numbers in each sub-scale are then multiplied by 2 (Lovibond, 1995)

Academic performance

Academic cumulative grade points average (CGPA) was used to measure academic performance change between academic performance in previous semesters with physical classes and after ODL was implemented. Undergraduates were requested for their CGPA score before and after the pandemic. We classified a decline in CGPA if participants stated their CGPA declined compared to their CGPA before and selecting 'no' in the question whether their academic performance has improved during ODL.

2.2 Statistical Analysis

Descriptive analysis was used to describe traits of the respondents. Next, Pearson Correlation was conducted to test the association between ODL satisfaction with mental health status. Multiple logistic regression analysis was conducted to evaluate the influence of mental health on the associations between ODL satisfaction and academic performance. Significant level was set as p value <0.05.

3.0 RESULTS

Among 256 respondents from 21 institutions (11 public and 10 private universities), 6 with mean age (SD) 22.10 (1.05), 27.3% reported to have declined in CGPA during Covid-19 pandemic. Majority of the respondents were females (75.8%) and from Malay ethnic group (58.6%) while the rest were from Chinese (27.7%), Indian (2.7%), and other (10.9%) ethnic groups. Most of the respondents were from public universities (92.9%) and only 7.1% were from private universities. About 21%, 60% and 19% were from year 2, 3 and 4 of their studies respectively. Undergraduates under the B40 household income group made up 44.9% of the respondents while the M40 and T20 groups were 33.6% and 9.4% respectively. Most of the undergraduates were living in Selangor (16.8%), Johor (16.0%), Pulau Pinang (11.7%) while the rest were from other states in Malaysia. Females were found to be significantly more likely to perform better than their male counterparts, as more females had maintained or improved in their academic performance. The internet accessibility median score was 4.0 (1 - 5) at both locations, homes and universities. Lastly, most of the respondents were equipped either with a handphone, laptop, tablet or both.

Table 1 : Respondents' Characteristics

Characteristic	Δ in Academic performance (CGPA in During-Pre COVID-19 pandemic)		
	Decline In CGPA (N=70), 27.3%	No Changes or Improve in CGPA (N=186), 72.7%	p-Value
Age (years old), Mean (SD)	21.91 (1.06)	21.87 (1.26)	0.218
Gender			0.048
Male	23 (32.9)	39 (21.0)	
Female	47 (67.1)	147 (79.0)	
Ethnicity			0.634
Malay	37 (52.9)	113 (60.8)	
Chinese	21 (30.0)	51 (28)	
Indian	2 (2.4)	3 (1.6)	

Others	12 (14.6)	17 (9.3)	
University			0.829
Public	76 (92.7)	170 (93.4)	
Private	6 (7.3)	12 (6.6)	
Study Program			0.953
Clinical	27 (38.6)	71 (38.2)	
Non-clinical	43 (61.4)	115 (61.8)	
Year of study			0.074
Year 2	15 (21.4)	40 (21.5)	
Year 3	42 (60.0)	130 (69.9)	
Year 4	13 (18.6)	16 (8.6)	
Household income			0.721
B40	29 (46.8)	86 (52.8)	
M40	26 (41.9)	60 (36.8)	
T20	7 (11.3)	17 (10.4)	
State			0.669
Selangor	12 (17.1)	31 (16.7)	
W. P KL	5 (7.1)	14 (7.5)	
Melaka	1 (1.4)	4 (2.2)	
Johor	11 (15.7)	30 (16.1)	
Negeri Sembilan	0 (0.0)	6 (3.2)	
Pahang	3 (4.3)	9 (4.8)	
Terengganu	2 (2.9)	7 (3.8)	
Kelantan	5 (7.1)	8 (4.3)	
Kedah	3 (4.3)	11 (5.9)	
Perak	6 (8.6)	21 (11.3)	
Pulau Pinang	9 (12.9)	21 (11.3)	
Sabah	7 (10.0)	12 (6.5)	
Sarawak	4 (5.7)	12 (6.5)	
WP Putrajaya	2 (2.9)	0 (0.0)	
Internet accessibility			
At Home	4 (4-5)	4 (3-5)	0.583
At University	4 (3-4)	4 (3-4)	0.538
Electronic Device			
Laptop	68 (97.1)	182 (97.8)	0.666
Handphone	59 (84.3)	162 (87.1)	0.546

Tablet 6 (8.6) 32 (17.2) 0.083

Bold values denote statistical significance at the $p < 0.05$ level.

Table 2 shows a negative correlation between ODL and mental health status. This indicates that undergraduates with higher satisfaction, computer-internet self-efficacy, self-directed learning, and learner control, learning motivation, and online communication self-efficacy, have lower depression, anxiety and stress scores.

Table 2: Correlation Between ODL And Mental Health Status (Dass-21 Score)

Correlation	Depression score	Anxiety score	Stress score
Satisfaction	-0.371**	-0.179**	-0.136**
Computer Internet Self Efficacy	-0.148*	-0.148*	-0.144**
Self Directed Learning	-0.384**	-0.227**	-0.272**
Learner Control	-0.367**	-0.225**	-0.235**
Learning Motivation	-0.419**	-0.252**	-0.257**
Online Communication Self Efficacy	-0.259**	-0.247**	-0.199**

** denote statistical significance at the $p < 0.01$ level.

Table 3 depicts the association between the ODL satisfaction and mental health status on academic performance. We found that self-directed learning with OR (95% CI) of 0.63 (0.43-0.91), p -value=0.015, learner control, OR (95% CI) 0.67 (0.48-0.94), p -value=0.020, learning motivation, OR (95% CI) 0.64 (0.44-0.93), p -value=0.025, and satisfaction, OR (95% CI) 0.43 (0.30-0.61), p -value= <0.001 were significantly associated with academic performance. Meanwhile the other two were not associated with academic performance; computer-internet self-efficacy scores and online communication self-efficacy. The association between mental health status and academic performance was not significant.

Table 3: Association Of ODL Readiness And Satisfaction And Mental Health Status On Academic Performance

	DECLINE IN CGPA, ODDS RATIO, p-VALUE OR (95 % CI)	
ORLS domains		
Computer internet self-efficacy	0.76 (0.51-1.13)	0.172
Self-directed learning	0.63 (0.43-0.91)	0.015

Learner Control	0.64 (0.44 -0.93)	0.020
Learning Motivation	0.68 (0.48-0.95)	0.025
Online Communication self-efficacy	1.00 (0.72-1.38)	0.998
Satisfaction	0.43 (0.30-0.61)	<0.001
Mental Health status (DASS-21)		
Depression score	1.00 (0.98-1.03)	0.803
Anxiety score	0.99 (0.97-1.02)	0.652
Stress score	0.99 (0.97-1.02)	0.578

Bold values denote statistical significance at the $p < 0.05$ level.

Table 4 depicts the multiple logistic regression on the associations between ODL satisfaction, mental health and academic performance. We found that self-directed learning, learner control, learning motivation, satisfaction remained significantly associated with academic performance even after the adjustment of demographic differences and further adjustments on mental health status indicating that mental health status has no role in the association between ODL and academic performance.

Table 4: Multiple Logistic Regression On The Associations Between ODL Readiness And Satisfaction, Mental Health And Academic Performance

	Decline in CGPA, Odds ratio, OR (95 % CI)							
	Adjusted with demographic differences*	Adjusted with demographic differences*+	Adjusted with demographic differences*+	Adjusted with demographic differences*+	Adjusted with demographic differences*+	Adjusted with demographic differences*+	Adjusted with demographic differences*+	Adjusted with demographic differences*+
		Depression	Anxiety	Stress				
Self-directed learning	0.55 (0.36-0.84)	0.52 (0.33-0.83)	0.54 (0.35-0.83)	0.50 (0.32-0.79)				
Learner Control	0.56 (0.36-0.86)	0.54 (0.34-0.85)	0.55 (0.35-0.84)	0.52 (0.33-0.82)				
Learning Motivation	0.54 (0.36-0.79)	0.50 (0.32-0.76)	0.52 (0.35-0.78)	0.49 (0.32-0.74)				
Satisfaction	0.40 (0.26-0.61)	0.38 (0.24-0.59)	0.40 (0.26-0.61)	0.39 (0.25-0.59)				

Notes: *Adjusted for age, gender, ethnicity & household income, Bold values denote statistical significance at the $p < 0.05$ level.

4.0 DISCUSSION

This study highlighted that, undergraduates' satisfaction with ODL, learning motivation, self-directed learning, and learner control was associated with their academic performance during Covid-19 pandemic. While there is a significant negative correlation between ODL and mental

health status, our study has revealed that mental health status among undergraduates does not have a significant relationship with their academic performance.

Our study results are in line with the findings from previous studies that have been done to investigate the effects of ODL on mental health during Covid-19 pandemic (Lischer et al. 2021, Bolatov et al. 2020, Irawan et al. 2020). Even though, literature have shown contrast results on the effects of ODL on students' mental health, mostly have pointed out that the students are coping well and their mental health status improved in the transition from traditional learning to ODL (Bolatov et al, 2021). However, the results from the study by Irawan et al. (2020) are equally of concern. Students were reported to be getting bored after 2 months of ODL and experiencing mood changes due to too many assignments and they considered this as ineffective (Irawan et al. 2020). Although the sample size in the study by Irawan et al. (2020) is small (N=140), the results suggest that there may be difference in the mental health of undergraduates in the different phases of Covid-19 pandemic restrictions. Further studies in the different phases of Covid-19 pandemic restrictions and the long-term effects or changes in undergraduates' mental health with the implementation of ODL will be beneficial.

However, many other factors could be influencing or mediating the effects of undergraduates' mental health and studies during Covid-19 pandemic restrictions. For example, Indonesian undergraduates from lower income families, experienced anxiety when having to buy internet quotas in order to keep up with their online classes (Irawan, Dwisona, and Lestari 2020). In addition, Oducado and Estoque (2021) reported that nursing students found online learning during the Covid-19 pandemic to be stressful, with some even reporting it to be very stressful, resulting in reports of fair to poor academic performance with moderate to low satisfaction. Similarly, undergraduates who require clinical practices have been found to have lower satisfaction towards online learning (Oducado and Estoque 2021; Wang et al. 2020). Undergraduates who are unprepared and are slow to adapt to the new online learning system would also experience a negative impact on their mental health status and towards ODL satisfaction (Patricia Aguilera-Hermida 2020; Hamdan et al. 2021).

In our study on the effects of mental health and academic performance, a contradicting finding to the past studies was obtained. Findings from the past studies (Bas 2020, Bostani et al., 2014) have shown that mental health has a positive relationship with academic performance and similar results were expected to be obtained in our study. However, our study results have shown that mental health status has no effect on undergraduates' academic performance in the ODL mode in the time of Covid-19 pandemic. As remarked by Bostani et

al. in 2014, students' academic performance may be affected by other factors and their interactional effects as well. We believe that other factors, for instance undergraduates' prior experience and readiness with online learning (Ranganathan et al. 2021), universities' readiness to adopt to remote learning and the use of alternative assessments for academic performance could be some of the reasons for our present findings.

Moreover, a previous study among Iranian clinical college students has shown that mental health status did not have a significant role on ODL and their academic performance (Bolotov A. K. et al.2021). Notably, there were lower scores for stress, anxiety, and depression, but increased in colleague-related burnout after the transition to online learning methods while maintaining academic performance (Bolotov A.K et al. 2021).

In our study, convenience sampling method was used to recruit participants and the use of questionnaires, which can be subjected to bias, are some of the notable limitations. This method lacks sampling accuracy and is without setting the number of undergraduates from each university based on the proportion to the size of the respective university. This is due to the non-probability method being a technique in which samples are selected based on the subjective judgement of the researcher, rather than random selection. Other than that, there could have been risk of recall bias in answering the self-reported questionnaire regarding their CGPA improvement.

5.0 CONCLUSION

There is an association between ODL and academic performance among undergraduates during the Covid-19 pandemic, however mental health status does not play any role. Students getting used to the shift into remote learning over time may explain why mental health status had no effect on their academic performance. There is however a call for the education institutions' stakeholders to recognize undergraduates' satisfaction with ODL that could lead to better academic performance. Future studies should focus on the know how to deliver effective ODL techniques to improve undergraduates' satisfaction with the hope to further improve their academic performance.

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