

Asynchronous Learning Attitudes and Mental Health Status Among Math Majors

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Abstract: The COVID-19 pandemic compelled more than a billion students worldwide to pursue their education online. Asynchronous learning is used by a variety of academic student groups that are unable to enter formal education programs due to the effects of the COVID-19 pandemic. Because of this, many university students experience common mental health problems like depression, anxiety, and stress. If these problems are serious enough, students may experience impairment, which prevents them from realizing their full academic and professional potential. Thus, the study aims to assess the students' attitudes toward asynchronous learning and their mental health status and identify the relationships and factors affecting their learning attitudes. A cross-sectional research design examined 106 math majors at Eastern Visayas State University, Ormoc City Campus, Ormoc City, Philippines. The TeLRA and DASS-21 scales were the instruments used in the study. The researchers carried out the study using an online survey utilizing Google Forms. The descriptive statistics use frequency counts, percentages, and the chi-square test and regression analysis for inferential statistics. Analysis of the data used SPSS version 23. The results found that most students (84.9%) had positive attitudes toward asynchronous learning, and the most prevalent were moderate levels of depression (39.6%) and anxiety (28.3%), and mild levels of stress (22.6%). Results also found that attitudes toward asynchronous learning and mental health status were not significantly related. Additionally, age, gender, year level, and mental health status were not predictors of students' attitudes toward asynchronous learning. These results necessitate the development of a health program based in schools.

Keywords: anxiety, attitude, depression, stress, mental health, asynchronous learning

I. INTRODUCTION

Araújo, de Lima, Cidade, Nobre, & Neto (2020) stated that closing of an educational facility mostly affects children and young people in particular. A text-based computer-mediated communication that facilitates human-to-human contact without time and place constraints is an asynchronous online debate. Research shows that there are many positive impacts on distance learning from asynchronous online discussions. Online conversations allow learners and instructors to have easy interactions. Participants flexibly view course materials on their timetables in asynchronous learning. Mail communication, which is the oldest type of distance education, message, video and audio recordings, print materials, and voicemail, is an asynchronous distribution technology. The attitude towards the class and trust in technology skills, as stated earlier, is linked to participation in

online discussions. However, as described by Alam, 2020; Bao (2020), students and teachers both encounter a variety of challenges, including psychological ones, resulting in an insufficient learning strategy. In the study of Thongsri, Shen, & Bao (2019), the success of e-learning systems is determined by how students and teachers carry out the curriculum. Rohman, Marji, Sugandi, & Nurhadi (2020) mentioned that students have a poor perception of online learning, despite the fact that it is one of the most promising alternatives to the traditional classroom., which may be a cause of psychological anguish. The study by Dewaele, Magdalena, & Saito (2019), found that students are nervous about the lack of classroom enjoyment.

Oyoque and Brown said in a mail, "The source of anxiety is the way of reacting to dissatisfaction, apprehension, and strange situations in the mindset of people and their body." Anxiety directly led from a place of uncertainty, and the unknown is likely to be encountered. This Covid-19 virus affected our need to cope and adapt to changes at an increasing rate, and it is overwhelming.

Stress is a condition where the sign of mental health and physical tension was also known as depression or hypertension that may cause individuals to respond to a stressful situation, or even both individuals will feel distressed or anxious. Depression is a state where an individual feels loneliness or may suffer deep pressure. It can influence a person's feelings, actions, emotions, and sense of health. A high level of stress may cause the following problems: affect one's mental health, decrease self-respect, and can affect students' academic achievements.

Asynchronous learning

One of the types in blended learning modality includes asynchronous learning. Asynchronous e-learning is a learner-centered method that stresses the value of exchanges amongst peers. In traditional on-campus or regular education, distant education, and continuing education, the strategy blended self-study with asynchronous interactions to allow learning and encouraged learning. According to Khan (2005), asynchronous learning is defined as training that is not constrained by time or location. Due to the unexpected situation, as stated by Malkin, A., Rehfeldt, R. A., & Shayter, A. M. (2016), many traditional classroom teaching approaches are updated to fit with social media platforms.

Asynchronous Learning Attitudes

Aiken (2000), defined attitude as a taught predisposition to reply to a particular thing, circumstance, association, or individual positively or negatively. The action then determines what a person does, and it represents who they are. In learning, attitude is one of the essential roles that a student must have to reach his/her goals in life. This factor affects how students deal with their daily school life. As stated by Awodeyi, Akpan, & Udo (2014), blended learning would also develop learners' curiosity and optimistic outlook. A study found out that relative to the other methods used, the mixed learning approach increased student success scores. Student behaviors were also influenced by it (Awodeyi, Akpan, & Udo, 2014). Students' actions and behaviors are influenced by their learning environment. learning what they want to understand and when they need to know.

Mental Health

Mental wellbeing, while not a new issue, has been more appropriate for debate in recent years, according to Vanderlind (2017). The educator needs to consider how mental health affects students and what courses of action are available to address students' mental health concerns. Eisenberg, D., Gollust, S. E., Golberstein, E., & Hefner, J. L. (2007), highlighted that many parts of a student's life might be affected by mental health issues. It may affect their quality of life, educational accomplishment, physical well-being, and satisfaction with their college experience, as well as their relationships with friends and relatives. In the study of Eisenberg, D., Gollust, S. E., Golberstein, E., & Hefner, J. L. (2007), depression is linked to poorer grade point averages, according to research, and this link might be exacerbated by co-occurring depression and anxiety. Depression has a connection with dropping out of school, too.

Objectives

The study was aimed to assess the attitudes toward asynchronous learning and mental health status and identified the relationships and factors affecting the learning attitudes during the period of pandemic among mathematics majors

II. METHODS

A cross-sectional research design was conducted from November 2020 to April 2021 among 106 mathematics majors at Eastern Visayas State University - Ormoc City Campus, Ormoc City, Philippines. They were selected using purposive random sampling technique.

The study tool used in the study were the Test of E-learning Related Attitudes (TeLRA) adopted from Kisanga & Ireson, 2016 and the Depression, Anxiety and Stress Scale (DASS-21) by Lovibond & Lovibond, 1995, with some demographic data of the respondents. The TeLRA was a tool used to identify opportunities and threats that affect the attitude of the students towards e-learning. It consists of 36 items which were rated on a four-point Likert scale (1 = strongly disagree to 4 = strongly agree). Some items were

revised and only items that would reflect the purpose of the study were retained. The Cronbach's alpha of the instrument was 0.857. The DASS-21 consists of a 21-item questionnaire incorporating self-reporting steps intended to assess adverse mental effects of depression, anxiety and stress. It is rated on a five-point Likert scale (0 = did not apply to me at all to 5 = applied to me very much or most of the time). The Cronbach's alpha for depression, anxiety and stress was 0.81, 0.89, and 0.78, respectively.

After the approval of the University Ethics Committee and the respondents' permission, the survey was then conducted using online questionnaires through Google Forms. One hundred six (106) responses were collected and their identity were kept anonymous and confidential.

Descriptive statistics such as frequency count and simple percentages were used. Chi square test and Binomial Regression analysis were used for inferential statistics with $\alpha = 0.05$ level of significance. Data analysis was done using SPSS version 23.

III. RESULTS

Student's Demographic Characteristic

Table 1 presents the demographic profile of the students. The majority of the respondents who responded were from the age group 22 or younger (87 or 82.1%), mainly females (91 or 85.8%), and mostly juniors (52 or 49.1%).

Table 1. Sample characteristics (N=106)

Characteristics	Frequency	Percent
Age		
22 or younger	87	82.1
23-28	14	13.2
29 or older	5	4.7
Gender		
Male	15	14.2
Female	91	85.8
Year Level		
Freshmen	24	22.6
Sophomore	27	25.5
Junior	52	49.1
Senior	3	2.8

Asynchronous learning attitudes, depression, anxiety, and stress in students

Table 2 depicts the asynchronous learning attitudes, depression, anxiety, and stress in students. The majority of students (84.9%) had positive attitudes toward asynchronous learning, and according to scores for depression (scores ≥ 10), anxiety (scores ≥ 8), and stress (scores ≥ 15), 70.7%, 79.2%, and 42.4% were at symptomatic levels (moderate to severely severe), respectively.

Depression symptoms were most common at the moderate level (39.6%), with prevalence rates at mild, moderate, severe, and extremely severe levels being 22.6, 39.6, 6.6, and 1.9%, respectively. Anxiety symptoms were most common at the moderate level (28.3%), with prevalence rates at mild, moderate, severe, and extremely severe levels being 24.5, 28.3, 15.1, and 11.3%, respectively. The percentage of participants who experienced mild, moderate, severe, or extremely severe stress symptoms was 22.6, 17.0, 1.9, and 0.9%, respectively, with mild level (22.6%) as the most common. (Table 2).

Relationship between asynchronous learning attitudes of the students and their mental health status

Roughly 5%, 4%, and 1% of students with moderate, mild and severe depression, respectively, showed a negative attitude towards asynchronous learning. The same percentages of students (5%) who experienced mild and moderate, and 2 % who had severe anxiety showed a negative attitude towards asynchronous learning. Under mild and moderate stress, only 4% and 2% of students, respectively, showed a negative attitude towards asynchronous learning, respectively. In total, 85% of students reported a positive attitude toward asynchronous learning with 61.4% exhibited mild to extremely severe symptoms of depression, anxiety, and stress. However, results found that the relationship between students' asynchronous learning attitudes and their mental health status was not statistically significant

Table 2: Asynchronous learning attitudes, depression, anxiety, and stress in student

Variables	f	%
Asynchronous learning attitudes		
Positive	90	84.9
Negative	16	15.1
Depression		
Normal	31	29.2
Mild	24	22.6
Moderate	42	39.6
Severe	7	6.6
Extremely severe	2	1.9
Anxiety		
Normal	22	20.8
Mild	26	24.5
Moderate	30	28.3
Severe	16	15.1
Extremely severe	12	11.3
Stress		
Normal	61	57.5
Mild	24	22.6
Moderate	18	17.0
Severe	2	1.9
Extremely severe	1	0.9

Table 3. Asynchronous learning attitudes of the students by mental health status

Mental health status	Asynchronous learning attitudes						X ²	p
	Positive		Negative		Total			
	f	%	f	%	f	%		
Depression							1.18	.882
Normal	25	23.6	6	5.7	31	29.2		
Mild	20	18.9	4	3.8	24	22.6		
Moderate	37	34.9	5	4.7	42	39.6		
Severe	6	5.7	1	0.9	7	6.6		
Extremely severe	2	1.9	0	0.0	2	1.9		
Anxiety							2.79	.594
Normal	18	17.0	4	3.8	22	20.8		
Mild	21	19.8	5	4.7	26	24.5		
Moderate	25	23.6	5	4.7	30	28.3		
Severe	14	13.2	2	1.9	16	15.1		
Extremely severe	12	11.3	0	0.0	12	11.3		
Stress							.883	.927
Normal	51	48.1	10	9.4	61	57.5		
Mild	20	18.9	4	3.8	24	22.6		
Moderate	16	15.1	2	1.9	18	17.0		
Severe	2	1.9	0	0.0	2	1.9		
Extremely severe	1	0.9	0	0.0	1	0.9		
DASS							2.05	.727
Normal	25	23.6	6	5.7	31	29.2		
Mild	29	27.4	5	4.7	34	32.1		
Moderate	27	25.5	5	4.7	32	30.2		
Severe	7	6.6	0	0.0	7	6.6		
Extremely severe	2	1.9	0	0.0	2	1.9		

Predictors of asynchronous learning attitudes

Multiple regressions test was conducted to determine the factors that directly affecting student attitudes toward asynchronous learning. The results showed that age, gender, and year level and mental health state did not contribute significantly to the regression model for the dependent variable asynchronous learning attitude.

Table 4. Predictors of attitudes toward asynchronous learning

Characteristics	SE	Wald	OR	95% CI	p	
Age						
22 or younger	17495.048	.444	.000	.000	.801	
23-28		.000			.999	
29 or older	17495.048	.000	.000	.000	.999	
Gender						
Male	1.098	.788	2.652	.308 – 22.830	.375	
Female						
Year Level						
Freshmen	1.873	2.497	14.200	.361 – 2.10	.476	
Sophomore		2.007			.157	
Junior		.814			4.838	.157
Senior		1.683			1.153	.6093
Depression	.671	.033	1.130	.303 – 4.214	.855	
Anxiety	.564	.560	1.525	.505 - 4.502	.454	
Stress	.594	.243	1.340	.419 – 4.289	.622	
DASS	1.201	.089	.699	.066 – 7.353	.765	

IV. DISCUSSION

The present study aims to assess the attitudes toward asynchronous learning and mental health status and identify the relationships and factors affecting the learning attitudes during the period of pandemic among mathematics majors. Full distance learning was used throughout the pandemic, utilizing the online collaboration tool known as Google Classroom to conduct synchronous online group discussions and new online evaluations.

Based on our study, Our students had positive attitudes towards asynchronous learning. Their earlier attitudes on the use of ICT may be the influence for this. Wang, et al., (2001) and an & Frick, (2006) stated that the students' prior attitudes toward the use of ICT may have an impact on how they feel about online learning. Gunnarsson (2001) and Suanpang (2007) found a significant correlation between their subjects' attitudes and their attitudes toward online learning. However, Roberts & Dyer (2005) discovered that participants' attitudes toward online learning could not be predicted based on their confidence in it prior to the course. This finding was also supported by the study of Adewole-Odeshi (2014) of 387 students in South-West Nigeria, which found that students have a good attitude towards asynchronous learning since e-learning tools are simple to use and obtain information, and that students are more likely to accept e-learning because they have a good attitude towards technology. However, this was not consistent with the study of Muih et al. (2020), which conducted such a study at Jordan University of Science and Technology, to explore whether the pandemic of COVID-19, which requires universities to rapidly offer online learning, will affect attitudes about online education for 1210 undergraduate health sciences students.

The students showed symptoms of depression (70.7%), anxiety (79.2%), and stress (42.4%), which ranged from mild to extremely severe conditions. The most prevalent were the moderate level of depression (39.6%) and anxiety (28.3%), and mild levels of stress (22.6%). These were lower than the study of Asif, et al. (2020) of 500 university students at Sialkot, Pakistan, wherein the most prevalent issue was anxiety (88.4%), followed by stress (84.4%), and depression (75%). The study's findings were also lower than those of (Rehman, Etxerbarria, N. et al. and Wang, C. et al. This outcome was anticipated since students were supposed to fully accept and quickly adapt to unanticipated changes. Similar findings were made by Cao and colleagues (Hasan et al., 2020), who reported that college students in China reported moderate to high anxiety levels and suffered many psychological effects of COVID-19 and the resulting quarantine. One explanation for this could be the prolonged time spent working alone in front of computer screens, coupled with the anxiety of being quarantined, adjusting to an unprecedented situation, and absorbing news about the confirmed COVID-19 cases.

The dread of contracting COVID kept the study participants up at night worrying, which may have contributed to their perceptions of lack of motivation and stress or anxiety. Similar findings have also been published, where students across a range of academic levels and programs reported mild to severe anxiety or mental health difficulties (Copeland et al., 202; Khawar et al.2021; Brett et al.,2021). Additionally, a number of variables were cited as stressors during the outbreak that contributed to feelings of anxiety. Although examining the causes of anxiety is beyond the scope of this study, it is important to note that students who are confined to their homes and are pursuing their studies online are likely to confront numerous risks that could have a detrimental effect on their psychological state and mental health. Having a family member with a confirmed COVID-19 infection at home, having their daily routines changed, and worrying about academic setbacks are all potential stressors. In fact, it is highly advised that educational institutions and authorities offer students with ongoing support, making sure the essential counseling services and emotional support measures are accessible and available in accordance with each institution's rules.

This study has revealed that age did not predict their attitudes toward online learning. Similar findings conducted by Muih et al. (2020), found that age was not a predictor of eLearning. however, number of years in major of a student is a predictor that can determine their eLearning attitudes.

Studies describing how attitudes toward online learning differ between males and females are typically conflicting and unclear. The results of Nistor (2013), revealed that males appear to have more consistent favorable attitudes toward online learning, whereas female online learners are more tenacious and engaged (Richardson & Woodley, 2003). Despite the fact that females in online learning environments have more self-regulation than males, males can apply more learning strategies and have greater technical skills (Alghamdi et al., 2020). There may not have been a substantial gender difference in the outcomes of online learning since the aforementioned findings may have negated the gender preferences in online learning. Controversial gender disparity study findings can have other causes. Future research in this area may be carried out.

A few limitations exist in the research study. The study analyzed two variables: students' attitudes toward asynchronous learning and their mental health status. First, this study's findings are limited to one public university at Eastern Visayas State University – Ormoc City Campus, and the sample size is 106 only, which was quite small. Thus, the results cannot be generalized to all public universities. Second, the survey was conducted entirely online and was only available to students with an internet connection, preventing some students from participating by filling out the Google Forms.

V. CONCLUSION

This study focused on the asynchronous learning attitudes and mental health status of the students. It showed that students had a favorable attitude towards asynchronous learning. Additionally, students showed mild to moderate depression (10.3%), mild to severe anxiety (36.8%), and mild level of stress (2.8%). Furthermore, no significant differences on mental health status are seen among covariates and no significant relationship between the students' asynchronous learning attitudes and their mental health status.

With these findings, it is recommended to conduct another survey to other courses aside from mathematics majors and increase the number of respondents to determine whether there is a significant relationship between their asynchronous learning attitudes and mental health status. It is also suggested that a future study should be carried out with a comparative study of face-to-face learning and asynchronous learning to determine if there is a significant relationship between the two variables towards the mental health status of the student. Collaboration between local health care services and higher education institutions is required not only to refer severe cases for treatment, but also to help educate students on the management of depression, anxiety, and stress. Furthermore, regular screening of mental health status should be conducted in order to identify students with severe problems and minimize the impact of their mental problems on their academic path and future career.

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