Measuring the Learning Environmental Satisfaction of Students during Online Class

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Abstract

This research study focuses on determining the factors that influence the satisfaction level of students in their learning environment during an online class. A learning environment refers to learning resources and technology, teaching methods, modes of learning, and connections to societal and global contexts. In this study, the factors used to measure the learning environment consisted of adequate learning materials, adequate access to gadgets for online learning, reliable and fast internet connection, physical and mental capacity, enough time and resources, enough skills for an online class, and enough infrastructure to support online learning. On the other hand, student satisfaction was measured based on teaching and delivery quality, facilitating conditions, and LMS quality. Pearson correlation test was employed to determine the association of learning environmental factors to students' satisfaction. In addition, regression analysis was also utilized to determine which factors influenced students' overall satisfaction during online learning. Results revealed that enough resources and skills and enough infrastructure to support online learning, have very high association with teaching delivery quality and LMS quality. In addition, regression analysis showed that factors that significantly influenced students' satisfaction are adequate learning materials, adequate access to gadgets, enough resources and skills, and enough infrastructure to support online learning.

Keywords
Learning environment, online class, COVID-19 pandemic

1. Introduction

The public health concerns led to a rushed closure of most higher education institutions worldwide in late March 2020 to stem the spread of the COVID-19 pandemic. Because of these closures, universities have had to utilize online teaching platforms regardless of the expertise of students and teachers in terms of technical skills and readiness. While online learning is not a new pedagogical method and has been used in various fields for many years, there is still a lack of competence in implementing online learning platforms. The emphasis on information technology in education is broadening beyond enhancing learning environments to include factors other than hardware, software, and the network. The learning environment is a synthesis of human practices and material systems, much like an ecology is a synthesis of living things and their surroundings.

Online learning refers to an electronic learning (e-learning) environment where, unlike traditional learning, there are no physical peer learners, and time and space are free. However, e-learning makes learning flexible and offers an alternative for those who, for some reason, cannot attend traditional classrooms. With the growth of technology and the internet, e-learning has secured a good position in the academic world. E-learning is temporarily classified under the distance learning category. Indeed, there are numerous benefits of online learning, especially today. Still, conversely, some concerns lead to online learner brain drain and ultimately hamper the progress of online courses. Lack of interest or lack of motivation is one of the main reasons that inhibit the growth of online learning and, in this way, also increases the rate of online course dropouts. Research has identified numerous critical challenges that are believed to affect education in an online environment. These challenges include the instructors' assessment of learners' academic integrity, cyberstalking and cyberbullying, lack of internet access, low quality of online instruction delivery, cost control, individual learning process, lack of professional technological training, inaccessibility of tools, and

technical issues. Additional challenges relate to the adaptability of faculty to adapt lectures for online learning, learning to monitor synchronous or asynchronous student collaboration, and designing authentic online assessment tools that facilitate the transition from face-to-face sessions to the online platforms accompany. Therefore, online teaching requires various skills, including pedagogical skills, design skills, technical skills, and communication skills.

Ku, Tseng, and Akarasriworn (2013) suggested that interaction is essential in students' perceived learning and motivation. Moore (2002) found that teacher-learner interaction is the most significant factor in student satisfaction and student learning outcomes. Muirhead (2005) suggested that instructors need the ability to design course structures that encourage social interaction and uphold sophisticated academic principles while promoting self-directed learning skills. Knapp (2018) found that online classes have been using the Learning Management System (LMS). The system often lacks valuable collaborative spaces where students can discuss and learn together in real-time. Alqurashi (2019) found that while learner content and learner-teacher interactions are significant for perceived learning and student satisfaction, learner-learner interaction is not such a significant predictor. A study by Al-Fraihat et al. (2020) also emphasized several factors that affect students' satisfaction in the e-learning system. Technical system quality, information quality, service quality, education system quality, support system quality, learner quality, and instructor quality as antecedents of perceived satisfaction with e-learning. This was also supported by Baber (2020) as it relates to students' motivation, course structure, instructor knowledge, and facilitation to students' perception of their learning results and satisfaction.

1.1. Objectives

Several studies have examined the success of using information technology in education from the learner's perspective; however, none of these studies examined all the environmental learning factors related to students' satisfaction with online learning, especially during a pandemic. Thus, this study aims to measure students' satisfaction levels based on the environmental learning factors during an online class. The study also intends to determine which environmental learning factors affect students' satisfaction during online learning.

3. Methods

3.1. Data Collection

Purposive sampling is used to collect samples for this study because the goal is to determine students' level of satisfaction as a result of changes in the learning environment caused by the COVID-19 pandemic. Respondents for the study were 200 undergraduate students from various private and government universities in the Philippines taking online classes. The survey was distributed online via google forms. These participants were necessary as the study seeks to measure student satisfaction levels based on learning environment factors during an online class. Researchers created a survey instrument to put the research model to the test. Most of the items were adapted from existing measures in the related literature with proven content validity and reliability and then modified to fit our research context. A reliability test yielded a Cronbach value of 0.88 for the student satisfaction survey and 0.82 for the environmental learning survey, implying the instruments had an excellent level of reliability.

3.2. Statistical Analysis

The data gathered from the survey questionnaires were analyzed using Minitab version 20. The study was conducted using a 95% confidence level, and the results of $p<0.05$ were considered significant. Pearson correlation test was employed to determine the association of learning environmental factors to students' satisfaction. Correlation analysis in research is a statistical method used to measure the strength of the linear relationship between two variables and compute their association. It calculates the level of change in one variable due to the difference in the other. A high correlation points to a strong relationship between the two variables, while a low correlation means that the variables are weakly related. The researchers used correlation analysis to determine the significant association between students' satisfaction and the environmental learning factors in an online class environment. In addition, regression analysis was also utilized to determine which factors influenced students' overall satisfaction during online learning.

4. Results and Discussion

4.1. Demographic Profile

The researchers had gathered 200 respondents for this study. It was found that the majority of respondents were female (65%) within 20-21 years old (73%). Most of the respondents are living in a province (54%) and
taking up an engineering program (77%).

4.2. Result of Student Satisfaction Survey

Table 1 shows the descriptive statistics of respondents' responses regarding student satisfaction levels. The items in the questionnaire were adopted in the study by Sultana & Khan (2019). Fourteen (14) items were captured from the survey questionnaire evaluated using the 5-Point Likert Scale (1-5). The items were categorized under three factors: LMS quality, facilitating conditions, and teaching delivery quality. The mean scores were calculated from the average scores for the measurement of items to test the respondent's degree of agreement. A mean of 2.5 was chosen as the lowest acceptable mean score on the 5-point Likert scale, indicating that any item with a mean value above 2.5 explains that respondents are satisfied with the given statement in the questionnaire. The result showed that the respondents were satisfied with all items in the measurement questionnaire. However, the item that had the highest rating is “LMS has required features for conducting class," followed by "LMS is easy to learn and use," and "LMS is effective and enhances my performance." On the other hand, an item with the lowest rating was "buying data is easy for me”. Overall, the factor that had the highest satisfaction rating was LMS quality (4.18), followed by teaching delivery quality (4.13) and facilitating conditions (3.71).

Table 1. Result of Student Satisfaction Survey

Factors	Items	Mean	Std. Dev.	Range	Agreement
LMS Quality	The LMS has required features for conducting class	4.35	0.78	2-5	satisfied
	The LMS is easy to learn and use.	4.29	0.77	2-5	satisfied
	The LMS allows me to easily communicate with teachers and my classmates.	4.02	0.90	1-5	satisfied
	The LMS has support services available whenever required.	3.98	0.95	2-5	satisfied
	The LMS has easy to retain information.	4.19	0.80	2-5	satisfied
	The LMS has flexible requirements to run the program.	4.18	0.90	2-5	satisfied
	The LMS is effective and enhances my performance	4.22	0.95	2-5	satisfied
Facilitating Conditions	I have a suitable place for doing classes attentively	3.74	0.94	1-5	satisfied
	Necessary devices (mobile/laptop/pc) are not a problem for me	3.98	0.75	1-5	satisfied
	Buying data is easy for me	3.42	0.92	1-5	satisfied
	Internet facility is easily available at my place	3.69	0.95	1-5	satisfied
Teaching Delivery Quality	My teachers can engage students effectively	4.11	1.03	1-5	satisfied
	Teachers can use features of LMS appropriately	4.19	0.91	2-5	satisfied
	My teacher’s delivery of lectures during online class was easy to understand	4.09	0.99	2-5	satisfied

4.3. Result of Learning Environmental Survey

Table 2 shows the survey result to assess the environmental learning factors of students during online learning. The items in the questionnaire were adopted in the study by Gumasing et al. (2022). The environmental learning factors were measured in a 5-point Likert scale rating. The mean scores were calculated from the average scores for the measurement of items to test the respondent's degree of agreement. A mean of 2.5 was chosen as the lowest acceptable mean score on the 5-point Likert scale, indicating that any item with a mean value above 2.5 explains that respondents agree with the given statement in the questionnaire. The result showed that the respondents agreed to all items in the environmental learning questionnaire. However, the item that had the highest rating was "having infrastructure and resources to support online learning," followed by "enough resources and skills for online learning" and "adequate access to gadgets for an online class." On the other hand, an item with the lowest rating is "reliable and fast internet." Overall, the satisfaction rating of respondents is above average (3.81).

Table 2. Result of Learning Environmental Survey

Items	Mean	Std. Dev.	Range	Agreement
adequate learning materials during online class	4.00	0.70	2-5	Agree
adequate access to gadgets for online class	4.04	0.76	1-5	Agree
reliable and fast internet connection	3.36	0.92	1-5	Agree

physical and mental capacity for online class	3.39	0.96	1-5	Agree
enough time and resources for online class	3.60	0.83	1-5	Agree
enough resources and skills for online class	4.07	0.91	2-5	Agree
infrastructure and resources to support online learning	4.32	0.84	2-5	Agree

4.4. Result of Correlation Analysis

Table 3 shows the Pearson r correlation results. Student satisfaction score was tested for each factor of the learning environment in terms of LMS quality, facilitating conditions, and teaching delivery quality. The result indicated that the factors with the highest Pearson correlation are enough resources and skills for an online class in teaching delivery quality, infrastructure, and resources to support online learning about LMS quality, and infrastructure and resources to support online learning about teaching delivery quality. The high correlation of relationship shows that the teachers needed more skills in conducting online classes, particularly in the use of technologies to deliver quality teaching to students. For infrastructure and resources to support online learning, schools should improve the infrastructure to support the LMS quality and delivery of teaching quality to students. There is also a significant correlation in other factors, such as adequate learning materials during online classes. Most participants are enrolled in Mapúa University, wherein students were already provided with learning materials such as video lectures, an online library, onsite assessments, and more during the start of an online class.

Table 3. Result of Correlation Analysis

Factors	Pearson correlation(R)	p-value	95% CI for p	Remarks	Level of correlation
adequate learning materials during online class → LMSquality	0.635	<0.001	(0.501, 0.739)	significant	high
adequate learning materials during online class → facilitating conditions	0.584	<0.001	(0.438, 0.700)	significant	high
adequate learning materials during online class → teaching delivery quality	0.56	<0.001	(0.408, 0.681)	significant	high
adequate access to gadgets for online class → LMS quality	0.428	<0.001	(0.253, 0.576)	significant	moderate
adequate access to gadgets for online class → facilitating conditions	0.554	<0.001	(0.401, 0.677)	significant	high
adequate access to gadgets for online class → teaching delivery quality	0.355	<0.001	(0.170, 0.515)	significant	moderate
reliable and fast internet connection → LMS quality	0.412	<0.001	(0.235, 0.563)	significant	moderate
reliable and fast internet connection → facilitating conditions	0.558	<0.001	(0.407, 0.680)	significant	high
reliable and fast internet connection → teaching delivery quality	0.421	<0.001	(0.245, 0.570)	significant	moderate
physical and mental capacity for online class → LMSquality	0.572	<0.001	(0.423, 0.691)	significant	high
physical and mental capacity for online class → facilitating conditions	0.496	<0.001	(0.331, 0.631)	significant	moderate
physical and mental capacity for online class → teachingdelivery quality	0.598	<0.001	(0.455, 0.711)	significant	high
enough time and resources for online class → LMS quality	0.571	<0.001	(0.422, 0.690)	significant	high
enough time and resources for online class → facilitating conditions	0.539	<0.001	(0.383, 0.665)	significant	high
enough time and resources for online class → teaching					

delivery quality	0.626	<0.001	(0.490, 0.733)	significant	high
enough resources and skills for online class → LMS quality	0.676	<0.001	(0.554, 0.771)	significant	high
enough resources and skills for online class → facilitating conditions	0.482	<0.001	(0.315, 0.619)	significant	moderate
enough resources and skills for online class → teaching delivery quality	0.76	<0.001	(0.663, 0.832)	significant	very high
infrastructure and resources to support online learning →LMS quality	0.736	<0.001	(0.631, 0.815)	significant	very high
infrastructure and resources to support online learning →facilitating conditions	0.533	<0.001	(0.376, 0.661)	significant	high
infrastructure and resources to support online learning → teaching delivery quality	0.788	<0.001	(0.663, 0.832)	significant	very high

4.4. Result of Regression Analysis

Table 4 shows the result of regression analysis; it was found that the factors that significantly influenced students' overall satisfaction during online learning are adequate learning materials, adequate access to gadgets, enough resources and skills, and infrastructure and resources. This finding is supported by prior studies that attempt to prove factors affecting students' satisfaction in e-learning. In a study by Allen et al. (2020), it was found that digital literacy levels, learner engagements, instructor support and guidance, and course design have all been linked to higher levels of learner satisfaction. According to Al Ghandi (2017) and Alyasi (2016), most universities invest heavily in a large team of specialists to enable remote learning and provide an effective preparation program for students and faculty. To deliver distance education, various technological tools that enhance learning interactions via learning management systems, such as video conferencing, discussion forums, threads, or prerecorded videos, have been used.

Table 4. Result of Regression Analysis

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.263	0.217	1.21	0.229	
adequate learning materials	0.2134	0.067	3.19	0.002	2.24
adequate access to gadgets	0.1244	0.0499	2.49	0.015	1.5
reliable and fast internet	-0.0014	0.0452	-0.03	0.975	1.76
physical and mental capacity	0.0303	0.0579	0.52	0.602	3.2
enough time and resources	0.0043	0.066	0.07	0.948	3.07
enough resources and skills	0.2408	0.0471	5.12	0.000	1.9
infrastructure and resources	0.3055	0.0521	5.86	0.000	1.97

On the other hand, physical and mental capacity showed no significant influence on students' overall satisfaction, as supported by the study by Ahmad (2011). Prior research proved that traditional classroom settings are more effective than online learning since students can participate actively in face-to-face classes and interact more with teachers and classmates than with e-learning. Lastly, another factor found to have no significant influence on overall satisfaction is having enough time and resources. Since most participants of the study were from Mapúa University, wherein there are classes/courses that are self-phased or asynchronous, most activities/requirements are done in the students' convenient time, and students are not required to have immediate access to the internet, thus, having enough time and resources do not affect their overall satisfaction.

5. Conclusion

The study's findings revealed that three learning environment factors, such as LMS quality, facilitating conditions, and teaching delivery quality, played significant roles in student satisfaction during the COVID-19 pandemic's emergency shift to remote learning. In addition, it was also proved that having adequate learning materials, adequate access to gadgets, enough resources and skills, and having infrastructure and resources during online learning

significantly influence students' overall satisfaction. The study results can be used to gain a new perspective on students' overall satisfaction with online learning. The researchers also recommend that schools and universities use this data to help improve the overall quality of relaying educational instructions to their students. The researchers also suggest that this topic be generated from a more specific perspective in future research.

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