Assessment of Online Learning Modality in Civil Engineering Correlation Courses

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Highlights

- The students are motivated to study more if given extra points in their assessments as an incentive.
- Most of the students wanted to go back to a face-to-face learning set-up for an easier mode of learning.

Abstract

The modalities of learning were abundantly shifted to online learning, and remote set-up and universities came up with different strategies to deliver academic quality education to students. This paper aims to focus on evaluating the online learning modality in correlation courses. A survey method was utilized and the data was analyzed using descriptive statistics and analysis of variance. Among the 402 respondents, the majority are male, 19 to 21 years old, 3rd year students, and enrolled in Correl 1. The time taken in studying as they spent between 2-3 hours per day would help them improve. Additional points in the summative assessment as an incentive are the motivation to study. The students responded that they were provided adequate learning materials and tools and listening to a 3-hour discussion is considered the most challenging situation, thus the respondents prefer the face-to-face set-up. The online examination set-up uses two (2) gadgets to prevent cheating during assessments. The Mastery-based Individualized Learning Enhancement System (MILES) is used as the current learning management system. The findings revealed that synchronous classes with group discussion would help in learning, due to some distractions in the synchronous classes from social media, house chores, and playing computer games, thus the result revealed that respondents always replay the recorded synchronous class. Correl students have lower grade expectations due to the difficulty of the assessments, even the examination type is multiple-choice. The students were satisfied with the attributes of their teachers. The analysis of variance showed that the study habits and motivation of students in different correlation levels are just the same. Thus, there is a necessity to revisit and continually improve the strategy in the online platform system to help students who were experiencing barriers in adapting to online as the Philippines still battles with COVID-19.

Key Words: civil engineering; learning modalities; online learning; pandemic

1. Introduction

The first case of Coronavirus disease (COVID-19) was discovered in Wuhan, China, in December 2019 (Tang et al., 2020). The COVID-19 then rapidly spread in different parts of the world in the early months of 2020. The leaders and governments of various countries ordered schools and universities to suspend face-to-face classes to prevent the risk of spreading COVID-19 (Maqableh & Alia, 2021). As the cases of COVID-19 surged in the Philippines, the face-to-face classes were suspended on March 9, 2020 (Pelmin,

2020). The educational system was then shifted into remote teaching to prevent the risk of spreading the virus.

The mode of learning has been greatly affected by the pandemic crisis brought by COVID-19. The drastic changes from face-to-face classes to online classes led students and educators to comply with a new platform while ensuring continuous academic learning. In the past 19 months of online classes, the schools and universities came up with different strategies to deliver academic quality education to students. However, the online classes still yielded challenges on students in receiving a quality learning experience. In developing countries like the Philippines, not all students have available sources and access to technology. Other factors that affected the students' learning experience were linked to their learning environment at home, mental health, finances, and mobility (Barrot et al., 2021). During the initial online learning in pandemic time, the Philippines was not prepared to provide quality education due to access to the internet, closure of internet shops, the isolated location of most students, and other social and economic factors (Toquero et al., 2021). Regardless of this situation, the universities, local government units, and other concerned groups and individuals find ways to bridge the gap for those students in need.

Higher education institutions (HEIs) have fully implemented the online learning system to facilitate student activities in terms of synchronous or asynchronous classes (Navarro et al., 2021). A learning management system (LMS) is being used as a learning tool in the new norm to online educational services. LMS is an online-based technology that can be developed to improve the learning process through planning, application, and evaluation in educational institutions (Alias & Zainudin, 2005).

Correlation courses were being used in the Far Eastern University (FEU) Institute of Technology to help the students review for the civil engineering licensure examination. The correlation courses will cover the review subjects included in the licensure examination as mandated by the Philippine Regulation Commission (PRC). Perceiving the students' overview on the online learning modality of the correlation courses will help the university and educators address the significant hindrances in reviewing the subjects covered in the licensure examination.

This paper aimed to focus on evaluating the factors of the online learning modality of Civil engineering students in correlation courses to help institutions improve their respective learning management systems.

2. Methods

2.1 Data gathering and analysis

The researchers conducted an online survey involving all the students enrolled in Correlation (Correl) courses at FEU Institute of Technology during the 1st term of 2021-2022. The survey was distributed online using Google Forms. The survey included questions related to the online learning modality during the online classes set up. The respondents were required to give their basic profile, including their gender, age, year level, and the correlation course they were enrolled in. The survey was divided into four sections, the first part included questions related to the students' habits and motivation. A student's enthusiasm was related to the variations of a student's academic attainment (Entwistle et al., 1974). The survey also included questions related to their learning resources and strategies, assessments of examinations, and the teacher's attributes in the students' learning mode.

The data gathered were analyzed using descriptive statistics and Analysis of Variance (ANOVA) to determine if there are significant differences in the responses in terms of the different levels of correlation courses.

2.2 The respondents and course description

402 total respondents participated in the online survey. The civil engineering department of FEU Institute of Technology offers three (3) correlation courses, namely, Correl 1, Correl 2, and Correl 3, which are offered for the second year, third year, and terminal students. The online learning system in Correl courses has two types of exam activities: formative assessments and summative assessments. The formative assessment is a multiple-choice exam and a requirement before taking a graded summative assessment. The subjects were patterned based on the criteria of the licensure examination. The subjects with higher relevance should be implemented in review courses (Poso & De Jesus, 2020).

3. Results and discussion

3.1 Basic profile characteristics

As shown in Table 1, among the 402 respondents, the majority are male, 19 to 21 years old, 3rd year students, and enrolled in Correl 1.

Table 1. Profile of the Respondents.

Sex	**Number of Respondents**	**Percentage (%)**
Male	248	61.69
Female	153	38.06
Prefer not to say	1	0.25
TOTAL	**402**	**100.00**
Age	**Number of Respondents**	**Percentage (%)**
19-21	185	46.02
22-24	172	42.79
25-27	37	9.20
28-30	7	1.74
>30	1	0.25
TOTAL	**402**	**100.00**
Year Level	**Number of Respondents**	**Percentage (%)**
2	5	1.24
3	168	41.79
4	94	23.38
Terminal	135	33.58
TOTAL	**402**	**100.00**
Correl Level	**Number of Respondents**	**Percentage (%)**
Correl 1	186	46.27
Correl 2	87	21.64
Correl 3	129	32.09
TOTAL	**402**	**100.00**

3.2 Study habits and motivation

Table 2 shows the evaluation of students on their habits and motivation. According to 46.52% of the total respondents, the time taken to complete a chapter would help them improve in studying. A chapter in a Correl course is usually discussed in a 3-hour synchronous class. The majority or 52.24%, said that they

are more motivated to study if they are given incentives. In the Correl online set-up, incentives are additional points given to the students when they got a satisfactory score in the formative assessment. Most students spend 2 to <3 hours studying Correl subjects per day.

Table 2. Students' evaluation of their study habits and motivation.

Correl Level	**CORREL1**	**CORREL2**	**CORREL3**	**TOTAL**	**%**
What change would help you improve your studying?					
Time taken to complete a chapter	90	38	59	187	46.52
Teaching method	52	18	25	95	23.63
Exam set up	18	19	25	62	15.42
None	18	5	10	33	8.21
Others	8	7	10	25	6.22
TOTAL	186	87	129	402	100.00
What motivates you to study more?					
Incentives	109	42	59	210	52.24
Discussion of confusing/complicated problems with classmates/teacher	59	33	44	136	33.83
Having additional problems/assignments after every module	15	8	16	39	9.70
Others	3	4	10	17	4.23
TOTAL	186	87	129	402	100.00
How much time do you lend to study for this course every day?					
<2 hours	32	17	20	69	17.16
2-<3 hours	82	28	39	149	37.06
3-<4 hours	41	26	42	109	27.11
4-<5 hours	18	8	15	41	10.20
≥5 hours	13	8	13	34	8.46
TOTAL	186	87	129	402	100.00

3.3 Learning Resources and Strategies

Table 3 shows that the majority of the respondents think that the university provides adequate learning materials and tools sometimes, and listening to a 3-hour discussion is considered the most challenging situation during the pandemic set-up. With the current online set-up, the students face different adversity based on their life status and situation, thus the majority responded that they prefer the face-to-face set-up. The correleation course requires the use of two (2) gadgets, one gadget in taking the summative assessment, and the other gadget will be used as a camera, to prevent cheating. The majority of the respondents responded neutrally on evaluating the Mastery-based Individualized Learning Enhancement System (MILES), the current learning management system used for correlation courses. The majority of the respondents responded neutrally on learning better if the synchronous classes have group discussion time and attend the synchronous classes. The result can be attributed to the policy that attendance in synchronous classes is not required. The majority or 73.6% of the total respondents stated they were sometimes distracted and ended up not listening to the discussion. This is attributed that the distractions in online learning were from social media, house chores, and playing computer games (Blasiman et al., 2018). Lastly, the majority, or 65.67% of all the respondents always replay the recorded synchronous class the sample problems they don't understand during synchronous discussion time.

Table 3. Students' responses on their learning resources and strategies.

Correl Level	CORREL1	CORREL2	CORREL3	TOTAL	%
Do you think the university provides adequate learning materials/tools?					
Sometimes	89	47	53	189	47.01
Yes	76	24	69	169	42.04
No	21	16	7	44	10.95
TOTAL	**186**	**87**	**129**	**402**	**100.00**
What would be the most challenging situation for you among the statements below?					
Listening to a 3-hour discussion	63	38	44	145	36.07
Distraction from online setup	52	17	44	113	28.11
Access to devices/internet	48	13	28	89	22.14
Difficult problems	23	19	13	55	13.68
TOTAL	**186**	**87**	**129**	**402**	**100.00**
In terms of the mode of learning, what would you prefer?					
Face to face classes	128	51	57	236	58.71
Online classes	15	11	27	53	13.18
Either	43	25	45	113	28.11
TOTAL	**186**	**87**	**129**	**402**	**100.00**
I feel comfortable using two gadgets during Summative assessments.					
Strongly agree	8	4	10	22	5.47
Agree	20	8	33	61	15.17
Neutral	67	32	36	135	33.58
Disagree	45	18	26	89	22.14
Strongly disagree	46	25	24	95	23.63
TOTAL	**186**	**87**	**129**	**402**	**100.00**
MILES 2.0 is better compared to the previous one					
Strongly agree	12	3	4	19	4.73
Agree	57	19	41	117	29.10
Neutral	101	51	72	224	55.72
Disagree	13	7	10	30	7.46
Strongly disagree	3	7	2	12	2.99
TOTAL	**186**	**87**	**129**	**402**	**100.00**
I will learn better if the synchronous classes have group discussion time with my classmates of the sample problems before the teacher explains the solution.					
Strongly agree	20	15	14	49	12.19
Agree	65	32	42	139	34.58
Neutral	83	30	47	160	39.80
Disagree	15	5	23	43	10.70
Strongly disagree	3	5	3	11	2.74
TOTAL	**186**	**87**	**129**	**402**	**100.00**
I only attend synchronous classes because attendance is required.					
Strongly agree	19	21	24	64	15.92
Agree	40	22	29	91	22.64
Neutral	63	22	34	119	29.60
Disagree	45	18	29	92	22.89
Strongly disagree	19	4	13	36	8.96
TOTAL	**186**	**87**	**129**	**402**	**100.00**
I got distracted and ended up not listening during the discussion in synchronous classes.					
Always	28	20	21	69	17.16
Sometimes	141	56	99	296	73.63
Not at all	17	11	9	37	9.20
TOTAL	**186**	**87**	**129**	**402**	**100.00**

I am replaying the recorded synchronous class for the sample problems I didn't understand during the synchronous discussion.					
Always	112	56	96	264	65.67
Sometimes	64	30	31	125	31.09
Not at all	10	1	2	13	3.23
TOTAL	**186**	**87**	**129**	**402**	**100.00**

3.4 Assessment on exam and students' performance

Table 4 presents that students believed that their grade would be in the range of 60-80% due to the course difficulty. Correl 2 and Correl 3 students have lower grade expectations compared to Correl 1 students. This can be implied that Correl 1 is composed of mathematics and surveying courses only which is only a part of the board examination content, compared to Correl 2 and 3 that includes the whole course content included in the licensure examination. The majority agreed that the difficulty of the questions for formative and summative assessments is fair. The majority of the students preferred the multiple-choice mode of questions, and the Correl courses use the same mode as it is in line with the format of the licensure board examination conducted by the Philippine Regulation Commission (PRC).

Table 4. Academic performance of the students.

Correl Level	**CORREL1**	**CORREL2**	**CORREL3**	**TOTAL**	**%**
Based on your performance on Formative assessments and Summative Assessments this term, your grades will fall under?					
80-100%	101	22	20	143	35.57
60-79%	76	38	90	204	50.75
50-59%	7	18	16	41	10.20
<50%	2	9	3	14	3.48
TOTAL	**186**	**87**	**129**	**402**	**100**
The difficulty of the questions for formative assessments is fair					
Strongly agree	11	5	6	22	5.47
Agree	127	46	79	252	62.69
Disagree	45	32	41	118	29.35
Strongly disagree	3	4	3	10	2.49
TOTAL	**186**	**87**	**129**	**402**	**100**
The difficulty of the questions for summative assessments is fair					
Strongly agree	12	4	3	19	4.73
Agree	109	23	50	182	45.27
Disagree	61	42	64	167	41.54
Strongly disagree	4	18	12	34	8.46
TOTAL	**186**	**87**	**129**	**402**	**100**
Which mode of questions do you prefer for the assessments, both formative and summative?					
Multiple choice	185	85	125	395	98.26
Numerical answer	1	2	4	7	1.74
TOTAL	**186**	**87**	**129**	**402**	**100**

3.5 Evaluation of teacher's attributes

The teachers are responsible for managing the class's environment and learning methods (Mojavezi & Tamiz, 2012). Table 5 shows that Correl professors clearly explain the solution to the sample problem, provide enough consultation time, provide additional reading materials and problem sets, motivate the

students to study. The results imply that the majority of the students were satisfied with the attributes of their teachers which is expected from them to ensure quality learning to the students. The findings can be attributed that the majority of the Correl professors are board examination placers and were trained to teach in a review class.

Table 5. Teacher's attributes on the subjects according to students

Correl Level	CORREL1	CORREL2	CORREL3	TOTAL	%
Clearly explains the solution to the sample problems.					
Strongly agree	21	17	28	66	16.42
Agree	123	52	93	268	66.67
Disagree	39	18	8	65	16.17
Strongly disagree	3	0	0	3	0.75
TOTAL	**186**	**87**	**129**	**402**	**100**
Provides enough consultation time for the subject.					
Strongly agree	35	11	17	63	15.67
Agree	119	52	90	261	64.93
Disagree	31	21	21	73	18.16
Strongly disagree	1	3	1	5	1.24
TOTAL	**186**	**87**	**129**	**402**	**100**
Provides additional reading materials and problem sets.					
Strongly agree	25	8	33	66	16.42
Agree	126	58	83	267	66.42
Disagree	33	20	13	66	16.42
Strongly disagree	2	1	0	3	0.75
TOTAL	**186**	**87**	**129**	**402**	**100**
The teacher motivates us to study.					
Strongly agree	18	19	24	61	15.17
Agree	119	53	85	257	63.93
Disagree	47	14	20	81	20.15
Strongly disagree	2	1	0	3	0.75
TOTAL	**186**	**87**	**129**	**402**	**100**

3.6 Statistical analysis result on study habits and motivation

The ANOVA results for rows showed a significant difference which means that the different responses of the respondents are significantly different from each other. While the columns, which are the different Correl levels showed no significant difference. This means that the responses among the different Correl levels do not significantly differ Thus, it implies that students' study habits and motivation in different levels are just the same.

Table 6. ANOVA Table (What change would help you improve your studying?)

Source of Variation	SS	df	MS	F	F crit
Rows	5743.73	4	1435.93	10.03	3.84
Columns	987.60	2	493.80	3.45	4.46
Total	7876.40	14			

Table 7. ANOVA Table (What motivates you to study more?)

Source of Variation	SS	df	MS	F	F crit
Rows	8001.67	3.00	2667.22	10.01	4.76
Columns	1234.50	2.00	617.25	2.32	5.14
Total	10835	11			

Table 8. ANOVA Table (How much time do you lend to study for this course every day?)

Source of Variation	SS	df	MS	F	F crit
Rows	3119.73	4	779.93	6.26	3.84
Columns	987.60	2	493.80	3.96	4.46
Total	5104.4	14			

4. Conclusions

The COVID-19 significantly changed the system in academe. The modalities of learning were abundantly shifted to online learning and remote set-up. The university and educators were continually improving their strategy on the online platform system to help students who were experiencing barriers in adapting to online learning. The students are now very eager for a face-to-face class as they encounter various struggles in their online learning. Incentives and time duration on taking the exam will motivate and help students to study more. As the level of Correl courses gets higher, the students' evaluation of their grades gets lower. The common problem of the students is limited access to devices while taking the exam. Not all students can provide enough gadgets and access to technology due to the financial situation, especially this pandemic. The teachers have a significant role in students' online learning. They implement theconditions of the students' environmental learning set-up. The study habits and motivation of students in different levels are just the same. Overall, there are still many factors t hat needs to be addressed to improve the quality education of the students in an online set-up.

References

Alias, N. A., & Zainuddin, A. M. (2005). Innovation for Better Teaching and Learning: Adopting the Learning Management System. *Malaysian Online Journal of Instructional Technology*, *2*, 27–40.

Barrot, J. S., Llenares, I. I., & del Rosario, L. S. (2021). Students' online learning challenges during the pandemic and how they cope with them: The case of the Philippines. *Education and Information Technologies*. https://doi.org/10.1007/s10639-021-10589-x

Blasiman, R. N., Larabee, D., & Fabry, D. (2018). Distracted students: A comparison of multiple types of distractions on learning in online lectures. *Scholarship of Teaching and Learning in Psychology*, *4*(4), 222–230. https://doi.org/10.1037/stl0000122

Entwistle, N. J., Thompson, J., & Wilson, J. D. (1974). Motivation and study habits. *Higher Education*, *3*(4), 379–396. https://doi.org/10.1007/BF00153949

Maqableh, M., & Alia, M. (2021). Evaluation online learning of undergraduate students under lockdown amidst COVID-19 Pandemic: The online learning experience and students' satisfaction. *Children and Youth Services Review, 128,* 106160. https://doi.org/10.1016/j.childyouth.2021.106160

Mojavezi, A., & Tamiz, M. P. (2012). The Impact of Teacher Self-efficacy on the Students' Motivation and Achievement. *Theory and Practice in Language Studies*, *2*(3). https://doi.org/10.4304/tpls.2.3.483-491

Navarro, M. M., Prasetyo, Y. T., Young, M. N., Nadlifatin, R., & Redi, A. A. N. P. (2021). The Perceived Satisfaction in Utilizing Learning Management System among Engineering Students during the COVID-19 Pandemic: Integrating Task Technology Fit and Extended Technology Acceptance Model. *Sustainability*, *13*(19), 10669. https://doi.org/10.3390/su131910669

Pelmin, M. (2020). Readings on Coronavirus Disease (COVID-19) and the Higher Education Institution (HEIs) Emergency Preparedness in the Philippines. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3573896

Poso, F. J., & De Jesus, K. L. (2020). Sensitivity Analysis of the Civil Engineering Licensure Examination Rating using Garson's Algorithm. *Philippine Journal of Engineering Education*.

Tang, W., Hu, T., Yang, L., & Xu, J. (2020). The role of alexithymia in the mental health problems of home-quarantined university students during the COVID-19 pandemic in China. *Personality and Individual Differences, 165,* 110131. https://doi.org/10.1016/j.paid.2020.110131

Toquero, C. M. (2021). Academic Silver Linings in a Philippine State University Amid the Early Stages of Pandemic Casesitle. *Journal of Learning for Development*, *8*, 448–455. http://hdl.handle.net/11599/3907