Original Research Article

Flexible Learning Amid Pandemic: The View of Engineering and Technology Students

ABSTRACT

This study assessed the readiness, attitude, and acceptability of the college of engineering students about flexible learning modalities during the pandemic. This study employed a descriptive-correlational design. Six hundred seventy-one respondents were identified from the six (6) courses of the College of Engineering, University of Eastern Philippines, Catarman, Northern Samar, enrolled during the School Year 2020-2021. The researchers identified that students rely on their mobile phones to do their school activities, thus using mobile data to connect to the internet. Students experience a fair internet connection. The majority of the students came from low-income families. Results also revealed that the students favor flexible learning methodology but are neutral in their acceptability towards flexible learning modalities. Using Spearman's Rho correlation, only internet connectivity significantly affects their attitude and acceptability towards flexible learning methods. The result means that students' good internet connectivity status can lead to a positive attitude and acceptance towards flexible learning.

Keywords: modalities; modular; blended; distance learning

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1. INTRODUCTION

The education system all over the world is gravely affected by the COVID-19 pandemic. Through the Department of Education and Commission on Higher Education (CHED), the national government is doing its best to ensure continuity in providing students with quality education amidst the country's crisis. Existing shortcomings in internet connectivity also emerged and challenged the government's efforts to find solutions to link teachers and students.

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In a news article, CHED chair Prospero de Vera said the "more practical solution" amid the coronavirus threat is to move toward flexible learning, which uses digital and non-digital technology. He noted that flexible learning is a broader term that focuses on designing and delivering programs, courses, and learning interventions that address learners' unique needs in terms of pace, place, process, and learning products. It does not necessarily require connectivity. [1]

CHED Memorandum Order No. 4 series of 2020 presents the guidelines for implementing flexible learning. According to this memorandum, flexible learning's primary objective should be to provide learners with the most flexibility on the learning content, schedules, access, and innovative assessment, using digital and non-digital tools. However, the HEIs shall continue to exercise their judgment in deploying available flexible learning and alternative delivery modes in lieu of on-campus education or face-to-face modality. [2]

Modular instruction is one of the best options among the distance learning methodologies suiting the connectivity issues in the locality. The teachers can prepare the lessons as they deliver them in face-to-face classes. Recently, the state universities in Region VIII made a consortium, the Eastern Visayas Higher Education Institutions Flexible Learning Management System Consortium (EVHEIs-FLMSC), which aimed to enhance the capabilities of teachers and prepare them for flexible learning management. These are transmitted to students via online media or printed copies.

Aside from teachers' preparedness, the authorities should also consider the students' awareness and acceptability of these changes. Considering the ability of the students to adapt to changes, it is still vital to understand students' difficulties in dealing with flexible learning. Just like teachers, hearing the students out and enhancing their capabilities should also be considered since they are the primary client and reason for the education system's existence.

The main concern is "how ready are the students for these flexible learning modalities?" In a study by Geng et al., they investigated self-directed learning and technology readiness in blended learning (BL) environment. Results of this study showed that student technology readiness plays a more substantial role in impacting the teaching presence in a BL environment than in a non-BL setting. Prior training in learning technologies can enhance students' teaching presence.[3]

During the pandemic, the University of Eastern Philippines (UEP) adopted modular instruction delivered through online platforms or printed copies since there is no option for face-to-face classes during the pandemic. It is essential to know if there is high acceptability of the students in this kind of mode of instruction. In an institutional study by Sheriffdeen, students rejected the idea of an online environment; they preferred mixed-mode delivery. They have positive opinions about migrating to new technology in education as an additional help for teaching and learning. Still, they have negative ideas about replacing face-to-face with online learning.[4]

On the other hand, the study by Sadiq concluded that modular teaching is more effective in the teaching-learning process as compared to ordinary teaching methods. The modular approach helps maximize the chances of student participation in the classroom to fulfill the given tasks on the spot. Because in this modular approach, the students learn at their own pace. So, the students feel free to learn in their style. [5]

In the study of Lim, it is concluded that the use of modules in teaching Math, precisely word problem solving, is a practical teaching approach. It was effective because it helped the subjects of the study learn concepts in mathematics without cramming in keeping up with the pacing of the teacher. The use of modules in teaching these particular concepts in Math was beneficial for the respondents in developing their learning study habits. [6]

This study is significant to the engineering students, the faculty members, and the administration of the College of Engineering. The assessment results of this study gave the students a platform to express their attitude and acceptability regarding flexible learning methods. In return, each department and the college administration may work together in formulating solutions or mediation to the challenges faced by the students.

This study generally aims to study the flexible learning method in the view of engineering and technology students enrolled during the School Year 2020-2021. Specifically, this study aims:

1. to assess the readiness of students in terms of:

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a. gadgets owned
b. connection devices
c. internet connectivity status
d. family income

2. to determine the attitude of students toward flexible learning methods;
3. to measure the acceptability of students of flexible learning modalities;
4. to find out if there is a significant relationship between the readiness of the college of engineering students towards flexible learning method and their attitude, and;
5. to determine if there is a significant relationship between the readiness of flexible learning methods of the college of engineering students and their acceptability.

2. METHODOLOGY

The respondents of this study were students from the five (5) departments of the College of Engineering: Agricultural and Biosystems Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, and Engineering Technology departments enrolled during the second semester of the School Year 2020-2021. Using, Sloven's formula, six hundred seventy-one students became the respondents selected randomly in each department.

Initially, the formulation of the survey questionnaire and interview schedule was done. Three research experts at the University then validated it. After revision and approval by the experts, the survey questionnaire was encoded using the Google Form application.

The collection of data was done through an online interview with respondents. The researchers contacted students with poor internet connections through phone calls. The data gathered through survey questionnaires were summarized using percentages and charts.

Questions on the attitude and acceptability of students toward flexible learning were answered using a 5-point Likert Chart. The mean of responses for the attitude, which have scores ranging from 4.20 to 5.00, 3.40 to 4.19, 2.60 to 3.39, 1.80 to 2.59, 1.0 to 1.79, are interpreted as "highly favorable," "favorable," "neutral," "unfavorable," and "highly unfavorable," respectively. The same scoring ranges were used for acceptability which is interpreted as "highly acceptable," "acceptable," "neutral," "unacceptable," and "highly unacceptable," respectively.

This study is a combination of quantitative and qualitative research. This study employed a descriptive-correlational research design to determine the relationship between the profile and readiness for the students' acceptability of flexible learning. Using IBM SPSS Statistics 23, the researchers used Spearman's correlation to test the correlation of the ordinal data gathered.

3. RESULTS AND DISCUSSION

3.1 Readiness of Students

The readiness toward flexible learning modalities is measured by the gadgets owned, connection devices used, internet connectivity status, and family income of the students.

3.1.1 Gadgets Owned by Students

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Table 1a presents the gadgets owned by the respondents. As shown in the table, most of the students, 80.33%, own mobile phones. The result shows that students rely on mobile phones to do school activities. These findings do not qualify with the result of the study by Simon Cheung on the Use of Mobile Devices for Distance Learning. With the different types of mobile devices reviewed, he found that conventional notebook devices are most preferred in all learning activities.

Table 1a. Gadgets Owned by the Students

Gadgets Owned	Frequency	Percentage
Mobile Phone	539	80.33%
Mobile Phone and Laptop	103	15.35%
Mobile Phone and Desktop	13	1.94%
None	7	1.04%
Laptop	7	1.04%
Desktop	2	0.30%
Mobile Phone, Laptop and Desktop	2	0.30%
Mobile Phone, Laptop and Tablet	1	0.15%
Mobile Phone and Tablet	1	0.15%
Sometimes Mobile Phone, sometimes None	1	0.15%
Mobile Phone, Laptop, Desktop and Tablet	1	0.15%
Total N, %	671	100.00%

3.1.2 Connection Devices Used by the Respondents

Table 1b presents the internet connection devices used by the respondents. 87.33% of the respondents rely on the mobile data connection. Since the students rely mainly on their mobile phones, they use mobile data to connect to the internet.

Table 1b. Connection Devices Used by the Respondents

Connection Devices	Frequency	Percentage
Mobile data	539	80.33%
Broadband/WiFi	103	15.35%
Broadband/wifi and mobile data	13	1.94%
No internet connection	7	1.04%
Mobile data and Pocket wifi	7	1.04%
Peso wifi	2	0.30%
Mobile data and Peso wifi	2	0.30%
Dial-up connection	1	0.15%
Pocket wifi	1	0.15%
Sometimes Mobile Phone, sometimes None	1	0.15%
Mobile Phone, Laptop, Desktop and Tablet	1	0.15%
Total N, %	671	100.00%

3.1.3 Connection Devices Used by the Respondents

Table 1c shows the internet connectivity status of the college of engineering students. It further indicates that most of the respondents, 39.05% and 36.66%, have fair and poor internet connectivity, respectively. The topographical condition of the province of Northern Samar causes inferior internet connection experienced by students.

Table 1c. Connection Devices Used by the Respondents

Internet Connectivity Status	Frequency	Percentage
Fair	262	39.05%
Poor	246	36.66%
Good	160	23.85%
Excellent	3	0.45%
Total N, %	671	100.00%

3.1.4 Family Income

Table 1d presents the family income of the students. It shows that the majority of respondents, 62.69%, have a family income of range ₱1,001.00 to ₱10,000.00. Only 14.16% of the respondents have a family income higher than ₱20,000.00. The majority of the students came from poor families, according to the Philippine Institute for Development Studies (PIDS) income classification.

Table 1d. Family Income

Family Income	Frequency	Percentage
₱1,001 - ₱10,000	420	62.59%
₱10,001 - ₱20,000	108	16.10%
₱1,000 and below	48	7.15%
₱20,001 - ₱30,000	30	4.47%
Don't Know /Preferred not to say	29	4.32%
₱30,001 - ₱40,000	17	2.53%
₱40,001 - ₱50,000	10	1.49%
Above ₱50,000	9	1.34%
Total N, %	671	100.00%

3.2 Attitude of Students Toward Flexible Learning Method

Table 2 exhibits different attitudes of students toward flexible learning modality. It shows that the students favor the flexible learning modality because they can study lessons at their own pace. Students are mentally engaged in doing the activities in the module. They are also motivated to participate in their learning activities and have the initiative to learn. They feel they can save money for boarding house rentals and living allowance.

On the other hand, the table presents that students need help deciding if they are capable of studying and confident enough with the flexible learning modality. They are still determining if they can manage their time and catch up with the lessons and activities given by their professors. They are still deciding if they still want a flexible learning modality even when the pandemic is over and their ability to manage their time.

Overall, they are favorable toward flexible learning methodology.

Table 2. Attitude of Students Toward Flexible Learning Method

Indicators	Score	Interpretation
I can study lessons in my own pace.	3.57	Favorable
I am mentally engaged in doing the activities in the module.	3.52	Favorable
I am capable of studying using the flexible learning modality.	3.48	Neutral
I am willing to participate in our learning activities.	4.05	Favorable

I have the initiative to learn.	3.91	Favorable
I have the motivation to learn.	3.95	Favorable
I have high level of self-confidence in using the flexible learning modality.	3.38	Neutral
I am satisfied with time flexibility of the learning method.	3.42	Neutral
I am satisfied with place flexibility of the learning method.	3.40	Neutral
I can catch up with the lessons and activities given by my professors.	3.43	Neutral
I feel that even pandemic is over, I still prefer flexible learning modality.	3.09	Neutral
I can manage my time.	3.45	Neutral
I can save money for boarding house rentals and living allowance.	3.55	Favorable
Average	3.55	Favorable

3.3 Acceptability of Students Toward Flexible Learning Method

Table 3 shows the acceptability of students toward flexible learning modalities. Students find flexible learning methodology acceptable because of the positive attitude of their professors. The modules' objectives are attainable as measured by assessing every topic. They also agreed that the online learning platform used by their professor is easy to access and manage.

They are neutral on their acceptability of the conduct of internet connection activities. They are still determining if modules equal the conventional mode of learning.

Generally, the students are neutral in their acceptability towards flexible learning modalities.

Table 3. Acceptability of Students Toward Flexible Learning Modalities

Indicators	Score	Interpretation
The online learning platform allows easy access to files sent by our professors.	3.53	Acceptable
I am satisfied with the browsing speed.	2.89	Neutral
I do not experience problems while navigating.	2.78	Neutral
I am able to share knowledge through online discussions using the online platform.	3.31	Neutral
I am able to ask my professors questions and receive answers.	3.52	Acceptable
Uploading my activities and assignments is easy.	3.12	Neutral
Through online discussion I am able to exchange ideas and comments with my classmates.	3.29	Neutral
Taking quizzes using the online platform is convenient.	3.31	Neutral
In our modules, topics are discussed like we are face to face with our professors.	3.06	Neutral
Online submission of requirements are accepted.	3.80	Acceptable
Modules' objectives are attainable.	3.55	Acceptable
Illustrative examples provided in the modules are easy to follow.	3.37	Neutral

Assessment in every topic measures the attainment of module's objectives.	3.53	Acceptable
My professors' knowledge on using the internet technology affects my efficiency of learning.	3.63	Acceptable
My professors are friendly and approachable.	3.81	Acceptable
My professors are easily contacted.	3.54	Acceptable
My professors encourage us to interact.	3.79	Acceptable
My professors provide learning resources online.	3.86	Acceptable
My professors accepts corrections positively.	3.81	Acceptable
My professors provide fast feedbacks to queries.	3.63	Acceptable
My professors provide supplement videos in explaining problems.	3.61	Acceptable
My professors are considerate regarding late submissions due to poor connection.	3.82	Acceptable
The online learning platform used by my professor is easy to access and manage.	3.66	Acceptable
The modules sent by my professors can be easily downloaded.	3.64	Acceptable
I am able to complete my assignments anytime and at any place.	3.43	Neutral
AVERAGE	3.49	Neutral

3.4 Readiness of the Students and their Attitude Towards Flexible Learning Method

Table 4 shows that among the readiness indicators of the college of engineering students, only internet connectivity significantly affects their attitude towards flexible learning methods with Spearman's Rho correlation coefficient of 0.101.

The result implies that a good internet connection helps students have a favorable attitude toward the flexible learning methodology.

Table 4. Correlation between Readiness and Attitude of Students towards Flexible Learning

Readiness Indicators	Spearman's Rho Correlation Coefficient	Interpretation
Gadgets Owned	-0.067	No significant Correlation
Internet Connection Device Owned	0.045	No significant Correlation
Internet Connectivity Status	0.101	Significant Correlation
Family Monthly Income	-0.040	No significant Correlation

3.5 Acceptability of the Students and their Attitude Towards Flexible Learning Method

Table 5 shows that among the students' acceptability indicators, only internet connectivity status significantly correlates with their acceptability toward flexible learning methods. Spearman's Rho correlation coefficient is 0.165.

The result implies that a good internet connection helps students accept the flexible learning methodology.

Table 5. Correlation between Readiness and Attitude of Students towards Flexible Learning

Acceptability Indicators	Spearman's Rho Correlation Coefficient	Interpretation
Gadgets Owned	-0.045	No significant Correlation
Internet Connection Device Owned	0.033	No significant Correlation
Internet Connectivity Status	0.165	Significant Correlation
Family Monthly Income	-0.020	No significant Correlation

4. CONCLUSION

Engineering and Technology students rely on their mobile phones in school activities; this does not qualify the result of the study by Simon Cheung on the use of mobile devices for distance learning. With the different types of mobile devices reviewed, he found that conventional notebook devices are most preferred in all learning activities. Students use mobile data to connect to the internet. They also experience poor to a fair internet connection. According to the Philippine Institute for Development Studies (PIDS) income classification, most college engineering students come from low-income families. The students have a favorable attitude towards flexible learning methodology. The students are neutral in their acceptability towards flexible learning modalities. Internet connectivity status affects both the attitude and acceptability of students toward flexible learning methods as a mode of instruction.

Comment [AA6]: In the Conclusion subsection, the authors not only describe the research findings but also provide suggestions for further research on the shortcomings of the research carried out. Please complete it.

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