Original Research Article

Readiness, Attitude, and Acceptability of Engineering and Technology Students Toward Flexible Learning Method

ABSTRACT

The COVID-19 pandemic affected every single component of society, including education.This study aims to assess the readiness, attitude, and acceptability of the college of engineering students about flexible learning modalities during the pandemic. It is essential that the institution understands the effect of the pandemic onitsprimary clientele, the students.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. This means that students fall short of the readiness that flexible learning requires.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:modular; blended; distance learning; flexible modality; COVID-19 pandemic

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.

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]Thus, the release of CHED Memorandum Order No. 4 series of 2020 presenting the guidelines for implementing flexible learning.

As a prefix to educational practices and products, to define learning as flexible connotes freedom for learners from potential participatory barriers in education, generated, for example, by family or work commitments, financial challenges, a disability, or a learner's geographic location. [2] Flexibility in learning, which emphasizes student choice, has been considered one key to enhancing education quality and satisfying highly diverse student needs. It is often associated with the terms 'open learning,' 'distance learning,' and 'e-

learning.' [3]In this study, flexible learning is the only option the students have during the pandemic in order to continue their education and recover from the long pause brought by lockdowns imposed by the government to ensure safety for everyone.

In the study of Agaton and Cueto, parents agreed on the effectiveness of the implemented educational policies to contain the pandemic, including the nationwide closures of schools, delaying the reopening of classes, and implementation of various instructional modalities.[4] Parents' support for their children is one of the primary motivations to help the students quickly adapt to changes.

The main concern is "how ready are the students for these flexible learning modalities?" A study by Geng et al. showed that student technology readiness plays a more substantial role in impacting the teaching presence in a Blended Learning (BL) environment than in a non-BL setting. Prior training in learning technologies can enhance students' teaching presence.[5] One of this study's main focuses is on students' readiness for the flexible learning modality in terms of technology.

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.[6] In the study of Baloran, results showed an unwillingness with the online-blended learning approach was observed. [7] Also, a recent study showed that overall differences between blended and traditional classroom learning are small, and, at best, minimal negative or moderate positive effects are plausible. Consequently, blended learning with reduced classroom time is not systematically more or less effective than conventional classroom learning. [8]

On the other hand, the study by Sadiqconcluded 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. [9]This makes modular instruction one of the best options among the distance learning methodologies suiting the connectivity issues in the region.

During the pandemic, the University of Eastern Philippines (UEP), specifically the College of Engineering, adopted modular instruction delivered through online platforms or printed copies since there is no option for face-to-face classes during the pandemic. They even joined a consortium amaong state universities in Region VIII, 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.

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. The use of modules in teaching these particular concepts in Math was beneficial for the respondents in developing their learning study habits. [10]This is why the attitude and acceptability of students of the flexible learning modality are also important considerations in this study. Especially engineering and technology courses have board examination subjects and laboratory subjects demanding face-to-face meetings to acquire the needed skills.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.

No previous study has correlated readiness to the attitude and acceptability of engineering and technology students toward flexible learning modality.This study is significant to the 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, especially on their readiness for the method.

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 to assess the readiness of students in terms of (a) gadgets owned, (b) connection devices, (c) internet connectivity status, and (d) family income. It aims to determine the attitude and measure the acceptability of students toward flexible learning methods. This study also investigates whether there are significant relationships between the readiness of the college of engineering students towards flexible learning method and their attitudeand their acceptability.

2. METHODOLOGY

The respondents of this study were students from the six (6) courses of the College of Engineering: Bachelor of Sciences in Agricultural and Biosystems,Civil, Electrical, and Mechanical Engineering, and Bachelor in Engineering Technology majors in Automotiveand Electrical Technology, enrolled during the School Year 2020-2021. Using, Sloven's formula, a total of six hundred seventy-one students became the respondents composed of students from each course selected randomly.

Initially, the formulation of the survey questionnaire 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 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 employed a descriptive-correlational research design to determine the relationship between readiness and the student'sattitude and acceptability of flexible learning modality. 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.Readiness can be achieved if the majority of the students have smartphones and laptops and can connect to the internet through mobile data and Wi-Fi providers since these

are the technical requirements for online education. It is also necessary that the official online platforms or learning management system first be established by the institution. [11] With the following results, the students do meet the readiness requirement for flexible learning modality.

3.1.1 Gadgets Owned by Students

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.[12]

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%

3.1.2Connection 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%

3.1.3Connection 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%

3.1.4Family 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. According to the Philippine Institute for Development Studies (PIDS) income classification, most students come from poor families.[13]

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%

3.2Attitude 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

3.3Acceptability 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

3.4Readiness 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.In the study of Dayagbal, et al., results showed that

most of the students had difficulty complying with the learning activities and requirements due to limited or no internet connectivity. [14]

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

3.5Acceptability 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 for distance learning. Students use mobile data to connect to the internet. They also experience poor to a fair internet connection. Most students come from low-income families. The students have a favorable attitude and 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.

Further studies should be conducted considering all the views of faculty, students, university administration, and local government unit on permanently implementing flexible or distance learning as an option for higher education programs in the future. Also, an assessment of the readiness of the institution for flexible or distance learning should be done, taking into account the enablers suggested by Zhang, namely (a) infrastructure, (b) learning tools, (c) learning resources, (d) teaching approaches, (e) learning strategies, (f) supports and services for teachers and students, and (g) cooperation among different stakeholders. [15]

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