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Higher Education students' technological characteristics and technological self-efficacy during Covid 19: Implications to flexible learning framework

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Abstract The new normal, to now normal and the next normal will undoubtedly include technological adaption with flexible teaching and learning. This descriptive-survey study describes the technological characteristics and self-efficacy of higher education students on flexible learning. Participated by 2380 consented students of a state university, responses were processed from a data set collected through Google forms. Majority of the participants or 63.9 percent were female. A substantial percentage belong to a family with joint monthly income below 5,000.00 as parents were mostly working as farmers or fishers. Most of the participants use a shared smartphone for learning, and a handful with personal laptops. With the majority considered as digital natives, most of them were familiar with and have used relevant online tools to support learning. The majority of them, however, are regarded as novices when it comes to using online learning management systems, tools for communication, storage, creating and packaging video content, and maintaining and uploading web content. Results revealed that most of the participants generally agree on self-efficacy items towards flexible learning. The research study provided valuable inputs for curriculum designers, educators, and administrators towards a functional and relevant teaching and learning framework that highly considers the current technological characteristics and self-efficacies of students especially in the COVID19 pandemic.

Keywords: flexible learning, technological characteristics, self-efficacy, new normal, virtual/online learning

1. Introduction

The implementation of the transformation process in the educational system that has emerged in response to the COVID-19 crisis has encountered several challenges. These challenges are connected to the fresh perspectives of online education and their technological complexity. Prior to this epidemic, open institutions in Philippines were thought to be the only source of online education, yet, in the COVID-19-induced period, online teaching-learning became a huge task, and stakeholders are not likely to be able to cope with the abrupt shift in educational environment as they lack the technological know-how necessary to adapt to the present environment.

Along this vein, COVID19 pandemic has driven the implementation of flexible teaching and learning across the globe to include the Philippine educational system. The paradigm shifts from traditional face-to-face classes to going online did not only conform to the mandate under memorandum circular number 4 series of 2020 of the Commission on Higher Education on Flexible Teaching and Learning but has offered higher education institutions the opportunity to embrace a teaching and learning delivery model practiced in other countries but likely foreign to many. It has necessitated higher education institutions to collaborate with stakeholders and strengthen a culture of sharing knowledge, resources and best practices (CHED 2020). Alongside this, it also raised issue on the preparedness of Philippine education for the unpredictable scenarios.

Open learning, distant learning, blended learning, and e-learning are all types of words that are occasionally used synonymously when discussing flexible learning. According to Javier (2019), online learning has developed into a vital tool to support in-class activities. This is because there are now a variety of internet of things that can be used to improve management of learning and advance the ICT abilities of both students and teachers. With this, institutions of higher learning should be adaptable and competent enough to manage emergency situations. Institutions should ready developed cogent answers to the dynamics of higher education in the new normal through online and/or flexible learning.

The Covid 19 crisis actually amplifies the importance of contemporary technology and emphasizes the necessity for careful planning of educational programs and the creation of viable alternative (Alolaywi 2021; Talosa et al 2021). Technology integration has been regarded as a key field of research, particularly given the potential usefulness of technology use for educational reasons such as individualized learning and ties to good student outcomes. The unpredictability of pandemic that

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may arise bringing havoc to future educational paradigms make us ready to the integration of technology in the classroom. Worth noting however is delving into a study on Transitions to Online learning as an integral component of higher education in the new normal.

According to Toquero 2020, in order to adapt to the present environment, educators and policymakers have realized that it is becoming increasingly necessary to transition learning activities from traditional classroom settings to online ones. As a result, online training became required, with various platforms being employed depending on how the nation was enforcing the regulations. Alaghbary (2021) however states that the challenge is to be able to use technology's educational potential to assist students in achieving their desired learning outcomes by developing instructional designs that offer genuine learning experiences for upcoming generations of students who are digitally literate. The digital divide is expanding as a result of students' restricted possibilities in poverty, including those in rural areas, and the need for equity for all learners in terms of access to technology that supports their learning (Yazon and Callo 2021). Albeit new to the educational landscape, is intriguing because it demonstrates the commitment of individuals and institutions to enhancing education and expanding the exchange of information and skills. Similarly, Idrizi et al (2021) report that due to technological advancements and rising demand for admission to higher education institutions, online learning is becoming more and more popular.

Researchers found that teachers in higher education need institutional assistance while switching to Flexible Teaching (Naylor and Nyanjom 2020). In this regard, several studies shown that strong leadership, technical and pedagogical assistance, the school's online learning goal, and the integration of online teaching are all related (Bao 2020; Rapanta et al 2020). To give an example, a lack of organizational commitment to change might demotivate instructors and prevent change, but a shared vision to incorporate online technology in educational processes can inspire teachers to change (Tondeur et al 2019).

While studies have been robust looking on teachers, few looked into students profiling. While there are studies that looked into the lens of students in flexible learning, these studies are mostly qualitative in nature. As students are the very important clients of education, there is a need to look into the self-efficacy assessment of students who are new to the platform. According to the literature, not all students, especially those who are just starting out in school, have the high levels of self-efficacy necessary to handle a foreign online environment. Due to disorientation, new teaching/learning methods, unfamiliar subjects, and the first week of their studies, these students frequently feel cognitive overload.

Studies that have looked at learners' characteristics in distance learning (DL) to date have discovered that some traits make for a better distance learner. Students must possess a number of abilities in order to succeed in online learning, including critical thinking, teamwork, academic writing, and computer and Internet proficiency. Being able to use these skills when necessary is just as crucial as having them. Additionally, students must be capable of handling a learning environment that is dissimilar from the conventional lessons they have previously taken. According to several research, students who are more self-assured or who believe in their own abilities are more likely to succeed in and stick with online courses. A study embarked by Karim and Hasan (2020) looked into the gaps in the paradigm shift from face to face learning towards virtual learning have found that teachers and students need to be trained with various online platforms. As there is a constant need to raise the level of education in all tertiary fields, it is crucial for educators to have some understanding of their student profiles in order to tailor lessons that best fit their needs.

With the help of this study, the institution can create appropriate plans and ways to meet the needs of its stakeholders. There will be less anxiety among students and professors, and academic activities may proceed without incident. For teachers, administrators, and students, potential training development programs and capacity-building activities would be created.

This study aims to identify the technological characteristics of distant learning and self-efficacy of students in higher education. The study specifically attempted to provide answers to the following questions.

1. What are the students' demographic characteristics?
2. What are the technological characteristics of higher education students?
3. What is the level of technological self-efficacy in flexible learning among higher education students?
4. What pedagogical implication and policy recommendations on flexible instruction engagements may be proposed to lead a better distance flexible learning?

2. Material and Methods

This study utilized quantitative method particularly the descriptive design. Descriptive design was used in determining the profile of higher education students, their technological characteristics and their perceived self-efficacy on flexible learning.

Respondents are English as a Second Language learners from the eight undergraduate degree offerings of the campus. Three of which are board while four are non-board courses. The respondents were recruited through complete enumeration.

The Cagayan State University's Aparri Campus served as the site of the study. Cagayan State University (CSU) is the sole state-run comprehensive institution of higher learning in Cagayan since 1978. Aparri is one of its campuses located at the Norther tip part. The institution's campus primary teaching and learning platform for the current academic year was the Learning Environment Network System. The respondents of the study are 2391 students across the different degree programs offered by Cagayan State University at Aparri. Total Enumeration was the sampling used in the study. Data collection was conducted through google forms.

A survey-questionnaire designed and pilot tested was the key instrument in the data collection. It comprises 3 parts: profile characteristics, technological access profile and use of online learning tools and devices, and self-efficacy on flexible learning. The self-efficacy questionnaire was slightly modified and adopted from the Online Learning/Distance Education Questionnaire (2003). With Google Forms, the survey questionnaire was made available to the participants in 4 weeks. Responses were extracted in a csv file and were subjected to data cleaning and validation.

To describe the profile characteristics and technological access profile of the respondents, frequency counts, percentages, and ranks were used. More so, for the variables referring to use of online learning tools and devices, and self-efficacy on flexible learning, weighted means with equivalent descriptive value were used.

3. Results and Discussion

3.1. Profile of the Students

3.1.1. Socio Demographic

Table 1 shows the age distribution of the respondents. as gleaned in the table, 1915 or 80.5 percent of the respondents belong to the age range of 16 to 20 which comprised the majority. Four hundred seven or 18.4 percent of them belong to the age ranging from 21 to 25 while 22 or 0.92 percent of them are aged 26-30. Meanwhile five or 0.21 percent of them belong to the ages 31 and above.

Of the 2380 respondents, 1520 or 63.9 percent of them are female which comprises the majority while 860 or 36.1 percent of them are male. The finding clearly suggests that in the institutional site, male students are outnumbered by females.

In terms of civil status, the table reveals that 2350 or 98.7 percent of the respondents are single while 30 or 1.3 percent of them are married.

1497 or 62.9 percent of them have joint monthly incomes below 5,000 while 590 or 62.9 percent of them have parents with an income ranging from 5,000-10,000. One hundred thirty-four or 5.6 percent of them have incomes ranging from 10,001-15,000 while 68 or 2.5 percent of the respondents' parents earn a monthly income of 15,001-20,000. Thirty-nine or 1.6 percent of them have a monthly income of 20,001-25,000 while 27 or 1.1 percent of them have parents with earnings of 25,001-30,000. Only 25 or 1.05 percent of them have parents with a monthly average income of 30,001 and above.

This finding insinuates a clear profile indicating that most of the respondents in the study locale belong to low income earning families. With the meager income, the students may not be provided with technological resources responsive to the demand of the new normal through flexible learning.

Table 1 Distribution of the Respondents in terms of Socio Demographic Profile.

Age	Frequency (n=2380)	Percentage
16-20	1915	80.5
21-25	437	18.4
26-30	22	0.92
31- above	5	0.21
Sex		
Female	1520	63.9
Male	860	36.1
Civil Status		
Single	2350	98.7
Married	30	1.3
Parents Income		
below 5000	1497	62.9
5,001-10,000	590	24.8
10,001- 15,000	134	5.6
15,001-20,000	68	2.5
20,001-25,000	39	1.6
25,001-30,000	27	1.1
30,001- above	25	1.05

3.2. Technological Access Profile

The distribution of the respondents in terms of technological access profile is shown in table 2. When asked of the personally and or family owned technological devices at home, table 6 reveals that smartphone tops all the other technological devices available to 2,282 respondents followed by Laptop personally or family owned by 374 respondents. Smart TV (162), Printer (74), Video Camera (65), Personal Computer (48), Transistor Radio (33), Tablet (28) and Ipad (15) ranked third to seventh respectively. The finding indicates that the respondents mostly are in possession of personal or family owned technological devices which may aid them in their online learning.

The table likewise exposes that ranking the resources shared by friends and neighbors, smartphone, laptop and printer ranked on top as the first to third technological devices shared to the respondents with frequencies of 1442, 664 and 259 followed by personal computer (231), smart TV (169), Tablet (167), Video Camera (161), and Ipad (1.45). The finding reflects that smartphones are the most accessible technology devices. Smartphones are "the hand held computers" for setting up daily calendars, storing huge documents, viewing films, listening to music, utilizing the internet, using the world wide web, participating in video conferences, and many other activities (Tuncay 2016). With smartphones, considering total loads per semester of students, posits however possible issues on storages during downloading of activities and reading texts or content courses and uploading of activities and assignments.

Table 2 Distribution of the Respondents in terms of Technological Access Profile.

	Frequency (n=2380)	Rank
Personally and or Family Owned Devices		
Smartphone	2282	1
Laptop	374	2
Smart TV	162	3
Printer	74	4
Video Camera	65	5
Personal Computer	48	6
Transistor Radio	33	7
Tablet	28	8
Ipad	15	9
Technological Devices Shared by Friends, Neighbors		
Smartphone	1442	1
Laptop	664	2
Printer	259	3
Personal Computer	231	4
Smart TV	169	5
Tablet	167	6
Video Camera	161	7
Ipad	145	8
Transistor Radio	142	9
Internet Provider	Frequency	Percentage
No connection	188	7.90
Below-1 mbps	609	25.6
1-5 mbps	724	30.4
6-10 mbps	252	10.6
11-15 mbps	142	5.97
16-20 mbps	131	5.50
21-25 mbps	54	2.27
26-30 mbps	59	2.48
More than 30	178	7.48
Average Expenditure for monthly internet subscription		
Below 100	864	36.3
More than 100 but not exceeding 500	1033	43.4
More than 500 but not exceeding 1000	251	10.5
More than 1000	175	7.35
Not Applicable	57	2.39
Internet Service Provider		
Globe	1220	51.3
Planet Cable	1	0.0
PLDT	234	9.8
Skycable	2	0.1
Smart	923	38.8

With data accessed through speedtest.net, respondents' current download and upload speed was tested and results reveal that the majority of the respondents utilized connection strength between 1 to 5 mbps comprising the frequency of 724. Six hundred nine of 25.6 percent have below 1mbps bandwidth and worth highlighting though negative as it may be, it is sad to note that there are also 188 students who do not have available connections in their areas. This realization poses quite a challenge in online learning. Bandwidth affects types of medium that could be applied for instructional design, and thus determines what kinds of interaction could be carried out, and how the interactions could be carried out. Conceptually, people

tend to conclude that lower bandwidth of collaboration channels creates disadvantages for users because bandwidth or capacities of transmitting information in each communication medium determine the effectiveness of networked collaboration in learning and problem solving.

Asked on the average expenditure for monthly internet subscription, data also revealed that the majority which comprised 1033 or 43.4 percent spent more than 100 but not exceeding 500. 864 or 36.3 percent of them spent below 100 while 251 or 10.5 percent of them spent more than 500 but not exceeding 1000. Meanwhile, 175 or 7.35 percent spent more than 1000 while 57 or 2. 39 reported that expenditure on subscriptions is not available on them.

As regards the technological access profile on internet service provider, majority which comprised 1220 or 51.3 percent gets access to internet services thru Globe as the carrier. Apart from being located in geographically disadvantaged areas displaced with valleys or mountains, most of the respondents maximized the low-rate cost of internet subscription plans offered by Globe Telecom. Meanwhile, service providers Smart and PLDT accounted for 893 and 226 responses respectively.

3.3. Technological Skill on Usage of online learning tools and devices

3.3.1. Use of Learning Management Systems

Usage of google classroom and Edmodo

Apparent in table 3 is the technological skill level of the respondents on use of learning management systems particularly that of google classroom and Edmodo feature. As revealed in the table, the CSU students reported as evinced by their weighted mean of 2.76, 2.72, 2.62 and 2.61, that they are intermediately skilled on participating in discussion, answering quizzes, opening and downloading uploaded materials and joining class in google classroom. Meanwhile, they are only classified as emerging on their skill along submitting output and activities including videos via Google Drive with a weighted mean of 2.51. The category mean of 2.64 with a descriptive value of intermediate reveals that the respondents are neutrally skilled in using the google classroom and its features. This might be due to the use of the online tool during the emergency remote teaching phase in the institution.

More so, as evinced in the same table, the respondents however perceived their technological skill as beginner/emerging on the use of Edmodo in all of its features. The result therefore poses on the need to consider Edmodo for technological skill to improve the students' skill considering exposure effect with repeated exposure increasing familiarity and skill.

Table 3 Level of Technological Skill on Usage of google classroom and Edmodo.

	Google Classroom		**Edmodo**	
Features	Weighted Mean	Descriptive Value	Weighted Mean	Descriptive Value
1. Join class	2.61	Intermediate	2.54	Beginner/ Emerging
2. Open and download uploaded materials	2.62	Intermediate	2.46	Beginner/ Emerging
3. Answer quizzes	2.72	Intermediate	2.54	Beginner/ Emerging
4. Submit output and activities including videos via Google drive	2.51	Beginner/Emerging	2.44	Beginner/ Emerging
5. Participate in discussion	2.76	Intermediate	2.51	Beginner/ Emerging
Category Mean	2.64	Intermediate	2.50	Beginner/ Emerging

3.3.2. Use of online communication tools

Yahoo mail/Gmail

Presented in table 4 is the level of technological skill of the respondents on the use of online communication tools particularly yahoo mail/ gmail and zoom/ google meet or webex. As revealed in the table, most of the respondents were intermediately skilled along creation of email accounts (2.84), composition and sending of email (2.77), making replies (2.75) and attaching files to email (2.73). Their confidence over using Gmail or Yahoo Mail may be supported with the fact that respondents were forced to maximize their emails as early as admission to the University.

With the sudden shift from face-to-face in-class sessions, most of the respondents were beginners in using or maximizing their presence in virtual conference tools such as zoom, google meet, and webex. This is evident from the responses made which include: joining meetings (1.94), posting questions or reactions (1.93), and sharing a slide or screen (1.91). This however may likely increase with repeated engagements among teachers and utilizing approaches or strategies where teachers

intersperse the use of slide sharing and posing reactions and questions during synchronous engagements using the online tools. More so, while, Email has been used in a variety of instructional contexts with its obvious benefits like efficiency, convenience, and cost, the result indicates that since students are intermediately skilled in email use, the app may also serve as a supplemental method of supervision in online courses.

Studies have suggested that "email use enables psychosocial, academic, and professional development and, further, that it can support the important interaction between cognitive and non-cognitive aspects of learning", (Burgstahler and Cronheim 2001).

Table 4 Level of Technological Skill on Usage of yahoo mail/Gmail.

	Weighted Mean	Descriptive Value
Yahoo		
Create an account	2.84	Intermediate
Compose and Send email	2.77	Intermediate
Attach files to email	2.73	Intermediate
Reply and forward email	2.75	Intermediate
Zoom/Google Meet/ WebEx		
Join meeting	1.94	Beginner/Emerging
Share slides/screen	1.91	Beginner/Emerging
Post questions or reactions	1.93	Beginner/Emerging

3.4. Use of storage devices

Flash drive and Compact Disc

The technological skill on usage of other devices like flash drive and Compact Disc is presented in table 5. In an effort to share learning resources to students incapable of accessing the internet, respondents were asked about their skills along the use of flash drive and compact disc. These drives are expected to be one way of gaining offline access to course materials as well as storing their outputs. Evident in the table below, however, that most respondents have emerging skills along formatting the device (2.24) as well as burning or writing files unto these devices (2.08).

Table 5 Level of Technological Skill on Usage of other devices like flash drive and Compact Disc.

	Weighted Mean	Descriptive Value
Format the device	2.24	Beginner/Emerging
Burn or write files	2.08	Beginner/Emerging

3.5. Creating and packaging video material

Apparent in Table 6 is the level of technological skill of the respondents in creating and packaging video material. Activating presentation and communication skills from the students, the use of presentation packages that run over mobile phones or laptops and computers were being surveyed. Most respondents indicated a beginner or emerging skill creating and packaging video materials using PowerPoint (2.41), Kinemaster (2.09), and Moviemaker (2.02). A very limited skill in the use of Vegas (1.74) surfaced from the respondents.

Table 6 Level of Technological Skill in Creating and packaging video material.

	Weighted Mean	Descriptive Value
Kinemaster	2.09	Beginner/Emerging
PowerPoint	2.41	Beginner/Emerging
MovieMaker	2.02	Beginner/Emerging
Vegas	1.74	Very Limited

Uploading and Managing content, video materials, outputs in online platform

In order to determine the skills of the students making submissions in online platforms, respondents were asked to shed some light on their skills in terms of uploading and managing content, video materials and outputs in an online facility. Data in table 7 unveiled that the respondents skill along the use of social media i.e. Facebook, maximizing YouTube, use of file management systems such as Google Drive and DropBox, as well Educational learning management systems or LMS were found to be emerging with a mean of 2.33, 2.09, 2.04, 1.82 and 1.96 respectively.

3.6. Self-efficacy on Flexible Learning

When asked on the personal assessment of the students on their self-efficacy on flexible learning, the result revealed in table 8 revealed that they possess high self-efficacy regarding a flexible learning environment. They felt they could confidently and comfortably utilize online learning tools. They likewise were in agreement of their self-efficacy on their self-

management of learning, self-supervision and self-regulation. Of the 22 items, the students only exhibited disagreement to the statement that learning on the Internet outside of class is more motivating than a regular course and they learn independently even with less teacher assistance. This poses the students need for instructional presence and supervision in a flexible environment. The reckoned overall weighted mean of 3.06 with a descriptive value of agree indicates that the students are relatively efficacious in a flexible learning environment.

The ASE of a learner is substantially correlated with academic success, according to several prior research (Richardson et al 2012; Honicke and Broadbent 2016). According to the findings, higher ASE scores are more likely to translate into greater levels of academic success. The average rating in the data indicates average self-efficacy.

Table 7 Level of Technological Skill in Uploading and Managing content, video materials, outputs in online platform.

	Weighted Mean	Descriptive Value
Youtube	2.09	Beginner/Emerging
Google drive	2.04	Beginner/Emerging
DropBox	1.82	Beginner/Emerging
Social media platforms (FB)	2.33	Beginner/Emerging
Educational Learning Mngt System	1.96	Beginner/Emerging

Table 8 Self-efficacy of the respondents on Flexible learning.

Statements	Weighted Mean	Descriptive Value
I am comfortable communicating electronically	2.97	Agree
I am willing to actively communicate with my classmates and instructors electronically.	2.79	Agree
I feel that my background and experience will be beneficial to my studies.	2.87	Agree
I am comfortable with written communication.	3.05	Agree
I believe looking back on what I have learned in a course will help me to remember it better.	3.13	Agree
In my studies, I am self-disciplined and find it easy to set aside reading and homework time.	3.06	Agree
I am able to manage my study time effectively and easily complete assignments on time.	3.03	Agree
As a student, I enjoy working independently.	2.94	Agree
As a student, I enjoy working with other students in groups.	3.17	Agree
I like a lot of interaction with my online instructors	3.12	Agree
I possess sufficient computer keyboarding skills for doing online work.	2.67	Agree
I feel comfortable composing text on a computer in an online learning environment.	2.64	Agree
I feel comfortable communicating online in English.	2.58	Agree
I can ask my teacher questions and receive a quick response during Internet activities outside of class.	2.81	Agree
I feel that face-to-face contact with my instructor is necessary to learn.	3.20	Agree
I am motivated by the material in an Internet activity outside of class.	2.72	Agree
I can discuss with other students during Internet activities outside of class.	2.70	Agree
I can work in a group during activities outside of class.	2.75	Agree
I can collaborate with other students donline	2.78	Agree
Learning is the same in class and at home on the Internet.	2.53	Agree
I can practice lessons during online activities outside of class.	2.81	Agree
I believe that learning on the Internet outside of class is more motivating than a regular face to face course.	2.46	Disagree
I believe a complete course can be given online without difficulty.	2.55	Agree
I could pass a course in a Flexible learning environment without any teacher assistance.	2.36	Disagree
I believe an online course is possible	2.85	Agree
Overall Mean	3.06	Agree

4. Implications

Pedagogic readiness as emphasized by Bappa-Aliyu (2012) focuses on the potential fit between Information Communication Technologies (ICT) and current teaching and learning practice. In order to be technically pedagogically prepared, CSU must examine various opportunities for incorporating flexible education, evaluate the technology proficiency requirements for teachers and students, guarantee that ICTs will meet students' educational needs, and guarantee that instructors are qualified to support flexible learning.

The findings of this study could have ramifications in the Academic service of the study site. It might want to consider the results in crafting a learner support program on improving technological skill responsive to flexible learning delivery mode especially on areas where the respondents were found to perform with emerging skill. With the right pedagogical base and

considering the respondent of the study site exhibiting relatively high efficacy on flexible learning, teachers might also consider using other online tools in their instructional delivery online. While a range of teaching and learning strategies can be used in online contexts to make flexible instructions; however, the convenience of technological tools and devices among students should be taken into consideration when choosing learning scenarios.

A flexible learning platform looking into connections, contents and contexts should be worked into to address needs and gaps. Also, a policy document on a one unit course readiness for flexible learning may be conducted prior to official classes most specifically thru the LENS platform of the university which may be integrated in the student manual handbook on flexible learning. Accommodating those disadvantage ones, an offline intervention through modular approach but monitored thru other remote modality could also be embarked.

5. Conclusion

Most of the participants use a shared smartphone for learning, and a handful with personal laptops. With the majority considered as digital natives, most of them were familiar with and have used relevant online tools to support learning. The majority of them, however, are regarded as novices when it comes to using learning management systems, online communication tools, storage devices, producing and packaging video content, and uploading and maintaining web contents. Most of the participants generally agree on self-efficacy items towards flexible learning.

The results posted varied user levels of competency or skills which offers an opportunity for Cagayan State University to devise adaptive training and development programs that would not only boost online presence but also take advantage of improving delivery of intended learning outcomes seamlessly with technology.

Considering the conditions of a number of disadvantaged learners with issues on finances, distance, connectivity and technological skills, curriculum designers must design learning activities that are student-friendly by allowing open submissions, less activity restrictions on outcomes-based learning activities expected for specific learning courses, and provision of a holistic learner-support structure.

The study posits some limitations. First, the study only made use of a descriptive method, therefore, a similar study using causal-correlational design with wider scope of participants might be embarked by future researchers.

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Ethical considerations

Involving human subjects as its participants, the study obtained approval from the Institutional Review Board (IRB) for research. All participants of the research were administered with a lodged informed consent where the research project's objectives, procedures, confidentiality, as well as the benefits and possible risks, were thoroughly explained and disclosed.

Conflict of Interest

The authors declare that they have no conflict of interest.

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References

Alaghbary G (2021) Integrating Technology with Bloom's Revised Taxonomy: Web 2.0-enabled Learning Designs for Online Learning. Asian EFL Journal Research Articles 28.

Alolaywi Y (2021) Learning in Crisis: An Investigation of Saudi EFL learners' Perceptions of E-Learning during the COVID-19 Pandemic Asian EFL Journal Research Articles 28:98-119.

Aristovnik A, Kerži˘c D, Ravšelj D, Tomaževi˘c N, Umek L (2020) Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. DOI: 10.3390/su12208438

Bao W (2020) COVID-19 and online teaching in higher education: A Case Study of Peking University.DOI: 10.1002/hbe2.191

Bappa-Aliyu M (2012) Challenges and Barriers to Successful Integration of Information and Communication Technologies (ICTs) in Nigeria. Journal of Technical, Vocational & Engineering Education 6:124-130.

Breuer H, Schwarz H, Feller K, Matsumoto M (2014) Value Innovation in Learner-Centered Design. How to Develop Valuable Learning Tools. DOI: 10.2249/IJE.2.1.01

Burgstahler S, Cronheim D (2001) Supporting Peer–peer and Mentor–protege Relationships on the Internet. Journal of Research on Technology in Education. 34:59–74.

Cicha K, Rizun M, Rutecka P, Strzelecki A (2021) COVID-19 and Higher Education: First-Year Students' Expectations toward Distance Learning. DOI: 10.3390/su13041889

Honicke T, Broadbent J (2016) The Influence of Academic Self-Efficacy on Academic Performance: A Systematic Review. DOI: 10.1016/j.edurev.2015.11.002

Idrizi E, Filiposka S, Trajkovik V (2021) Analysis of Success Indicators in Online Learning. DOI: 10.19173/irrodl.v22i2.5243

Joaquin J, Biana H, Dacela M (2021) The Philippine Higher Education Sector in the Time of COVID-19. DOI: 10.3389/feduc.2020.576371

Karim M, Hasan M (2020) Virtual Classes during COVID 19 Pandemic in Tertiary Level in Saudi Arabia: Challenges and Prospects from the Students' Perspective. Asian EFL Journal Research Articles 27:205-219

Li KC, Wong B (2018) Revisiting the Definitions and Implementation of Flexible Learning. In Li K, Yuen K & Wong B (Eds.) Innovations in Open and Flexible Educatiom 3-13.

Muilenburg L, Berge Z (2007) Student Barriers to Online Learning: A Factor Analytic Study. DOI: 10.1080/01587910500081269

Naylor D, Nyanjom J (2020) Educators' Emotions Involved in the Transition to Online Teaching in Higher Education. DOI: 10.1080/07294360.2020.1811645

Tanveer M, Bhaumik A, Hassan S, Ul Haq I (2020) Covid-19 Pandemic, Outbreak Educational Sector and Students Online Learning in Saudi Arabia. Journal of Entrepreneurship Education 23.

Tondeur J, Scherer R, Baran E, Siddiq F, Valtonen T, Sointu E (2019) Teacher Educators as Gatekeepers: Preparing The Next Generation of Teachers for Technology Integration in Education. DOI: 10.1111/bject.12748

Rapanta C, Botturi l, Goodyear P, Guàrdia L, Koole M (2020) Online university teaching during and after the covid-19 crisis: Refocusing teacher presence and learning activity. DOI: 10.1007/S42438-020-00155-y

Ratliff V (2009) Are College Students Prepared for a Technology-Rich Learning Environment? MERLOT Journal of Online Learning and Teaching 5:689-702.

Richardson M, Abraham C, Bond R (2012) Psychological Correlates of University Students' Academic Performance: A Systematic Review and Meta-Analysis. DOI: 10.1037/a0026838

Talosa AD, Javier BS, Dirain EL (2021) The flexible-Learning Journey: Phenomenological Investigation of Self-Efficacy Influencing Factors among Higher Education Students. DOI: 10.37028/lingcure.v5nS3.1590

Toquero C (2020) Challenges and opportunities for higher education amid the COVID19 Pandemic: The Philippine Context. DOI: 10.29333/pr/7947

Tucker R, Morris G (2012) By Design: Negotiating Flexible Learning in the Built Environment Discipline. DOI: 10.3402/rlt.v20i0.14404 22 2021

Tuncay N (2016) Smartphones as tools for Distance Education. Journal of Educational and Instructional Studies in the World 6:20-30.

Wu S, Chang D, Sun F (2020) Exploring College Student's Perspectives on Global Mobility during the COVID-19 Pandemic Recovery. DOI: 10.3390/edusci10090218

Xiong W, Mok K, Ke G, Cheung J (2021) Impact of COVID-19 Pandemic on International Higher Education and Student Mobility: Student Perspectives from Mainland China and Hong Kong. International Journal of Educational Research.

Yazon A, Callo E (2021) Assessing Teacher's Knowledge, Self-efficacy, and Practices (KSP) in Adopting Flexible Learning during the Covid-19 Pandemic. DOI: 10.13189/ujer.2021.090115