

STRENGTHENING THE FLEXIBLE LEARNING PROGRAM THROUGH A LEARNING MANAGEMENT SYSTEM MOBILE APPLICATION

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ABSTRACT: The novel coronavirus disease (COVID-19) has caused widespread disruption throughout the world following the subsequent medical and economic fallout. Many universities have been forced to choose between closing and suspending teaching or rapidly adapting their approach to learning through online course delivery and, thus, requiring students to rely entirely on the internet. Even with the adaptation of the Flexible Learning Program (FLP), university students still face challenges in their studies, one of which is the inconsistent internet connection in their respective locations. So the University of Science and Technology of the Southern Philippines (USTP) stepped in to help the students on their internet concerns. Using the results from the student survey and focused group discussions with students, it was concluded that the USTeP Mobile Application a great complement to the University's FLP because it provides solutions to most of its users' concerns on internet connection. Students who are struggling to load up and locate a reliable internet connection will benefit greatly from the USTeP App's powerful feature of downloading unlimited learning content and viewing it offline. It is hoped that the Application will soon be available for IOS users, allowing the University's Learning Management System to be fully utilized. Moreover, the USTP faculty must also learn how to make the activities available to users offline. Finally, to support the Application's offline quizzes capability, a policy or set of guidelines may be developed.

Keywords: Learning Management System, Mobile Application, Internet Connectivity, Android Application, Branded Moodle Application, Flexible Learning Program, Higher Educational Institution

1. INTRODUCTION

As the number of COVID 19 infections continues to climb, the Philippine government, along with the rest of the world, took aggressive measures to close educational institutions temporarily in order to slow the spread of the pandemic and reduce infections [1]. More than 1.2 billion students throughout the world have been affected by the closure, including more than 28 million in the Philippines [1]. Several countries' responses, such as community lockdown and community quarantine, have pushed students and teachers to study and work from home, resulting in the development of online learning platforms [2]. However, the introduction of online learning presented a variety of concerns, issues, and hurdles for both professors and students, particularly in higher education institutions (HEIs) [3].

In the study conducted elsewhere [4], it was identified that the top three barriers and challenges encountered by students were 1.) the difficulty of clarifying topics or discussions with the professors, 2.) the lack of study or working area for doing online activities, and 3.) the lack of a good Internet connection for participating in online activities. The internet has been identified as one of the pandemic's major roadblocks.

Despite the Commission on Higher Education (CHED) suggestion to strengthen online platforms and blended learning such as but not limited to google classroom, messenger, zoom, Edmodo, Facebook and YouTube [5], recent researches show that learning in the pandemic remains a problem. As a matter of fact, different sectors have criticized these HEIs' proactive online learning initiatives. While acknowledging the importance of online education, student organizations from throughout the country have called for the cancellation of courses because students' circumstances vary greatly among universities. Access to the internet and learning equipment continued to be a luxury up to this day the petitioners claim. The internet is unavailable to 46% of Filipinos (46 million) and 74% (34,500) of public schools [6].

Students in remote parts of the country lack even access to roads and electricity, let alone computers and the internet. Furthermore, given present internet infrastructure, even kids in the metropolitan areas may have restricted access to the internet. As a result, a "digital divide" emerges between those who have and those who do not.

The DICT and the National Telecommunications Commission NTC have a vision of a connected Philippines by 2024 [7]. According to the DICT National Broadband Plan, while national plans champion ICTs for their socio-economic potential with an immediate national target of at least 80%, Internet penetration rate for the majority of the population remains low, with estimates for Internet usage at 43.5% of the population, mobile penetration is high at 101%, and yet just 30.0%, smartphone penetration in the

Philippines is relatively low [7]. The country's Internet connection problems that result to a gap in the Internet penetration rate could potentially be caused by institutional rigidities that could limit connection capacities of businesses, and thus serves as a barrier to growth for the country facing IoT demands.

There is a growing need to address the connectivity and to find ways in which students will be able to cope with the challenge of learning in the new normal.

2. REVIEW OF RELATED LITERATURE

Flexible Learning Program (FLP)

CHED Chairperson Prospero De Vera characterized the concept of flexible learning as more inclusive than online learning many months after the first outcry in March 2020. De Vera emphasizes that whereas online learning necessitates internet access, flexible learning does not. Instead, it concentrates on the design and delivery of programs, courses, and learning interventions that address the learners' particular needs in terms of pace, location, method, and learning products [8].

"Flexible Learning" is a term referred to in Sec. 3 of RA 10650 as another description of distance education which is "a mode of learning in which students and teachers are physically separated from each other. It is student-centered, guided independent study, making use of well-studied teaching and learning pedagogies to deliver well-designed learning materials." The University of Science and Technology of Southern Philippines (USTP) is a public institution of tertiary education with a strategic locational advantage in Northern Mindanao. It has 2 major campuses and six (6) satellite campuses in Misamis Oriental and Misamis Occidental. The University has 16,208 students in the first FLP implementation (SY 2020-2021) and 21,308 on its second year (SY 2021-2022).

Part of the preparatory initiatives of the University for the FLP is the faculty and student survey to primarily determine the nature of support to be given to faculty and students, system-wide surveys on availability of gadgets and connectivity, and experience in online teaching/learning are to be conducted. Along with it is the preparation of the the Digital Infrastructure and the setting up and deployment of online systems such as admission, enrolment and the learning management system.

Internet Condition in Mindanao

Although the Philippines became officially linked to the Internet in 1994, the Internet continues to be a major source of frustration. According to data, the Philippines is towards the bottom of the globe in terms of Internet speed, accessibility, and information sharing [9]. In some nations, information and

communication technologies (ICTs) have become a game changer in terms of sharing information, gaining access to connections, and moving beyond existing Internet connectivity to the next big ICT revolution: the Internet of Things (IoT) [9]. The essential prerequisite for IoT to work, however, is not met if basic connectivity is unavailable. IoT requires more than 55 times the current average Internet connection speed in the Philippines to sustain its dependability, quality, and pervasiveness [10]. There can be no IoT until the country has widespread, dependable, and high-quality enterprise Internet connectivity. As a result, as the need for more modern technology grows, businesses will increasingly need to install Internet connectivity solutions [10]. According to Ookla Global Speedtest, as cited in [12], Internet speed in the country is at best 32% of global fixed broadband speed, and 53% for mobile broadband as shown in the table below.

Table 1. Philippine Internet Speed

	Fixed Download (Mbps)	Broadband Speed (Mbps)	Mobile Download (Mbps)	Broadband Speed (Mbps)
Philippine Average	19.28		14.46	
Global Average	59.6		27.22	

With the overall low internet speed, it is even slower in Mindanao. Table shows the average internet speed in key areas in the country using the Measurement Lab (MLab) of Princeton University, Google, Open Technology Institute and Code for Science and Society [12]. It can be seen that places in Mindanao have the lowest speed making it a challenge for both the teacher and students to get by the new normal.

Table 2. Internet Speed in Key Areas in the Philippines

Area	Average Internet Speed (Mbps)
Cotabato City	1.03
Davao City	2.57
Cagayan de Oro City	2.79
Cebu City	2.62
Bacolod City	2.44
Naga City	9.57
Quezon City	6.04
Makati City	4.06
City of Manila	3.19

With the ongoing pandemic, access to fast and stable internet is a must. Thus, the Department of Information Communication and Technology (DICT) proposed immediate intervention such as fasttracking the implementation of programs that will improve Mindanao digital infrastructure [13]. However, things do not just happen overnight and it will still take time before plan of actions are seen and felt on the ground.

With students presently enrolled in a fully remote learning program due to the pandemic, the University must enable its determined students to continue learning and help them especially in their battle to find a decent internet connection.

3. DATA GATHERING PROCEDURE

Part of the preparatory initiatives of the University is the faculty and student survey to primarily determine the nature of support to be given to faculty and students, system-wide surveys on availability of gadgets and connectivity, and experience in online teaching/learning are to be conducted. The survey was incorporated in the enrollment process and disseminated through the help of the student organizations.

A focused group discussion among the Student Government body, the Office of Student Affairs and Office of the Vice President for Student Affairs and the Digital Transformation Office was also conducted.

4. RESULTS AND DISCUSSION

Due to the short notice and the timing, which was during the Summer vacation, only 5,606 respondents were able to answer the survey from June 18, 2020 to July 10, 2020.

Table 3. Distribution of Respondents per Campus

Campus	N	%
Cagayan de Oro		
College of Engineering and Architecture	1,792	32%
College of Information, Technology and Computing	905	16.1%
College of Science and Mathematics	513	9.2%
College of Science and Technology Education	669	11.9%
College of Technology	511	9.1%
Senior High School	286	5.1%
Claveria		
College of Agriculture	293	5.2%
College of Arts and Science	50	.9%
College of Engineering and Technology	188	3.4%
Balubal	32	.6%
Jasaan	111	2%
Oroquieta	103	1.8%
Panaon	90	1.6%
Villanueva	63	1.1%
Total	5,606	

Table 3 shows that there were 4,676 from Cagayan de Oro Campus, 531 from Claveria Campus and 399 total respondents from Satellite Campuses.

Table 4. Availability of Internet Connection at Home

With Internet Connection at Home	N	Percentage
Yes	2,362	42.1%
None - but willing to pay for internet connectivity in order to attend FL classes	2148	38.3%
None - there is no way for me to have internet connectivity at home	1096	19.6%

Table 4 shows that 2,362 (42.1%) of the respondents have internet connection at home while 3,244 (57.90%) do not have internet connection at home. Out of those who do not have connection, 2,148 respondents are willing to pay for internet connectivity while 1,096 do not have means of getting an internet connection. The data show that students may have problem getting a decent signal, may not have means to purchase an internet data or may not have the gadget to support online learning.

Table 5. Types of Devices for Internet Connection

Devices use to connect to the Internet	N	Percentage
Desktop Computer	283	5.05%
Netbook PC/Laptop	397	7.08%
Tablet	534	9.53%
Smart Mobile Phone	3,222	57.47%
Computer Shop/ Borrow from relatives	108	1.93%
No response/Blank	1,062	18.94%

Table 5 shows that majority of the respondents or 3,222 (57.47%) use their smart phone or mobile phone in connecting to the internet. Other gadgets that allow mobility are Netbook PC and Tablet which accounts to 397 (7.08%) and 534 (9.53%) of the respondents, respectively. It is well noting that only 283 (5.05%) respondents are using desktop computer at home. However there are 108 (1.93) students who do not have gadgets and may need to borrow from their family members, relatives or go to computer shop to connect.

Table 6. Type of Internet Connection at Home

Type of Internet Connection at Home	N	Percentage
Postpaid Plan/Bundle/Wired Connection	1,553	27.70%
Prepaid Wifi	743	13.25%
Postpaid Data	107	1.91%
Prepaid Data	2,375	42.37%
Others (P2P, neighbor's connection)	84	1.50%
No response/Blank	744	13.27%

Table 6 shows that the mobile Data Connection is the primary means of connectivity at home with 2,375 (42.37%) and 107

(1.91%) respondents for prepaid and postpaid data, respectively. This is followed by respondents with wired or wireless connection at home with 1,553 (27.70%) and 743 (13.25%) respondents for postpaid plan and prepaid wifi, respectively. It can be inferred that internet connectivity comes from subscribing to the network's carrier.

Table 7. Internet Speed

Internet Speed in *mbps	N	Percentage
1-2.99	1,560	27.83%
3-3.99	679	12.11%
4-5.99	797	14.22%
6-9.99	711	12.68%
Oct-20	486	8.67%
21-50 or higher	392	6.99%
Can't run the test/I don't know	877	15.64%
No response/Blank	104	1.86%

*mbps- megabytes per second

Table 7 shows that the top speed of the internet of the respondents fall between 1-2.99 mbps. That accounts to 1,560 (27.83%) respondents while 392 (6.99%) have 21-50 or higher internet speed. This proves the slower internet connection in Mindanao as presented in Mindanao Development Authority report.

Table 8. Internet Speed Description

Description of internet speed	N	Percentage
Unpredictable speed patterns (sometimes fast, sometimes slow)	2,263	40.37%
Slow at all times	515	9.19%
Slow in the day but fast in the dawn/late evening	1,103	19.68%
Fast in the day but slow in the dawn/evening	120	2.14%
Fast	518	9.24%
Very fast	138	2.46%
No response/Blank	949	16.93%

Table 8 shows the stability of the internet connection as described by the respondents. There are 2,263 (40.37%) respondents who say that they experience unpredictable internet connection and 1,103 (19.68%) says that their connection is slower in daytime and faster at dawn or late evening. This is probably due to the number of users during the day that causes the speed to go down.

These are some of the students verbatim comments on the FLP Survey and FGD.

- *"I connect through Smart Mobile Phone, Only a smart mobile phone but is already on the verge of no longer being sufficient for online classes due to being an obsolete model and has a huge LCD damage on the screen. Parents can no longer afford to buy a new device for me".*
- *"I use Smart Mobile Phone, sometimes I borrow laptop from my cousin".*
- *"I have Laptop Computer, Smart Mobile Phone, Pero guba pa battery ang laptop (but the laptop battery is damaged already)*
- *"There is no way for me to have Internet connectivity at home. I buy load and use data connection".*
- *"Walay signal sa amoa lugar, ayha rako maka internet kung mag anha sa Centro which is 15-20 minutes motorcycle drive gikan sa amo. Para maka konek sa internet, magpaload ko usahay sa ako cp". (There is no signal in my place. I only get connected when I go to the city, which is about 15-20 motorcycle ride from our place. To get connected to the internet, I have to load up my cellphone with data")*
- *"Close ang internet cafe tanan dre... hinay kaayo signal sa device dre (2bars ra ug HSPA - 3G ra pa jud)" (All internet cafes have closed...the internet connection in my device is so poor--it has 2 bars of HSPA, 3G connection)*
- *"I find a place where there is connection"*
- *"I use mobile data with my phone but i need the go outside to catch a signal".*
- *Everywhere just to reach stable network connection*
- *"We have wifi but it is not that effective in terms of signal. It's not enough".*

- *"Need to go outside and find Internet connection"*
- *"I will buy load go to the city"*
- *"I try to connect via Free wifi in a public place"*
- *"I am Travelling to Villanueva to have an internet"*
- *"I go to elevated place a approximately 1km away from our house, prone from rain and sunlight. Each day walk-in to be there".*
- *"I rent a boardinghouse here in the city, and we paid for wifi"*
- *"There is a Wifi Vendo, 50 meters away from our house"*
- *"If internet is not available, there's no way for us to find another way since there's no computer shops nor public places that offers free wifi".*

It can be gleaned from the survey that the the problems emanate from the intermittent and limited internet connection. Moreover, most respondents use smart phone and mobile phone to access learning contents inside and outside of their homes.

Learning Management System Application

USTP launched its own platform for the FLP using Moodle, an open source learning management system. The University branded it as USTeP or University of Science and Technology e-Learning Portal. Students need to access the site using a web-browser to see their courses and participate in learning activities.

The Office of the Vice President for Academic Affairs (OVPA) issued several memorandum to guide the faculty in the implementation of the FLP. The minimum learning content had a target of 75% completion before the opening of classes. Additionally, delivery modes are specified according to the availability of students' gadget and internet connectivity. Learning contents and activities shall be designed so that these can be easily downloaded and/or printed even in weak signal areas.

The data shows that most students connect to the internet using the mobile phone and use mobile data to connect to the internet. Moreover, there are students who need to go to the city or move from place to place to either load up or to get a decent internet signal to access USTeP. With these reasons, the University subscribed to a USTeP Mobile Application through the Branded Moodle App program.

The USTeP mobile Application can be downloaded from Google Playstore. Since it's an application, students just need to install the app and login with their credentials and access it seamlessly. This is highly convenient than logging into classes through a device's browser.

But the most powerful feature of the USTeP Application is its ability to download unlimited learning contents and access them offline. Students can browse contents offline and take activities and once they are connected back to the internet, the App will synchronize all the necessary information to USTeP. This is useful for commuting or living in rural places where the network may be unstable. Thus, those students who need to travel far just to connect to the internet can just access the site once in a week or several times in a month to download the Courses from the Application and access them offline.

The App also alerts the users when downloading large files. If the user is connected to a Wifi Network, it can download >=20mb files while >=2mb to a data network only. Finally, the App stores browsing activities to the learning contents and prompts users especially the students if resources have been updated by their Instructors and Professors so they can refresh the page and store them to cloud for offline access.

With its push notifications, students are engaged in their virtual lessons. Exchange of messages are possible and seamless, too.

The following data from Google Playstore shows an increasing number of users from the time it was deployed in February, 2021 towards the second year of the FLP implementation in September, 2021.

Table 9. Number of USTeP Application Downloads per Month

Month	Number of Downloads
February	3,093
March	972
April	274
May	309
June	164
July	384
August	5,263
September	2,252
October	682
Total	13,393

The data shows that the concentration of highest downloads happened when it was first launched in February and during the first few months of the First Semester of current school year 2021-2022. This accounts to 3,093 downloads in February, which is within the first year of FLP implementation and School Year 2020-2021; 5,263 and 2,252 for August and September, respectively. This high volume of downloads happens whenever students are oriented with the availability of USTeP application and when the benefits and advantages are discussed during the Week of Welcome. It can also be inferred that students proactively prepare for their classes and ensure they have the application to be able to download their courses and access them even when they go offline.

5. CONCLUSION AND RECOMMENDATIONS

In reference to the findings, it can be concluded that the USTeP Mobile Application strengthens the Flexible Learning Program of the University by providing the students the means to learn without being completely reliant on the accessibility and availability of an Internet connection. The USTeP Application is valuable to the academic community because it provides solutions to the most of its users' concerns. The App is a great complement to the University's Flexible Learning Program. It is hoped that the Application will soon be available for IOS users, allowing the University's Learning Management System to be fully utilized. The faculty of USTP must also learn how to make some of the activities offline-ready for its users. Likewise, a policy or set of guidelines may be created to support the offline quizzes of the Application.

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