

Higher education students' perceptions of the CBSUA's IDIG-funded free Wi-Fi project: Access, usage, well-being, and challenges

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Abstract: The availability of free Wi-Fi provided by the Commission on Higher Education (CHED) Institutional Development and Innovation Grant (IDIG), in partnership with the Central Bicol State University of Agriculture (CBSUA), across its four campuses aims to enhance students' learning experiences by providing access to educational resources, communication tools, and online platforms for flexible learning. A total of 103 student beneficiaries participated in the study, selected through a purposive random sampling method. Using a convergent parallel mixed-method design, both survey questionnaires and interviews were employed to capture students' experiences. Findings revealed that while the free Wi-Fi program provided equitable access to online resources and supported asynchronous learning, significant barriers limited its effectiveness. Students reported slow internet speed, dropped connections, usage restrictions, and limited coverage as common problems. These challenges hindered their ability to participate actively in online classes and reduced opportunities for social connectedness. Despite these issues, students acknowledged that the project helped them download course materials, complete asynchronous tasks, and reduce the stress of securing mobile data. The study suggests that institutional Wi-Fi initiatives can help bridge aspects of the digital divide, but they require stronger infrastructure, policy adjustments, and effective student support systems to maximize their benefits. These findings are significant for enhancing CBSUA's educational programs and services by ensuring inclusive access to digital learning.

Keywords: Academic Success, Challenges, Digital Divide, Free Wi-Fi, Student Well-Being.

1. Introduction

The COVID-19 pandemic underscored the importance of ensuring that students have access to the necessary resources to continue their education. While flexible learning modalities were introduced as a response, one of the most critical forms of support provided by higher education institutions has been access to reliable internet connectivity. At the Central Bicol State University of Agriculture (CBSUA), the implementation of a free Wi-Fi program through the Commission on Higher Education IDIG was able to implement the project titled "Education at the One-Step." Sustaining higher education amidst the COVID-19 pandemic through flexible learning in partnership with the communities. This initiative not only supports academic requirements but also promotes inclusivity by giving all students equal opportunities to participate in the learning process.

The provision of free Wi-Fi is aligned with the CHED-IDIG Project, which seeks to accelerate government efforts in providing equitable internet access for Filipinos. By offering free Wi-Fi in educational institutions, the law acknowledges the necessity of connectivity in enhancing learning opportunities and reducing inequalities between students of varying socio-economic backgrounds. For CBSUA, this project plays a vital role in ensuring that students are able to attend virtual classes, engage in academic discussions, and submit outputs on time despite financial or geographical limitations.

This study is anchored in several theoretical perspectives that highlight the value of internet access in education. The Digital Divide Theory emphasizes the disparity between individuals who have access to technology and those who do not, framing free Wi-Fi as a tool to narrow this gap. In addition, *Connectivism* theory underscores the role of digital networks in the learning process, where knowledge is acquired through connections facilitated by technology. Furthermore, Maslow's Hierarchy of Needs illustrates how internet access addresses students' basic academic requirements, enabling them to pursue higher-level goals such as self-improvement, collaboration, and personal growth. These theories collectively provide the framework for understanding how access to free Wi-Fi can influence students' learning outcomes and overall well-being.

Despite the benefits of such initiatives, there remain significant challenges in maximizing their effectiveness. Prior studies reveal that unstable internet connections, limited bandwidth, and weak signals in remote or rural areas hinder students from fully benefiting from free Wi-Fi programs [1]. These issues not only affect academic performance but also contribute to student stress and disengagement. Without reliable connectivity, students are often left behind in online discussions and may struggle to complete their academic requirements efficiently.

Recognizing these challenges, programs such as CBSUA's free Wi-Fi initiative must be continuously improved to ensure wider coverage, stronger signals, and more consistent service. This requires investment in infrastructure, careful monitoring of system performance, and coordination with government initiatives such as the CBSUA's approved IDIG Project. By doing so, institutions can strengthen the sustainability of internet provision and maximize its impact on student learning.

This study was conducted to harness the students' perceptions of CBSUA's free Wi-Fi project on students' academic success and well-being. Specifically, it investigates how access to reliable internet influences productivity, engagement, and stress reduction among learners. According to York et al. [2], academic success is multidimensional, encompassing cognitive achievement, persistence, skill development, and satisfaction with the learning experience. Therefore, the CBSUA's IDIG-funded project reflects how improved internet access contributes to students' academic productivity, participation in flexible learning, and sense of accomplishment in tertiary education.

The findings of the study are expected to provide insights into how institutional support in the form of internet access can help bridge educational gaps, foster equitable learning environments, and serve as a model for enhancing accessibility in higher education.

1.1. Objectives

The study was conducted to:

1. Describe students' access and usage of the CBSUA's IDIG-Funded Free Wi-Fi project across the campuses.
2. Explore students' perceptions of how the free Wi-Fi provision supports academic tasks, flexible learning participation, and well-being;
3. Identify challenges to the effective use of free Wi-Fi in students' learning experiences.

2. Methodology

This study employed a mixed-method research design, specifically the Convergent Parallel Design, to harness student perceptions on the CBSUA's IDIG Funded Project. The design was deemed appropriate because it allowed the researchers to collect both quantitative data through survey questionnaires and descriptive statistics and qualitative data through interviews and narratives simultaneously, giving equal importance to both types of data. The integration of results provided a more holistic understanding of the effect of free Wi-Fi on students' academic experiences and well-being.

The study was conducted after the COVID-19 pandemic, when CBSUA had already shifted to implementing support programs that enhanced accessibility for students in the post-pandemic learning environment. This period was significant because it reflected the transition from emergency flexible

learning to more sustainable institutional interventions, such as the free Wi-Fi project, designed to address connectivity gaps.

Table 1.
Free Wi-Fi Beneficiaries from the Four Campuses of CBSUA

Campus	Access Point Location	Frequency	Total	Percentage
Campus A	Barangay A1	5	10	9
	Barangay A2	5		
Campus B	Barangay B1	17	39	38
	Barangay B2	22		
Campus C	Barangay C1	20	43	42
	Barangay C2	23		
Campus D	Barangay D1	7	11	11
	Barangay D2	4		
Total			103	100

As reflected in Table 1, the number of Wi-Fi beneficiaries at the four campuses of CBSUA is listed. The Access Point Locations for each campus are situated in the Barangays A1 and A2 in Campus A, Barangays B1 and B2 in Campus B, Barangays C1 and C2 in Campus C, and Barangays D1 and D2 in Campus D. Furthermore, the table shows that there are 10 student beneficiaries in Campus A, 39 in Campus B, 43 in Campus C, and 11 in Campus D. A total of 103 student beneficiaries accessed the internet using CBSUA's free Wi-Fi project.

The participants of this study were selected based on their status as official beneficiaries of the CBSUA free Wi-Fi project. Only students whose names appeared on the list of registered users provided by the university were included, ensuring that the respondents had direct and legitimate access to the service. Furthermore, purposive sampling was applied to include those who had firsthand experience in using Wi-Fi for online classes, flexible learning, and other academic activities.

2.1. Institutional Approval and Ethical Compliance Statement

This research was reviewed and approved by the Research Service Division of the Central Bicol State University of Agriculture (CBSUA), which oversees institutional research activities and ensures compliance with ethical standards. All procedures involving participants adhered to the university's research guidelines and ethical principles, including voluntary participation, confidentiality, and informed consent.

2.2. Research Instruments

Two main instruments were used in this study. A survey questionnaire was distributed to student beneficiaries to collect quantitative data on accessibility, frequency of use, and perceptions of the free Wi-Fi project on their academic performance and well-being. In addition, a semi-structured interview guide was employed to gather qualitative data from students focusing on the challenges encountered in using the free Wi-Fi, as well as suggestions for improvement. To ensure reliability and appropriateness, both instruments were reviewed and validated by experts in research and educational technology.

2.3. Ethical Considerations

Ethical standards were strictly observed in the conduct of the study. Participation was voluntary, and informed consent was obtained from all respondents. The confidentiality of their responses was assured, and anonymity was maintained in reporting the results. The data gathered were used solely for research purposes.

2.4. Data Analysis

Quantitative data were analyzed using descriptive statistics such as frequency counts and percentages, presented in tables. Qualitative data were transcribed, coded, and analyzed thematically to capture the students' experiences and perceptions. The quantitative and qualitative findings were integrated and triangulated in the discussion to provide a comprehensive understanding of the free Wi-Fi project, thus forming the students' perceptions.

3. Results and Discussion

3.1. Students' Access and Usage of the CBSUA's IDIG-Funded Free Wi-Fi Project Across the Campuses

The data reveal that most student beneficiaries use the free Wi-Fi for less than 30 minutes daily, followed by those who connect for 31 minutes to 1 hour, and a smaller portion who use it for more than 2 hours. Specifically, Campus B and Campus C recorded the highest number of short-duration users, while Campus D and Campus A had relatively fewer users within this range.

The findings indicate that while the IDIG-funded free Wi-Fi project has reached students across all CBSUA campuses, its usage duration remains relatively short. This suggests that students access the internet mainly for essential academic activities such as downloading learning materials, uploading tasks, and checking announcements rather than for continuous browsing or extended online learning. The variation in access duration among campuses may also reflect differences in signal strength, connectivity reliability, and campus infrastructure supporting Wi-Fi availability.

Table 2.

Daily duration of internet access among CBSUA students across the four campuses.

Daily Duration	Campus A	Campus B	Campus C	Campus D
Less than 30 minutes	3	27	24	3
31 minutes to 1 hour	3	6	11	2
1 hour to 2 hours	1	5	6	0
More than 2 hours	2	1	4	4

Shorter internet usage durations do not necessarily imply underutilization but rather efficient adaptation to available resources. Students appear to strategically use their allotted connection time to accomplish key learning tasks offline afterward, reflecting a practical and time-conscious approach to connectivity limitations. Moreover, this pattern underscores the significance of the free Wi-Fi initiative in bridging the digital divide, particularly for students with limited access to mobile data or home internet services.

These findings align with the study of Bhatnagar and Bolia [3], which emphasizes that even limited Wi-Fi access can substantially enhance students' academic engagement by enabling crucial digital tasks like downloading, uploading, and communication.

Table 3.

Reasons behind the limited duration of internet access among CBSUA students across the four campuses.

Factors	Campus A	Campus B	Campus C	Campus D
Poor signal reception	6	25	24	2
Technical Difficulties in reconnecting to the network	5	28	17	4
Limited access to a device to connect to the internet	2	3	6	1
Personal preference	4	7	10	5
Another source of internet connection	1	2	6	0
Distance of the connection from home	2	2	1	1

The data reveal that the most common reasons for short Wi-Fi usage were technical difficulties in reconnecting to the network and poor signal reception. In particular, Campus B and Campus C recorded the highest frequencies of technical issues, with 28 and 17 students, respectively. For weak signal reception, 25 and 24 students from the B and C Campuses reported issues. Other factors identified include

limited access to devices, personal preferences, use of other internet sources, and the distance of connection points from home.

The findings also indicate that although the IDIG-funded free Wi-Fi project is accessible across campuses, its effectiveness is hindered by connectivity issues. Poor signal reception and technical difficulties in reconnecting emerge as the most prominent barriers, reflecting the infrastructure limitations of the network system. Additionally, the distance of access points, especially in areas like Campus A and Campus B, contributes to limited usage, as students living farther from the designated coverage zones face challenges in maintaining consistent connectivity. These obstacles result in shorter internet access times, compelling students to rely more on offline learning strategies.

The results suggest that while the free Wi-Fi initiative has broadened digital access for CBSUA students, its practical usability remains constrained by technical and geographical factors. Students' adaptive responses, such as downloading materials for asynchronous learning, demonstrate their resilience and ability to maximize limited connectivity. However, this situation also underscores the importance of enhancing infrastructure to ensure equitable access to online learning resources.

These results align with the findings of Jaca [4] that poor and unstable internet connections are among the top issues faced by state university students in the Philippines. Similarly, Bhatnagar and Bolia [3] emphasized that while free Wi-Fi initiatives increase accessibility, their impact on learning outcomes is limited if students encounter persistent technical disruptions.

Table 4.

Frequency of Wi-Fi usage among CBSUA students across the four campuses.

Frequency of Use	Campus A	Campus B	Campus C	Campus D
Once a day	5	29	27	3
Twice a day	2	5	7	5
Trice a day	3	3	3	1
When out of options	2	2	2	1
One time and never again	1	4	4	1
Rarely	0	0	4	0

The data show that the majority of respondents use the free Wi-Fi once a day, with Campus B (29 students) and Campus C (27 students) recording the highest usage in this category. Only a few students reported using it twice or thrice a day, while others accessed it only when out of options or used it once and never again. The least frequent users were from Campus D and Campus A.

The findings suggest that most students access the CBSUA's IDIG-funded Free Wi-Fi on a limited, once-a-day basis. This pattern reflects that the Wi-Fi is mainly used for specific academic purposes, such as downloading materials, accessing the learning management system, and submitting outputs, rather than for continuous browsing or extended online sessions. Furthermore, the limited duration and frequency of use may be attributed to restricted bandwidth allocation, weak signal coverage, or the rotational time limits per user imposed to accommodate more beneficiaries. The low frequency of multiple daily uses implies that while the Wi-Fi project provides essential access, it is not the students' primary or consistent internet source. Many respondents rely on mobile data or private connections when the campus Wi-Fi is unavailable or unreliable.

The results imply that CBSUA students have partial but significant access to the IDIG-funded free Wi-Fi project. Using it once daily suggests that the Wi-Fi service is primarily a supplementary educational resource rather than a full-time connectivity option. The findings point to the need for system optimization, including stronger coverage, faster connectivity, and extended access time, to fully realize the project's goal of promoting digital inclusion.

The present findings align with several studies emphasizing the importance and limitations of institutional Wi-Fi access among students in higher education. Jaca [4] found that many students accessed institutional Wi-Fi once or twice a day, mainly to download materials due to limited connectivity

and bandwidth issues. The study emphasized that accessibility does not always equate to continuous usability.

Table 5.

Time of day when CBSUA students from the Campus A, Campus B, Campus C, and Campus D campuses access the IDIG-funded Free Wi-Fi project.

Time of Day	Campus A	Campus B	Campus C	Campus D
Morning	4	22	17	7
Afternoon	3	1	8	2
Evening	2	2	3	1
Dawn	1	0	5	2

Results show that the majority of respondents use Wi-Fi in the morning, with Campus B (22) and Campus C (17) recording the highest morning users. Fewer students connect in the afternoon, evening, and dawn, although some from Campus D and Campus C reported using the connection at dawn when fewer users are online.

The data indicate that the peak Wi-Fi usage period is in the morning, as students typically go online early to download learning materials and engage in academic activities before participating in offline tasks later in the day. The relatively low usage in the afternoon and evening may be attributed to weaker connection quality during peak hours when many users are connected simultaneously. Conversely, students residing near the Local Access Points (LAPs) take advantage of off-peak hours, such as evening and dawn, to maximize connection speed and stability. Students have developed strategic internet habits, planning their online sessions according to signal strength, user congestion, and proximity to Wi-Fi hotspots.

The findings suggest that the IDIG-funded Free Wi-Fi project effectively supports students' flexible learning, allowing them to access resources at optimal times. Morning access demonstrates students' commitment to academic preparation, while off-peak usage reflects adaptability to the system's technical constraints. While the project successfully enables connectivity, its effectiveness is shaped by time-based accessibility patterns, emphasizing the need for improved bandwidth management and equitable signal coverage to ensure consistent service quality throughout the day.

The results are consistent with recent and credible studies addressing the temporal and infrastructural patterns of Wi-Fi usage in higher education settings. Jaca [4] reported that students prefer using institutional Wi-Fi during the early hours of the day to avoid network congestion and optimize download speeds. Fabito et al. [5] similarly observed that network congestion and weak signal reception during daytime force students to connect during late-night or early-morning hours to achieve better Wi-Fi performance.

Table 6.

Types of gadgets students use to access the free Wi-Fi across CBSUA campuses.

Campus	Mobile Phone	Laptop
Campus A	10	1
Campus B	39	3
Campus C	43	5
Campus D	10	2

The data show that the majority of students rely on mobile phones rather than laptops when connecting to the internet. Specifically, 10 of 11 respondents in Campus A, 39 of 42 in Campus B, 43 of 48 in Campus C, and 10 of 12 in Campus D reported using mobile phones. In contrast, only a small number on each campus, ranging from 1 to 5, used laptops. This trend indicates that mobile phones are the most common device among student users of the Free Wi-Fi project.

This preference is likely influenced by several practical factors such as affordability, portability, and convenience. Many students, particularly in rural or suburban areas, do not own laptops due to their higher cost and maintenance requirements. In contrast, mobile phones are more accessible, affordable, and easier to carry, making them ideal for connecting to the university's Wi-Fi hotspots, which are sometimes located in public areas or near campus access points.

This finding suggests that while the Free Wi-Fi project successfully promotes internet accessibility, the type of device available to students significantly affects how they utilize the service. Mobile phones, while convenient, may limit engagement in more complex academic tasks such as typing long reports, creating presentations, or running specialized software, which are better supported by laptops or desktop computers.

The predominance of mobile phone use among CBSUA students underscores both the inclusivity and the limitations of the Free Wi-Fi initiative. On one hand, it demonstrates that the project effectively reaches students by enabling them to connect through commonly owned devices. On the other hand, it highlights a digital divide not in connectivity but in device capability. Although mobile phones facilitate access to online materials and communication platforms, they may restrict deeper academic engagement that requires multitasking or document editing. The findings suggest that students have adapted their learning behaviors to their available resources by using their phones to download files, watch recorded lectures, and communicate with instructors through platforms like Messenger or Google Classroom. This adaptation illustrates student resilience and resourcefulness but also points to the need for broader digital support, such as laptop loan programs or device subsidies, to maximize the educational potential of the Free Wi-Fi project.

According to Giray et al. [6], students are heavily reliant on digital devices; frequent device use, including smartphones, and many lack multiple high-end devices. And Besa et al. [7] found that students consistently use cellphones and sometimes computers; cellphones are the most common gadget in learning.

3.2. Students' Perceptions of How the Free Wi-Fi Provision Supports Academic Tasks, Flexible Learning Participation, and Well-Being

Table 7.

Perceived effect of the CBSUA's IDIG-Funded Free Wi-Fi on students' ability to participate in flexible learning across the four campuses.

Level of Improvement	Campus A	Campus B	Campus C	Campus D
Significantly Improved	3	7	8	3
Somewhat Improved	10	30	25	4
No Change	5	10	8	5

The data show that the majority of respondents in all campuses indicated that their participation in flexible learning somewhat improved due to the availability of free Wi-Fi. Specifically, 10 students in Campus A, 30 in Campus B, 25 in Campus C, and 4 in Campus D reported moderate improvement. A smaller proportion from each campus, 3 in Campus A, 7 in Campus B, 8 in Campus C, and 3 in Campus D, experienced significant improvement, while others observed no change in their learning participation.

The results indicate that while the free Wi-Fi project contributed positively to enhancing students' participation in flexible learning, the improvement was not uniform across campuses. Campus B and Campus C recorded the highest number of respondents who experienced improvement, suggesting relatively better connectivity or more frequent utilization of the Wi-Fi project in those locations. On the other hand, Campus A and Campus D had fewer students reporting significant improvement, implying possible limitations in Wi-Fi coverage, signal stability, or accessibility in those areas. The predominance of "somewhat improved" responses implies that although the free Wi-Fi project served as a valuable resource, its effectiveness was constrained by inconsistent speed and technical interruptions.

The findings imply that CBSUA's free Wi-Fi initiative has moderately enhanced students' access to online academic resources and their engagement in flexible learning. The connectivity provided enabled students to access course materials, download assignments, and communicate with instructors, contributing to reduced stress and improved academic efficiency.

However, since many students reported only somewhat improved participation, it can be inferred that technical issues such as slow speed, limited bandwidth, and unreliable connections hindered full utilization of the service. This reflects that while infrastructural support is in place, sustainable improvements in digital facilities are necessary to ensure equitable access across all campuses. From a theoretical standpoint, the findings align with Maslow's Hierarchy of Needs, wherein providing essential learning tools such as internet access meets students' basic academic needs, enabling them to focus on higher-order goals like achievement and self-actualization. The results also resonate with Connectivism Theory, which highlights that access to digital networks fosters learning through connections and collaboration.

The results support Dharmaraj [8], who emphasized that improved digital connectivity reduces inequalities and psychological strain among students in disadvantaged communities. Similarly, Cho et al. [9] found that maintaining peer interaction through digital platforms enhances students' motivation and engagement, consistent with the present findings that free Wi-Fi connectivity helped sustain social and academic connections.

Using thematic coding of interview transcripts from students, four major themes with corresponding sub-themes emerged: (1) Academic Support and Productivity, (2) Student Well-being and Stress Reduction, (3) Social Connectedness and Collaboration, and (4) Barriers to Access and Utilization. These themes represent common experiences, challenges, and perceived benefits related to the use of CBSUA's Free Wi-Fi Project.

3.3. Theme 1: Academic Support and Productivity

3.3.1. Sub-theme 1.1: Access to Learning Materials

"I use Wi-Fi to download modules in the morning and study offline at home."

Students frequently reported using the free Wi-Fi to access virtual learning portals and download course materials, which they later studied asynchronously. This pattern indicates that free internet access was instrumental in supporting independent learning and resource retrieval, particularly for those who lacked consistent data connectivity at home. The Wi-Fi served as an academic enabler, bridging the gap between online instruction and self-paced learning.

3.3.2. Sub-theme 1.2: Task Completion and Submission

At least I can submit my assignments on time, even if I cannot attend online classes regularly.

Despite limited connection time and occasional slow speeds, students could meet academic deadlines through timely access to digital materials and submission portals. The free Wi-Fi became a vital tool for compliance with academic requirements, reflecting how digital access directly supports productivity and accountability in a flexible learning environment. This demonstrates that connectivity, even when intermittent, can meaningfully enhance students' capacity for self-regulated learning.

3.4. Theme 2: Student Well-Being and Stress Reduction

3.4.1. Sub-Theme 2.1: Reduced Anxiety over Internet Costs

Before, I had to borrow money to buy a load. Now, I just wait for the signal at the barangay hall.

The free Wi-Fi significantly eased students' financial stress by reducing their need to purchase mobile data or prepaid load. Many respondents highlighted how this lessened economic pressure, which in turn alleviated academic-related anxiety. The sense of relief from cost burdens fostered better focus on studies and improved overall well-being.

3.4.2. Sub-Theme 2.2: Peace of Mind from Offline Access

"Even if I cannot attend the online class, I still feel updated because I can download materials."

Access to online materials, even asynchronously, helped students feel less excluded from the learning process. This availability provided reassurance and stability, allowing them to keep pace with academic requirements even amid connectivity interruptions. Such access not only supported learning continuity but also promoted mental peace, aligning with the notion that digital access enhances psychological well-being through educational inclusivity.

3.5. Theme 3: Social Connectedness and Collaboration

3.5.1. Sub-Theme 3.1: Communication with Peers and Instructors

We have a group chat where we discuss our assignments. Wi-Fi helps me join in.

Students relied on the free Wi-Fi to maintain communication with peers and instructors via online messaging groups and collaborative platforms. This digital interaction nurtured academic cooperation, facilitated knowledge sharing, and sustained a sense of community among students despite physical distance.

3.5.2. Sub-Theme 3.2: Sense of Belonging in Online Communities

"I feel part of the class even if I am just reading messages."

Even minimal online participation fosters inclusion and belonging. Students expressed that being able to access class group chats, announcements, or discussions made them feel connected to the academic environment. This connection is vital in flexible learning contexts, where isolation can hinder motivation and engagement. The Wi-Fi project, therefore, acted as a social lifeline, promoting both academic collaboration and emotional support.

3.6. Theme 4: Barriers to Access and Utilization

3.6.1. Sub-theme 4.1: Poor Signal and Connectivity Issues

"Sometimes I'm already connected, but the page won't load at all."

Technical glitches, weak signals, and inconsistent connectivity were the most common issues reported. These problems disrupted learning sessions and discouraged students from relying solely on the campus Wi-Fi. Such challenges underscore the need for technical upgrades and consistent maintenance to ensure dependable access.

3.6.2. Sub-Theme 4.2: Distance from Wi-Fi Access Points

"It's too far. I have to walk 30 minutes to reach the hotspot."

Students in geographically distant or rural areas faced difficulty accessing Wi-Fi zones, which limited their participation. This issue highlights spatial inequity in resource distribution and the importance of establishing additional access points to support inclusivity across campuses.

3.6.3. Sub-Theme 4.3: Usage Restrictions and Site Blocking

"I can't even open the video my teacher posted because it's blocked."

Some respondents cited restrictions such as time limits, blocked sites, and download limitations as obstacles that hindered effective learning. While these measures may aim to regulate bandwidth, they inadvertently constrain students' access to educational materials, suggesting a need for policy adjustments that balance control with educational flexibility.

The results indicate that free and stable internet access is not merely a technological provision but a critical educational support system. It enhances academic engagement, supports emotional well-being, and fosters social inclusion among students. However, the persistent technical and geographical barriers reveal inequality in digital opportunities within the university. Addressing these issues can further strengthen the positive impacts of the project and ensure that all students benefit equally from digital learning resources.

These results align with the findings of Asio et al. [10] that reliable internet connection and learning device availability are essential factors that shape students' participation in flexible learning, emphasizing

that poor connectivity limits educational access and performance. Similarly, Gocotano et al. [11] revealed that students from rural areas in the Philippines face major challenges in online learning due to weak internet signals and inadequate infrastructure, which parallels the connectivity barriers identified in this study. In the South African context, Tungela and Iyamu [12] noted that the availability of free Wi-Fi does not always guarantee effective access, as distance and technical limitations often restrict its use, echoing the experiences of CBSUA students who reported signal and access point issues. These studies support the present findings that while free Wi-Fi provision enhances learning access and social connectedness, issues in connectivity, infrastructure, and accessibility must be addressed to ensure equitable digital inclusion for all students.

3.7. Challenges to the Effective Use of the Free WI-FI in Students' Learning Experiences

The study aimed to identify the challenges encountered by CBSUA students in using the IDIG-funded Free Wi-Fi across its four campuses. Findings revealed that while the initiative was designed to support flexible learning and equitable access to digital resources, students continue to experience several obstacles that hinder its effective utilization. The major issues identified were slow internet speed, buffering and dropped connections, usage restrictions, and limited Wi-Fi coverage or access points.

These challenges, as reported by respondents, often disrupted their online learning engagement and reduced their overall productivity in academic tasks. These challenges are consistent with earlier studies that highlighted the weaknesses of ICT infrastructure in Philippine public schools [13]. While CBSUA's free Wi-Fi improved academic access, more investment in infrastructure and coverage expansion is needed to ensure equitable and sustainable impact.

During data gathering, the issues encountered by students in using the free Wi-Fi were documented. These problems highlighted barriers to effective internet access within educational settings. The challenges were primarily related to technical difficulties, connectivity issues, and network reliability. Understanding these problems is important for improving the free Wi-Fi project for students. The problems encountered by students were categorized and presented as follows:

- a. **Internet Speed.** Based on the responses of the students, they experience slow internet speed. Due to limited bandwidth, students experience frequent disconnections while browsing the virtual learning portals or different websites. These problems disrupt their ability to access online lectures, submit assignments, download materials, and participate in online classes. Moreover, the reliability of free Wi-Fi connections is often compromised by high user demand. As more students connect to the network simultaneously, the available bandwidth gets stretched thin, resulting in slower speeds and increased latency. These technical issues can lead to inconsistent access to educational resources and affect the students' ability to complete their school-related tasks on time.
- b. **Buffering issues / dropped connections.** Students using the free Wi-Fi have reported several connectivity problems. They frequently experience buffering issues when browsing websites, leading to delays and frustration. Additionally, connections sometimes drop suddenly, making it difficult for students to reconnect and access the login sites. There are instances where login accounts do not work even though the credentials are correct, causing further inconvenience. Moreover, some devices cannot connect to the internet even after successful login attempts.
- c. **Usage Restrictions.** Another problem students encounter with the free Wi-Fi is usage restrictions. Each student's account is limited to two hours of usage per day and can only be used on one device. Some sites are blocked by the system, which limits students' browsing experience. Additionally, the accounts are restricted from downloading large data files such as videos, datasets, applications, or software updates. These usage restrictions hinder the effective use of free Wi-Fi for online classes because it is often insufficient for attending classes, completing assignments, and participating in group discussions. These limitations disrupt learning continuity and reduce participation in virtual classroom activities.

- d. Location of the Free Wi-Fi. The location of free Wi-Fi can limit student access due to physical distance, restricted coverage areas, and accessibility issues. According to student responses, they sometimes choose not to use the free Wi-Fi because the Local Access Point is too far from their homes. The Wi-Fi signal can only reach a limited area around the Barangay Hall, making it difficult for those living farther away to access it. This restricted coverage means that students who live farther away have to travel to access the internet, which is not always feasible, leading them to opt out of using the free Wi-Fi. Limited range means only those nearby can benefit, and physical or transportation barriers can further restrict access.

The findings imply that while CBSUA's Free Wi-Fi project has made strides in promoting digital inclusion, several infrastructural and administrative limitations continue to affect its effectiveness. The recurring connectivity and accessibility issues highlight the gap between infrastructure availability and practical usability. The restricted bandwidth and short usage duration suggest that the system's design prioritizes equitable distribution over sustained academic use, inadvertently compromising students' ability to complete longer online sessions or research tasks.

Location-based constraints reveal a disparity between students who live near signal sources and those in peripheral areas, emphasizing a digital divide within the institution's catchment zones. Such conditions not only impede academic continuity but may also affect students' motivation and learning engagement, particularly in remote learning contexts where stable connectivity is essential. These results underscore the need for expanded bandwidth allocation, improved router distribution, and policy adjustments to align the project's operational framework with students' actual digital learning demands.

The challenges observed in this study are consistent with previous findings on connectivity barriers in Philippine higher education. Ganai et al. [13] identified persistent issues in ICT infrastructure, such as limited network capacity and uneven internet access, which hinder technology-driven learning. Baticulon et al. [14] reported that among medical students, technological barriers, including poor internet connectivity, issues with devices, and instability, are among the most common obstacles to online learning.

4. Conclusions

1. The CBSUA's IDIG-funded Free Wi-Fi project has provided students across all campuses with significant, though limited, access to online connectivity essential for academic purposes. Most students reported using the free Wi-Fi for less than 30 minutes to one hour daily, typically once a day and primarily in the morning, reflecting a strategic pattern of short but purposeful use aimed at downloading materials, uploading assignments, and checking online announcements. Mobile phones emerged as the primary devices for connectivity, underscoring both accessibility and device-based limitations in executing complex academic tasks. Despite broad availability, the data revealed considerable variation in usage across campuses due to inconsistent signal reception, technical difficulties, and limited access points. The findings suggest that while the project successfully promotes digital inclusion, infrastructural and technological constraints continue to limit its full potential. The project fulfills its goal of extending basic connectivity but requires technical optimization, such as improved bandwidth, better signal coverage, and extended access duration to support sustained digital learning engagement. CBSUA's initiative represents a commendable step toward digital equity but demands continuous infrastructure development for more consistent and equitable access.

2. The CBSUA's Free Wi-Fi project has moderately improved students' participation in flexible learning and contributed positively to their academic productivity and overall well-being. The majority of respondents indicated that the Wi-Fi access "somewhat improved" their ability to engage in flexible learning modalities, with variations across campuses linked to network reliability and accessibility. Qualitative findings highlighted three key areas of impact: academic support and productivity, student well-being and stress reduction, and social connectedness and collaboration. Students perceived the free Wi-Fi as a crucial academic enabler that facilitated access to learning materials, timely submission of tasks, and consistent communication with instructors and peers. Economically, it alleviated financial

strain by reducing data costs, thereby promoting psychological comfort and focus on learning. It nurtured a sense of belonging within digital academic communities, mitigating isolation commonly associated with flexible learning. While the free Wi-Fi project has effectively supported students' academic and emotional well-being, its full impact can be maximized through a more stable and inclusive connectivity infrastructure.

3. Several persistent challenges hinder the effective use of CBSUA's IDIG-funded Free Wi-Fi project. Among these are slow internet speed, frequent disconnections, usage restrictions, and limited coverage of access points, all of which directly affect students' ability to engage fully in online learning. High user demand and restricted bandwidth lead to buffering and dropped connections, while policy limitations such as daily time caps and blocked educational sites further constrain usability. The distance of Wi-Fi zones from student residences, particularly in rural or remote areas, reinforces a geographic digital divide, with students near access points benefiting more than those farther away. These barriers collectively reduce the continuity and depth of students' online academic engagement, compelling many to adopt offline or asynchronous learning strategies. While these adaptations demonstrate resilience, they also indicate a need for stronger institutional support to ensure equitable and reliable digital participation.

5. Recommendations

Based on the data gathered, several tangible recommendations are proposed to strengthen the implementation and sustainability of CBSUA's IDIG-funded free Wi-Fi project.

It is recommended that the university expand and optimize its Wi-Fi coverage by installing additional Local Access Points (LAPs) in strategic and underserved areas, particularly in distant campus zones where connectivity is weak. Upgrading the bandwidth capacity and server infrastructure should also be prioritized to improve the stability and speed of the connection, especially during peak academic hours. Additionally, the administration may consider implementing equitable access scheduling to manage user load effectively, ensuring fair and uninterrupted usage among students. Providing device support initiatives, such as laptop loan programs or partnerships with local donors, would help students who rely solely on mobile phones to access online resources. Furthermore, developing a centralized digital usage dashboard can help the university monitor data consumption patterns and identify areas requiring immediate technical improvements. These initiatives will collectively enhance accessibility, equity, and consistency of the Free Wi-Fi service across all campuses.

2) To support academic tasks, flexible learning participation, and well-being, the university should strengthen digital literacy and student wellness programs. Conducting workshops and orientations on proper Wi-Fi utilization, digital productivity tools, and online well-being can help students maximize the benefits of connectivity while managing stress and screen fatigue. Establishing regular feedback mechanisms, such as online surveys or consultation meetings, will ensure that student perceptions and concerns regarding Wi-Fi performance are continuously addressed. Promoting awareness campaigns through campus bulletins and digital platforms will also help disseminate accurate information about Wi-Fi zones, log-in procedures, and acceptable use policies. Faculty members should likewise be encouraged to design flexible learning materials and activities that consider connectivity limitations, such as providing downloadable content and asynchronous modules. In addition, the Guidance and Counseling Office may provide psychosocial support for students experiencing anxiety or frustration due to connectivity issues, ensuring that the Free Wi-Fi project continues to foster both academic and emotional well-being.

3) It is recommended that the establishment of regular system audits and maintenance programs be considered to detect and resolve recurring technical problems. Creating an ICT Help Desk or Online Support System will allow students to report connectivity issues and receive timely assistance from trained staff or assigned student assistants. The university should also reexamine its network restriction and filtering policies to ensure that essential academic resources such as online libraries, video lectures, and research databases are fully accessible while maintaining system security. Installing solar-powered or long-range access points can address coverage gaps in areas with limited electricity or geographical

barriers. Moreover, partnerships with the Department of Information and Communications Technology (DICT) and private telecommunication companies should be explored to secure technical and financial support for infrastructure enhancement. Incorporating Wi-Fi system maintenance and expansion into the university's annual budget plan will ensure long-term sustainability and continuous improvement of the service.

These recommendations aim to create a more inclusive, reliable, and student-centered Wi-Fi system that supports CBSUA's commitment to equitable digital access and enhanced learning experiences. By addressing both the technical and human aspects of connectivity, the university can fully maximize the benefits of its Free Wi-Fi project, ensuring that all students have equal opportunities to engage, learn, and succeed in a digitally driven academic environment.

The study was limited to the experiences of 103 identified student beneficiaries across the four campuses of CBSUA. As such, the findings may not fully capture the perspectives of students who were unable to access the free Wi-Fi program or those who relied on alternative internet sources. These limitations highlight the need for broader research with a larger sample and in different contexts to gain a more comprehensive understanding of the program's long-term impact.

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Acknowledgements:

The author gratefully acknowledges the Central Bicol State University of Agriculture for its invaluable support in the completion of the study. Special recognition is extended to the Research Services Division for providing the essential funding, guidance, and encouragement that enabled the successful conduct of this research. Their steadfast commitment to promoting academic excellence and meaningful inquiry served as a strong foundation for this work. The author also expresses sincere appreciation to all individuals who generously shared their time, expertise, and insights, contributing to the significance and impact of this scholarly endeavor.

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