RJEST Research Journal of Education Science & Technology
Volume 4, Number 1 (2024)
ISSN: 2783-0225
www.rjest.org

Research Article

OPEN ACCESS

Student Information and Communication Capability and Preferences and the Challenges of Online Learning During the Quarantine

Rabbi B. Malaga[a] and Mary Gee A. Salbibia[a]

[a]College of Education, Carlos Hilado Memorial State University, Talisay City, Negros Occidental, 6115, Philippines

ARTICLE INFO

Corresponding Author:
Jose Rabbi Malaga
Email: jrbmalaga@gmail.com

Article History
Received: January 9, 2024
Revised: August 20, 2024
Accepted: December 12, 2024

Keywords
Online Learning
ICT Capability
Internet Access
Descriptive
State University

DOI
10.63179/rjest.v4i1.72

ABSTRACT

The crisis-induced shift to online learning during the COVID-19 pandemic exacerbated educational inequalities, particularly for students from low-income families who lacked access to Information and Communication Technology (ICT) and internet connectivity. This study determined the ICT capability of students and explored the challenges they encountered in adapting to online learning during the quarantine period. Using a convergent parallel mixed-methods design, numerical and descriptive data were gathered from 185 students enrolled in Educational Technology 1. A validated and reliability-tested instrument was used. Findings revealed that the students' overall ICT capability was low, characterized by insufficient ownership of devices, very low utilization of the course website, and dependence on mobile phones and prepaid internet. Despite these constraints, a majority of students demonstrated resilience by complying with academic requirements. The challenges identified were financial problems, lack of access and poor connectivity, lack of digital skills, unfavorable home environment, and inappropriate teaching methodologies. The study concludes that the digital divide presents a significant barrier to effective online learning. It is recommended that the university administration implement targeted interventions, such as a device-lending program, partnerships for affordable student internet plans, and faculty training on inclusive and mobile-friendly online pedagogy, to narrow this gap and ensure equitable educational opportunities.

1. INTRODUCTION

The abrupt transition to online learning during the COVID-19 quarantine period posed unprecedented challenges for education systems worldwide. Within the Philippine educational landscape, this shift exposed fundamental disparities in students' information and communication technology (ICT) capabilities, their preferences regarding instructional delivery methods, and the complex challenges they encountered throughout this period. The pandemic disrupted established routines globally, bringing societal functions to an unexpected standstill. This health crisis precipitated what has been described as one of the most rapid and extensive disruptions in modern history, leaving communities disoriented and unprepared. As

Recommended Citation: Malaga, R.B., & Salbibia, M.A. (2024). Student Information and Communication Capability and Preferences and the Challenges of Online Learning During the Quarantine. *Research Journal of Education, Science & Technology*, *4*(1), pp. 1-12. DOI: 10.63179/rjest.v4i1.72. 2024 © Author(s).

confirmed cases and fatalities continued to rise, healthcare systems in resource-constrained nations such as the Philippines faced severe strain. Despite these difficulties, periods of acute crisis often catalyze meaningful transformation and accelerate the adoption of technology-enhanced educational practices.

The ongoing pandemic prevented teachers and students from convening in their designated classrooms during scheduled instructional periods. In response to government directives and public health mandates, educational institutions suspended in-person instruction and prohibited face-to-face classes (UNESCO, 2020). Students adapted by continuing their education through various digital platforms, including video conferencing applications, email, virtual collaboration tools, discussion forums, digital journaling, and technology-facilitated instructional videos (Dhawan, 2020; World Economic Forum, 2021).

Blended and online learning modalities have increasingly become essential components of the student learning experience, though their implementation varies considerably depending on the ICT infrastructure and internet accessibility available in homes and educational institutions. The integration of ICT in education has fundamentally altered pedagogical approaches and learning processes. Educational technology tools (e.g., laptops, tablets, interactive whiteboards, electronic readers, and related computing devices) serve multiple functions in communication, content creation, information dissemination, data storage, and knowledge management (UNESCO, n.d.). While blended and online learning depend heavily on ICT infrastructure, these approaches have traditionally served supplementary roles, augmenting learning experiences and providing materials not readily available through conventional face-to-face instruction, which has remained the predominant mode of educational delivery. Traditional teaching and learning frameworks typically require students to attend physical learning environments at fixed times and predetermined locations.

The implementation of community quarantine measures several months prior created substantial obstacles for both educators and learners, as they found themselves confined to their residences while simultaneously expected to fulfill their respective instructional and academic obligations. Teachers experienced physical separation from their students yet remained accountable for delivering their assigned curricula and facilitating learning activities (Korolkov et al., 2020). The school closure mandates disproportionately affected students in disadvantaged circumstances who lack adequate access to digital devices or reliable internet connectivity, particularly those enrolled in institutions without established learning management systems (Santos, 2020). This situation has been further aggravated by insufficient provision of the necessary technological infrastructure and equipment required for effective online learning (Ghora & Bhati, 2016).

This crisis has illuminated profound inequalities extending beyond mere access to devices and bandwidth, though these remain critically important, to encompass disparities in students' capacity for self-directed learning (Andersen, 2020). The pandemic has necessitated a critical examination of the contextual factors that shape college students' experiences with online learning during quarantine. Nevertheless, there remains a notable gap in the literature regarding the specific ICT capabilities, instructional preferences, and lived experiences of students within individual collegiate institutions in the Philippines, knowledge that proves essential for developing contextually appropriate interventions.

The emergency adoption of online learning utilizing available materials, infrastructure, and communication channels can only partially address the limitations imposed by community quarantine measures and the variable ICT access among both educators and students. Recognizing these constraints, this study gathered, examined, and synthesized data to establish a robust foundation for improving online instruction in Educational Technology courses at the collegiate level.

This investigation pursued two primary objectives: First, the study sought to assess the ICT capabilities of students enrolled in Educational Technology 1 during the second semester of the 2019-2020 academic year across several dimensions: (a) ownership of and access to ICT resources and internet connectivity; (b) engagement with the course website platform; (c) internet availability and reliability; (d) adherence to submission deadlines and assignment completion; and (e) preferences regarding instructional delivery modalities for Educational Technology 2 during the quarantine period. Second, the study aimed to document and analyze the challenges students encountered while adapting to online learning environments. Through these research objectives, this study contributes essential evidence to inform institutional planning and policy development aimed

at enhancing both the equity and effectiveness of online education delivery.

2. FRAMEWORK OF THE STUDY

This study employs the ADDIE model (Analyze, Design, Develop, Implement, and Evaluate) as its primary instructional design framework (Branch, 2009). This model was chosen for its structured yet iterative approach to diagnosing learning needs, which corresponds directly with the study's objective of assessing student ICT capabilities. The subsequent phases of the model provide systematic guidance for designing and developing evidence-based instructional solutions derived from empirical findings. The analysis phase examines students' current ICT competencies and their use of online platforms, including the course website (http://www.chmscedtech.org), to fulfill academic requirements and navigate learning experiences during the community quarantine period necessitated by the global pandemic.

Additionally, the challenges identified among students are examined through the theoretical lens of the Community of Inquiry (CoI) framework (Garrison et al., 2000), which argues that meaningful online learning emerges from the dynamic interaction of three essential elements: social presence, characterized by learners' sense of connection and belonging within the learning community; teaching presence, encompassing both the design of educational experiences and the facilitation of learning processes; and cognitive presence, representing the construction of knowledge through sustained reflection and collaborative discourse. The observed challenges (e.g., student isolation, unconducive home-learning environments, and pedagogical approaches ill-suited to the online context) pose direct threats to the establishment of these critical dimensions of presence.

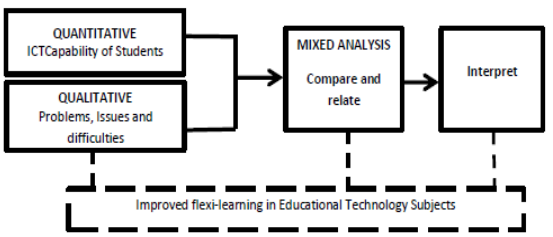

Figure 1. Schematic model illustrating the study framework, adapted from the ADDIE model (Branch, 2009).

This methodological approach provides an instructional design lens through which to examine current capabilities in utilizing ICT and online platforms for instructional delivery, ultimately informing the development of an enhanced system grounded in the actual circumstances and relevant factors identified through student input.

3. METHODOLOGY

3.1 Research Design

To achieve a comprehensive understanding of the research problem, this study adopted a convergent parallel design (Creswell & Plano Clark, 2017), a mixed-methods approach denoted QUAN+QUAL (Morse, 1991). This design required the researchers to collect quantitative and qualitative data simultaneously within the same research phase, to assign equal weight to both methodological strands, to analyze each component independently, and to subsequently integrate the findings to generate a holistic interpretation (Creswell & Plano Clark, 2011). To facilitate corroboration and validation of results, the researchers employed methodological triangulation by directly comparing quantitative statistical outcomes with qualitative findings.

3.2 Participants

The study involved 185 college students, constituting approximately 70% of the 264 total enrollees in Educational Technology 1 during the second semester of the 2019-2020 academic year. Participant selection followed specific inclusion criteria: (1) official enrollment in the Educational Technology 1 course during the designated semester, (2) accessibility through email or the course website platform, and (3) provision of informed consent for participation. Given the practical challenges of contacting all enrolled students during the quarantine period, the researcher employed convenience sampling. Informed consent was secured from all participants before distributing the survey instrument. Respondents had a two-week window to complete and return the survey questionnaire, which was disseminated via email or available for download on the course website (http://www.chmscedtech.org).

3.3 Research Instrument

The researchers developed a survey instrument to address the fundamental research questions guiding this investigation. The instrument's construction involved an extensive review of the literature on the digital divide and the challenges associated with online learning environments (e.g., Mossberger et al., 2003; Adedoyin & Soykan, 2020).

The survey was organized into five principal sections aligned with the study's key variables: (a) ownership and access to ICT resources (including device types owned), (b) utilization patterns of the course website (including access frequency and activities performed), (c) Internet availability and accessibility (encompassing subscription types and connection speeds), (d) compliance with assignment submission deadlines, and (e) preferences regarding instructional delivery modes. The preliminary version, incorporating Likert-scale items, multiple-choice questions, and open-ended prompts, underwent face and content validation by five college professors recognized for their expertise in assessing educational infrastructure, physical facilities, and technological resources. Evaluation using the Good and Scates criteria yielded an overall rating of 4.52, confirming the instrument's validity. Subsequently, the instrument underwent reliability testing to verify its ability to produce stable, consistent responses. A test-retest procedure was conducted with twenty randomly selected students from the total participant pool. The collected responses were analyzed using Pearson's correlation coefficient, producing reliability coefficients of 0.88 for ICT ownership, 0.81 for course website utilization, and 0.79 for Internet availability and accessibility, thereby establishing the instrument's reliability.

3.4 Data Gathering Procedure

The researcher obtained formal approval from the University Research Ethics Committee before initiating the study. The survey instrument was distributed and collected via online channels accessible to participants. Respondents received comprehensive information regarding the study's purpose, procedures, and the nature of data to be collected. Participants were informed of their rights as research subjects and requested to provide written consent through an informed consent form. Concurrent with quantitative data collection, qualitative data were collected through open-ended questions embedded in the survey instrument. These prompts included statements such as "Please describe the most significant challenge you have faced in adapting to online learning" and "What factors influence your preference for instructional delivery mode?", designed to elicit detailed, descriptive accounts of students' lived experiences. Following the collection period, survey instruments were compiled, organized, and prepared for statistical treatment.

3.5 Data Management

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3.6 Data Analysis

Frequency distributions and percentage calculations were utilized to analyze data addressing the first research objective across the following areas: (a) ICT ownership, (b) course website utilization, (c) Internet availability and accessibility, (d) compliance with submission deadlines during the quarantine period, and (e) instructional delivery mode preferences for Educational Technology 2.

Furthermore, the tabulated frequency scores for dichotomous responses (Yes/No) in the domains of (a) ICT ownership, (b) course website utilization, and (c) Internet availability and accessibility were employed to compute index scores. Responses were assigned numerical codes: 1 for affirmative responses and 0 for negative responses. For each assessed parameter, an index score was calculated using the formula: Index = (YES)/(YES + NO), where YES denotes the number of affirmative respondents, NO represents the number of negative respondents, and the denominator constitutes the total number of respondents (N).

Table 1. Interpretation scale for index scores.

Index Score Range	Interpretation
0.81 - 1.00	Very High
0.61 - 0.80	High
0.41 - 0.60	Moderately High
0.21 - 0.40	Low
0.00 - 0.20	Very Low

To label and analyze the challenges students encountered in adapting to online learning during the quarantine period (sub-problem 2), the thematic analysis introduced by Braun and Clarke (2006) was applied. It consists of the following steps: (a) familiarization with data, (b) coding, (c) generating initial themes, (d) reviewing themes, (e) writing-up. Rigor of findings was ensured through peer briefing and triangulation for credibility; code-recode strategy and stepwise replication for dependability; thick description and theoretical sampling for transferability; and data checking and audit for confirmability. The full survey instrument and detailed analytical protocols are available from the corresponding author upon request to ensure reproducibility.

3.7 Ethical Consideration

The researchers maintain adherence to fundamental ethical principles throughout all phases of the research process. Following approval from the College Research Ethics Committee, participants were asked to complete an informed consent form outlining the study's purpose and the nature of the information to be collected. Participation remained entirely voluntary, with provisions to protect privacy rights and participant anonymity. To mitigate potential power imbalances, the consent form explicitly stated that decisions to participate or withdraw would have no consequences for academic standing or institutional relationships. Response confidentiality was maintained through the previously outlined data management protocols, with only the researcher having access to individual participant responses. Throughout data collection, processing, and reporting phases, the researchers exercised the highest standards of objectivity and accuracy.

4. RESULTS AND DISCUSSION

Students enrolled in Educational Technology 1 demonstrated a generally low level of information and communication technology capability (Index score = 0.39). More specifically, they exhibited a moderately high level of ICT device ownership (Index score = 0.40). While a substantial proportion (93.50%) used mobile phones for communication, including sending and receiving messages, most students (100 out of 185, representing 54.10% of the total sample) did not own personal computing devices such as laptops, desktops, tablets, or related equipment. This item received an index rating of -0.08, indicating a very low level of ownership.

Utilization of the course website developed for the Educational Technology subject was similarly very low (Index score = 0.05). The findings revealed that a considerable number of students (88 out of 185) failed to access the course website to download instructional materials or review posted announcements and notifications. In contrast, students reported high levels of Internet availability and accessibility (Index score = 0.89, categorized as very high), with a moderately high proportion maintaining personal Internet subscriptions to access and share information online (Index score = 0.56).

These results suggest a strong correlation between limited access to and ownership of instructional technology and minimal utilization of the course website for Educational Technology coursework. This finding aligns with Lorenzo's (2016) research in the Philippine context, which highlighted persistent challenges related to hardware availability and restricted laboratory access in educational institutions. Similarly, Kubota, Yamamoto, and Morioka (2018) identified insufficient funding, inadequate professional training, and deficient infrastructure as primary barriers to effective ICT integration in educational environments. The shortage of technological facilities impedes meaningful integration efforts, while limited computer availability in schools restricts comprehensive learning experiences for both educators and students (Tomaro & Mutiarin, 2018). As Cajilig (2009) observed, despite considerable enthusiasm for technology integration among stakeholders, actual ICT implementation remained limited primarily due to insufficient computer facilities and resources.

Online learning operates fundamentally on the availability of technological devices and reliable Internet connectivity (Adedoyin & Soykan, 2020). Consequently, instructors and students lacking adequate devices or experiencing poor Internet connections face significant barriers to accessing online learning opportunities. The technological dependencies inherent in online education present substantial challenges for educational institutions. This situation inevitably pressures colleges and universities to remain current with technological advancements and develop innovative educational platforms to maintain relevance and competitiveness. Strategic interventions prioritizing ICT training, instructional resources, and infrastructure development can address existing deficiencies and facilitate comprehensive adoption of online learning during pandemic conditions. The acquisition and implementation of ICT equipment represents a critical step toward recalibrating educational services to meet the urgent demands of the current pandemic context.

Table 2. ICT Capability of Students in Educational Technology 1 in terms of Ownership of ICT, Utilization of the Course Website, and Availability and Accessibility of the Internet.

	YES		NO		Index	IN
A. Ownership of ICT	n	%	n	%	Score	
1. I own a mobile phone to Communicate, receive, and send messages.	173	93.50	12	6.50	0.87	VH
2. I own a PC (laptop, desktop, tablet, etc.) to create documents and outputs.	85	45.90	100	54.10	-0.08	VL
Sub-Total					**0.40**	**MH**
B. Utilization of the Course Website (www.chmscedtech.org.)						
1. I personally access and download course materials from the course website.	97	52.40	88	47.6	0.05	VL
2. I personally access the course website to read announcements and notices.	97	52.40	88	47.60	0.05	VL
Sub-Total					**0.05**	**VL**
C. **Availability and Accessibility of the Internet**						
1. Internet is available at my location or home town.	175	94.60	10	5.40	0.89	VH
3. I personally subscribe to the Internet to access and share information online.	144	77.80	41	22.20	0.56	MH
Sub-Total					**0.73**	**H**
Total					**0.39**	**L**

Note: 0.19 and below Very Low (VL); 0.20-0.39 Low (L); 0.40-0.59 Moderately High (MH); 0.60-0.79 High (H); and 0.80-1.00 Very High (VH)

Table 3. ICT Capability of Students in Educational Technology 1 in terms of Ownership of ICT, Utilization of the Course Website, and Availability and Accessibility to the Internet.

ICT Capability	n	%
A. Ownership of ICT		
The alternative option to do the task (based on NO response in item A.2)		
1. College ICT Lab 15 15.00		
2. Borrow from friends/relatives 54 54.00		
3. Computer rental 31 31.00		
Total	**100**	**100.00**
B. Utilization of the course website		
The alternative course of action to download course materials from the website (based on NO response in item B.1)		
1. Get shared or forwarded softcopy from classmates	78	88.64
2. Get photocopy or printed downloads from classmates	10	11.36
3. Get any hard or soft copy but only borrow or share from	0	0.00 classmates
4. Don't get or acquire any course materials 0 0.00		
Total	**88**	**100.00**
The alternative course of action to access the course website to read announcements and notices (based on NO response in item B.2)		
1. Get shared or forwarded softcopy of announcements 77 87.50 from classmates		
2. Get photocopy or printed copy of announcements from	4	4.50 classmates
3. Manually copy or take note of Announcements from	7	8.00 classmates
4. Don't get or read any announcement or notice from the	0	0.00 course
Total	**88**	**100.00**
C. Availability and Accessibility of the Internet		
Strength/speed of signal of available and accessible Internet (based on YES response in item C.1)		
1. Strong and fast 10 5.71		
2. Moderate 96 54.86		
3. Slow 69 39.42		
Total	**175**	**100.00**
Type of Subscription (based on YES response in item C.2)		
1. Pre-paid 117 81.25 2. Post-paid 27 18.75		
Total	**144**	**100.00**
Alternative Internet access (based on NO response in item C.2)		
1. College ICT Lab 21 51.00		
2. Access thru friends/relatives 18 44.00		
3. Internet rental 2 5.00		
Total	**41**	**100.00**

4.1 Alternative Strategies for Meeting Computing Requirements

To meet the course's computing requirements, students employed various compensatory strategies. The distribution of these approaches is detailed as follows: (a) Borrowing from social networks—the majority of students, 54 (54.00%), addressed the absence of personal devices by borrowing from friends and relatives, highlighting their dependence on personal social networks to overcome resource constraints; (b) Commercial rentals—a significant proportion, 31 (31.00%), chose to utilize commercial computer rental services, suggesting a willingness to bear financial costs to satisfy academic requirements; (c) Institutional resources—the remaining students, 15 (15.00%), accessed the college's Information and Communications Technology laboratory. Although this represents an essential institutional resource, it constituted the least-utilized compliance method among the three alternatives. These data underscore a substantial digital access gap within the Educational Technology 1 student population, necessitating dependence on shared, borrowed, or rented resources to complete fundamental academic work.

4.2 Course Material and Announcement Acquisition

The findings reveal a considerable non-engagement rate with the official course website, with 88 students (47.60%) not directly accessing or downloading required course materials. This circumstance necessitated the use of alternative acquisition methods. Specifically, most non-accessing students obtained materials through softcopy sharing (78 students), illustrating the prevalence of peer-to-peer distribution networks. A comparable pattern emerged for notices and announcements, with 77 students receiving updates via shared or forwarded soft copies, further indicating that reliance on social networks superseded direct platform use. This pattern suggests the presence of potential barriers to direct website access, such as limited connectivity, associated costs, or usability concerns.

4.3 Internet Connectivity and Quality

Data on Internet access indicate that 144 students (77.80%) maintained active subscriptions, predominantly via prepaid accounts (117 students). Among the 41 students lacking personal subscriptions, access was secured through institutional facilities (the College ICT laboratory, 21 students) and social support networks (friends and relatives, 18 students). Despite nearly universal self-reported Internet availability (94.60%), connection quality presented a critical limitation. Only 10 students (5.71%) reported experiencing strong and fast connections. Most of the cohort experienced suboptimal service conditions, with 96 students (54.86%) reporting moderate connection

quality and a substantial 69 students (39.42%) characterizing their service as slow. This digital quality gap is likely a primary contributor to the low direct engagement with the course website, as slow speeds and unreliable connectivity actively discourage downloading large files or sustained online activity.

4.4 The Persistent Digital Divide

The rapid, crisis-induced transition of higher education institutions to online learning during the recent global pandemic frequently overlooked students' socioeconomic and technological vulnerabilities, particularly those on the disadvantaged side of the digital divide. While the perceived affordability of technological devices and the apparent ubiquity of Internet access might suggest equitable conditions, scholarly consensus indicates that a persistent digital divide persists along socioeconomic lines (Solten, 2020). This disparity represents a global phenomenon (Fuchs & Horak, 2006), characterized by lower socioeconomic and minority groups consistently trailing more affluent populations in both digital resource acquisition and technological competency (Sarkodie-Mensah, 2000). For many learners, access to the requisite technology and reliable connectivity remains a significant impediment.

The inability to acquire or own essential instructional technology tools and maintain adequate Internet access effectively excludes these learners from opportunities for global connection, comprehensive engagement, and participation in contemporary forms of lifelong learning. This socioeconomic disparity carries profound implications for educational equity. The digital divide thus actively impedes educational attainment by limiting access to appropriate technological resources (Mossberger, 2003). Consequently, higher education institutions and relevant stakeholders must implement targeted interventions designed to bridge, reduce, or eliminate this technological gap. Such proactive measures are essential to ensuring that all students have an equitable platform for communication, knowledge acquisition, and expanded learning opportunities within the evolving digital educational landscape.

Table 4. ICT Capability of Students in Educational Technology in terms of Compliance with the Submission and Deadline of Outputs

Required Outputs submitted	n	%
1. before deadline	103	55.68
2. on the deadline	58	31.35
3. after the deadline negotiated submission	17	9.19
4. after 1 year grace period	7	3.78
Total	**185**	**100.00**

Table 5. ICT Capability of Students in Educational Technology in terms of Preference of Instructional Delivery Mode for Educational Technology 2

For student-**residents of Talisay City**	N1	%
1. Opt for full online distance learning (all eLearning materials delivered online with scheduled F2F quiz and exam)	4	19.00
2. Choose alternate blended distance learning (a combination of scheduled F2F twice a month and distance learning, plus scheduled F2F quiz and exam)	7	33.30
3. Prefer scheduled classroom-based blended learning once a week with online reinforcements	10	47.60
Sub-Total	**21**	**100.00**
For students who are **non-residents of Talisay City**		
1. Stay hometown and access materials online or delivered in printed form	119	72.12
2. Stay at the boarding house to access materials online or inside the campus	18	10.90
3. Stop schooling in the meantime until the pandemic is over	28	16.97
Sub-Total	**165**	**100.00**

4.5 Preferences for Instructional Delivery Modes

The results indicate that face-to-face instruction for Educational Technology 2 remained the preferred modality among students residing in Talisay City. Within this context, direct human interaction is considered essential for effective learning. Department of Education Secretary Leonor Briones emphasized the importance of classroom instruction in nurturing complete and well-rounded individuals rather than producing mechanistic learners (Esguerra, 2020). Face-to-face learning environments facilitate active collaborative learning. The physical presence of instructors in the classroom enables them to implement strategies that maintain student involvement, attention, and engagement, which typically yield improved learning outcomes (London Management Center, 2020). However, in these unprecedented circumstances, where traditional face-to-face learning remains unfeasible, blended learning approaches can incorporate face-to-face elements and effectively translate them into digital spaces to create meaningful impact and help learners achieve predetermined learning objectives (Cookie, 2020).

Among non-residents of Talisay City, 119 students (72.60%) preferred to remain in their hometowns and access materials online or in printed format, 27 students (16.50%) chose to temporarily suspend their studies until the pandemic subsided, and 18 students (11.00%) preferred to reside in boarding facilities to access materials online or on campus. Realistically, online learning can effectively serve students who live a considerable distance from campus and cannot attend full-time, on-campus classes. This learning modality allows students to pursue employment while studying, conserve time and financial resources, learn at their own pace, and study from any location at any time (Bijeesh, 2021) without exposure to pandemic-related health risks.

Some students, however, opted for temporary or permanent withdrawal from their studies. Jeremy Alder, founder and managing editor of College Consensus, told CNBC Make It that he was aware of students who had already withdrawn from the following academic year due to concerns about not receiving the on-campus experience they anticipated (cited in Hess, 2021). The Philippine Association of State Universities and Colleges estimated that approximately 44,069 college students enrolled in state universities and colleges were unable to continue their enrollment during the pandemic (Magsambol, 2020). Cornelio (cited in Magsambol, 2020) noted that the pandemic had adversely affected family finances, rendering the continuation of children's education a secondary priority for many households.

Online learning appears less desirable and acceptable to some students than traditional face-to-face instruction. Issues such as isolation, disconnection from peers, and technological difficulties may contribute to student course withdrawal (Willging & Johnson, n.d.). Consequently, dropout rates can serve as one indicator of online program effectiveness. Program quality can be assessed, in part, through student completion rates (Gabrielle, 2001), which tend to be lower in online courses than in traditional formats (Hiltz, 1999). While this study's single-course sample limits the generalizability of its findings, the expressed preferences and national dropout statistics underscore the critical need for flexible, supportive learning models.

Colleges worldwide closed their physical facilities and transitioned courses online to mitigate coronavirus transmission. Students immediately began online learning without prior preparation, including simulations or practice sessions. Online classes eliminate the benefits of direct instructor presence, peer learning opportunities, and social interaction with friends. Students found themselves isolated with only assignments, activities, and exercises to complete.

Students from low-income backgrounds attending underfunded schools were placed in particularly disadvantageous situations, becoming the primary casualties of government-mandated school closures and the transition to online learning (Angdiri, 2020). The following discussion examines problems, difficulties, and challenges in the online learning experiences of Educational Technology 1 students, using their direct quotations to illustrate the quantitative findings.

4.6 Financial Constraints

Students described experiencing considerable educational hardship that persisted throughout the pandemic in their locality. Family members who financially supported their education lost employment. Students were compelled to seek work to supplement household income for regular expenses. They needed to allocate limited resources to purchase mobile phone credits to attend classes. Students without alternative options considered temporarily withdrawing from their studies. Respondents articulated:

"Our electrical power was disconnected due to unpaid bills. My older brother who supports my studies lost his job. I had to look for a daily budget to buy loads for my online class."

"Sometimes, I experience self-pity. My parents cannot provide me enough budget for my cell phone load that I had to sacrifice attending my online classes. I would ask my classmates about the requirements so I could keep pace with my classmates at least."

"I would do a part-time job so I would have money for Internet rentals and printing of my modules and outputs. It's extremely difficult but I am left with no choice."

"This online class is so stressful and demands money. I have no laptop or tablet to use to comply with the assignments and activities. I am thinking of dropping or quitting until things are back to normal."

"Looking for food is more important than looking for an Internet connection."

While online learning offers numerous advantages, it requires an investment of time and money. Approximately 263 million children globally do not attend school. Researchers at the University of Texas at Austin and Pew (cited in Rodriguez, 2018) determined that low-income students in classroom settings cannot always capitalize on their educational opportunities due to technological barriers. Schools assign homework requiring computer or Internet use; unfortunately, many students lack the resources to complete these assignments (Atlantic reports cited in Rodriguez, 2018). This situation becomes more complicated when low-income students must adapt to online learning designed for more affluent demographics with greater technological resources. Essentially, schools adopting online modalities and requiring students to learn and submit coursework electronically place low-income students at a

disadvantage. Consequently, economic inequality can intensify both digital and educational inequality.

4.7 Limited Access and Inadequate Connectivity

Students could not afford the technology and connectivity requirements for online learning. They lacked laptops, tablets, or desktop computers for their assignments, activities, and projects. Instructors frequently require research and collaborative work, which necessitate Internet access. The geographical location of their residences affected Internet speed and signal clarity. This situation prevented them from submitting quality work to their instructors. Respondents conveyed:

"All I have is an out-dated and hand-over cell phone with limited storage and could not easily upload apps and download materials published through course websites and online classrooms. I don't know if the instructors who assign heavy work and assignments are aware or understand that many of us are poor and cannot afford these technologies."

"I live in a remote barrio with no signal. I have to ride a motorcycle to get to the area in the city proper to attend my online class. If I would do this every day, this is terribly more expensive than having classes in school. To be honest, sometimes I just copy the answers forwarded to me by my classmates so I could comply with the assignments."

While online learning may be the optimal option under current circumstances, not all students can readily adjust to and manage the challenges that emerge in online classes, particularly in synchronous sessions. Unfortunately, most of these challenges relate to technology ownership and connectivity, areas where low-income students are positioned on the disadvantaged side of the digital divide. In 2015, the Pew Research Center analyzed data on Internet access in the United States and found that the problem primarily affected low-income families (Lynch, 2017). The Philippines faces significant challenges in its Internet infrastructure. Issues including poor Internet signals, audio clarity problems, system malfunctions, outdated devices, and software inadequacies—if not complete absence of these resources—have disrupted the successful implementation of remote online learning generally (Amadora, 2020).

4.8 Inadequate Technical Skills

Inadequate technical skills prevented students from fully engaging with online learning. Some students who graduated from public secondary schools in rural areas lacked experience using computers and other ICT tools. Google Forms, Google Classroom, Zoom, email, and chat platforms represented unfamiliar technologies. While they may have possessed conceptual knowledge, they lacked operational skills to manipulate or utilize these tools for learning. Respondents expressed:

"Admittedly, I do not know yet these Google things. How can I cope with my subject requirements when I am still groping how to use computers."

"I am actually hesitant to adapt to online learning. I don't have a gadget and I don't know how to use the computer. I am too slow because I was not taught how to use it in my barrio school."

As technology continues to permeate students' daily lives, technological proficiency becomes essential. Mossberger et al. (2003) explain that the absence of fundamental technology-related skills—including mouse operation, typing, email usage, web-based information retrieval, and word processing and spreadsheet applications—clearly indicates the need for policy attention to this issue. Technology proficiency has become imperative in education. Information constitutes knowledge, and knowledge represents power. Contemporary society has transitioned from an industrial to an information-based economy. Schools must equip students with the necessary technical skills to address this challenge (Bolt, 2010).

4.9 Unconducive Home Learning Environments

Students' home environments profoundly influenced their online learning experiences. Students resided in areas not insulated from unwanted and disruptive outdoor noise. Without visual monitoring by instructors, students could divert their attention from the teachers' lectures. With limited residential space, family activities and conversations are disrupted by ongoing online classes. Respondents described:

"The loud sound from the karaoke nearby distracts my attention. And so, I just deactivate my audio and video and later on fall to sleep."

"My teacher would often notice the crowing of the rooster and my parents having some squabbles. Truly...disturbing..."

"I have no other place to go. We have a common area at our house for online learning sessions. If my two younger siblings are also using the WIFI connection, my use is limited. With the intermittent video and audio signals, I could not clearly hear what my teacher and classmates were saying. I just attend for the sake of attendance."

Noise impedes learning opportunities for students. It adversely affects more complex cognitive and learning abilities because of

diminished motivation and elevated annoyance levels (Wilts University, 2016). Ambient noise (e.g., dogs barking, car horns, television audio, and family member conversations) can originate from both instructor and student environments. In all instances, ambient noise creates unfavorable learning conditions that disrupt online sessions and diminish the overall quality of instruction and participant experience. This directly impedes the development of a cohesive Community of Inquiry, particularly social presence (connection with others) and cognitive presence (capacity to concentrate and construct meaning).

4.10 Inappropriate Pedagogical Approaches and Assessment Methods

For subjects emphasizing performance and product-based learning, online instruction appeared inadequate. Students reported that instructors primarily assigned paper-based activities and demonstrated limited creativity in designing more authentic tasks for student performance or completion. They also observed that some instructors provided no lectures and simply directed them to complete module activities without feedback. Students stated:

"We were assigned voluminous exercises but we didn't know how we were scored and graded."

"Our teacher met us four times as I counted just to inform us of the requirements. There was no lecture because she said that we are all independent learners and that we must learn by ourselves. There were activities in the module that we cannot understand but we just answered. Not a single activity or test was returned for us to know whether we answered the activity right or wrong."

"I major in PE. I just wonder if the pencil-paper test would suffice to measure my learning and skills developed."

Online instructors are expected to compensate for the absence of physical presence by creating supportive virtual classroom environments where all students feel comfortable participating and where students know their instructor remains accessible. This constitutes "teaching presence" within the CoI framework, which was notably absent in many cases. If instructors lack proper training in online delivery and methodologies, program success becomes compromised (University of Illinois, n.d.). Observably, in the institution's hurried adoption of online learning, curriculum design and teaching methodology received insufficient attention. Instructors primarily utilized paper-based activities and exercises, while product- and performance-based assessments were largely set aside. Consequently, students were required to write responses on paper or submit them electronically. Students received objective scores on activities and exercises requiring lower-order understanding, compared with product- and performance-based assessments designed to measure deeper understanding through skill and ability demonstration (Frey, 2018). For online programs to succeed, instructor-facilitators must develop more creative pedagogical approaches and instructional strategies that capitalize on the strengths of the online modality while avoiding pitfalls arising from its limitations.

The integrated analysis of quantitative and qualitative data revealed that Educational Technology 1 students demonstrated low ICT capability, characterized by inadequate access, limited skills, and restricted utilization of instructional technology tools. Their ownership of outdated mobile phones with limited storage capacity constrained their ability to download course materials from the course website and participate regularly and actively in online learning. Poverty and residential location curtailed their opportunities to benefit from online learning. Unconducive home environments and inappropriate teaching methodologies diminished their preference for pure online learning over traditional face-to-face instruction. Given the revealed problems and challenges, educational commissions, college administrators, and concerned stakeholders must coordinate efforts and resources to develop planned interventions and programs to address students' urgent online learning needs.

5. CONCLUSION

The rapid, crisis-driven adoption of remote e-learning during the COVID-19 pandemic, while representing a significant educational transformation, was fundamentally compromised by a pervasive digital divide affecting the Educational Technology 1 student population. This study concludes that their online learning experience was severely constrained by the near absence of personal ICT devices and critically inadequate Internet access. This unplanned and precipitous transition, which failed to adequately address entrenched issues concerning access, connectivity, and resource adequacy, resulted in a learning environment that frequently proved counterproductive to sustained academic progress. Students, constrained by their socioeconomic circumstances, characterized their online experience as inadequate and deficient, struggling to maintain pace and fully meet academic

requirements despite their diligent efforts. This disparity underscores that while technology offers innovation, its benefits remain restricted to those who can afford device ownership and connectivity.

The findings provide essential data for the institution to evaluate and prioritize students' ICT needs. Prompt and targeted interventions are necessary to narrow this digital gap and ensure equitable access, skills development, and effective technology utilization for all learners.

DECLARATIONS

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this study. The research was conducted objectively, and no personal, financial, or professional relationships influenced the design, implementation, or reporting of the findings.

Informed Consent

All participants were adequately informed about the purpose, procedures, and scope of the study prior to their participation. Participation was voluntary, and informed consent was obtained from all respondents. Participants were assured of confidentiality, anonymity, and their right to withdraw from the study at any time without penalty.

Funding Agency

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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AUTHOR'S BIOGRAPHY

Rabbi B. Malaga, Ph.D. is an Associate Professor at Carlos Hilado Memorial State University (CHMSU), Philippines. He holds a doctorate in Educational Management and has research interests in educational technology, digital divide, ICT integration in education, and institutional quality assurance. His scholarly work focuses on the application of information and communication technologies to improve teaching, learning, and educational management in developing contexts. He has authored and co-authored several academic studies published in peer-reviewed journals and actively contributes to research, instruction, and academic development initiatives within higher education.

Mary Gee A. Salbibia is a faculty member and researcher affiliated with Carlos Hilado Memorial State University (CHMSU), Philippines. Her academic interests include educational technology, evaluation of learning systems, and the integration of information and communication technologies (ICT) into teaching and learning. She has been involved in academic research and instructional initiatives that support technology-enhanced education and quality assurance in higher education, and she contributes to scholarly work aimed at improving educational practices in local and regional contexts.