FROM CHALKBOARD TO CHATROOM: A SURVEY- BASED STUDY ON THE IMPACT OF ONLINE EDUCATION ON LEARNING EQUITY IN LOW-INCOME COMMUNITIES IN CEBU CITY, PHILIPPINES

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ABSTRACT: *This study investigates the impact of online education on learning equity among students from low-income communities in Cebu City, Philippines. Anchored on the shift from traditional classroom instruction to digital learning environments during and after the COVID-19 pandemic, the research examines how technological access, instructional delivery, and household socio-economic conditions shape student learning experiences. Utilising a survey-based research design, data were collected from students enrolled in public secondary schools across several urban poor communities. Descriptive and inferential statistical analyses were employed to determine disparities in access to devices, internet connectivity, and learning support at home, and to identify their relationship with academic engagement and perceived learning outcomes. Findings reveal that while online education offers opportunities for flexible and self-paced learning, persistent digital divides such as inconsistent connectivity, limited device ownership, and constrained learning environments continue to hinder equitable participation and performance. The study highlights the importance of developing comprehensive and localised educational policies, community-based support systems, and infrastructure improvements to ensure that online learning modalities promote, rather than hinder, educational equity for marginalised learners. Recommendations are provided for instructional design, school governance, and public policy to help narrow the learning gap in digital education.*

Keywords: Online Education, Learning Equity, Digital Divide, Low-Income Communities, Distance Learning, Educational Access, Cebu City, Public Schools, Socioeconomic Barriers, Technology Integration

INTRODUCTION

The rapid shift from traditional face-to-face instruction to online learning has become one of the most significant educational transformations of the 21st century. While technology-enhanced learning environments have long been promoted for their potential to expand access and support innovative teaching practices, the COVID-19 pandemic accelerated

the implementation of online education systems worldwide, including in developing countries like the Philippines. In many urban centres across the country, schools and higher education institutions adopted digital platforms to ensure continuity of learning during extended periods of community lockdowns. However, this abrupt transition revealed longstanding structural inequalities, particularly in low-income communities where access to digital resources is limited.

In Cebu City, one of the Philippines' major urban hubs, the shift to online education highlighted disparities in technology ownership, internet connectivity, and home learning environments. Students from economically disadvantaged households frequently face challenges such as sharing a single digital device among multiple family members, unstable mobile data connections, and restricted physical space for studying. These barriers not only affect academic performance but also create conditions in which educational opportunities are not equally distributed. The promise of online learning as a democratizing force is therefore questioned when fundamental access is uneven.

Learning equity refers to the fair and just opportunity for all students to succeed academically, regardless of socioeconomic background, learning environment, or personal circumstances. When educational delivery heavily depends on digital resources, equity becomes closely tied to the digital divide, the gap between individuals who have access to information and communication technologies and those who do not. For learners in low-income communities, this divide may widen pre-existing educational gaps, further disadvantaging students who were already at risk of academic underperformance.

A growing body of research in global and Southeast Asian contexts has examined the challenges of distance learning in marginalized communities, citing issues such as technological inadequacy, reduced teacher-student interaction, and limited parental academic support. However, there remains a need for localized, data-driven insights that reflect the lived experiences of Filipino learners and the specific socioeconomic conditions of urban low-income communities. Understanding how students in Cebu City adapt to, experience, and are affected by online education is crucial for designing targeted interventions and informed educational policymaking.

This study, therefore, seeks to investigate the impact of online education on learning equity in selected low-income communities in Cebu City. By employing a survey-based method, the research examines levels of access to digital learning tools, patterns of academic engagement, student perceptions of online learning effectiveness, and the broader social conditions influencing learning outcomes. The findings aim to contribute to ongoing national dialogues on inclusive education and digital transformation, guiding both school-level practices and public policy developments to ensure that educational innovations promote, rather than hinder, equitable learning opportunities for all students.

STATEMENT OF OBJECTIVES

This study aims to examine the impact of online education on learning equity among students in low-income communities in Cebu City, Philippines. Specifically, it seeks to:

1. Determine the level of access to digital learning resources (e.g., devices, internet connectivity, and learning platforms) among students in selected low-income communities.
2. Assess the extent of student engagement in online learning activities, including participation, attendance, and completion of required academic tasks.
3. Evaluate students' perceived learning outcomes and academic experiences in online learning environments.
4. Identify the socioeconomic, technological, and environmental barriers that affect students' ability to participate effectively in online education.
5. Examine the relationship between digital access, learning engagement, and perceived academic performance to understand how these factors influence learning equity.
6. Propose recommendations for schools, local government units, and educational policymakers to enhance learning equity and support effective online education implementation in low-income communities.

BACKGROUND NARRATIVE

The abrupt transition from classroom-based instruction to remote and online learning during the COVID-19 pandemic has generated wide-ranging shifts in educational delivery worldwide. While digital learning has long been promoted for its potential to support flexible, self-paced, and student-centred instruction, its implementation under emergency conditions exposed systemic inequities that shape students' learning opportunities. Studies across various regions indicate that access to stable internet connectivity, digital devices, and supportive home learning environments significantly determines the quality of online learning experiences [1]. These challenges are particularly pronounced in developing contexts, where the digital divide was already substantial before the pandemic [2].

In Southeast Asia, the pivot to remote education revealed structural disparities rooted in socioeconomic status, geography, and institutional capacity. Research in Indonesia, Malaysia, and Vietnam underscores that while online learning enabled educational continuity, learners from low-income households encountered barriers such as inadequate devices, low bandwidth, and a lack of academic support at home [3]. Such barriers often resulted in reduced motivation, decreased engagement, and widening performance gaps. These findings align with broader international literature arguing that the effectiveness of online learning is contingent not only on technological access but also on pedagogical adaptability, digital literacy, and social support systems [4].

In the Philippines, similar patterns have emerged. Studies across basic education and higher education institutions highlight that students, especially those from urban poor and rural areas, struggled with device sharing, high data costs, unstable connectivity, inadequate learning spaces, and emotional stress resulting from home responsibilities [5, 6]. Aguilar [7] found that these material and environmental constraints directly influence academic confidence and perceived learning gains in online modalities. Meanwhile, teacher-centred challenges, including limited training in digital pedagogy and assessment adjustments, further contributed to uneven learning experiences [8].

The concept of learning equity, therefore, becomes central in assessing the impacts of online education. Learning equity is not simply equal access to learning platforms, but the assurance that all learners, regardless of socioeconomic standing, receive fair support, resources, and opportunities for academic success. Contemporary digital education literature emphasizes that the digital divide is multi-dimensional: it encompasses disparities in access, skills, and meaningful use [9]. Thus, providing devices alone does not resolve learning inequity; effective interventions require comprehensive supports that address infrastructure, family context, teacher preparedness, and community participation.

Despite a growing body of national and international research, there is limited localized evidence that captures the day-to-day realities of online learning in *specific low-income urban communities* in the Philippines. Cebu City, a major metropolitan centre with dense informal settlements, offers a critical site for understanding how socioeconomic constraints shape digital learning engagement. By focusing on low-income barangays in Cebu City, this study contributes context-specific empirical data that can inform targeted school practices, local government programming, and policy directions aimed at building a more just and inclusive educational system.

METHODOLOGY

Research Design

This study employed a **survey-based quantitative research design** to examine the impact of online education on learning equity among students in low-income communities in Cebu City. A survey approach is appropriate as it allows for the systematic collection of data on students' access to technology, learning engagement, and perceived academic outcomes. Following Creswell [10], survey research is an effective method for obtaining information about a population's characteristics, opinions, and behaviors, and for identifying relationships among variables. This design aligns with the study's aim to assess and compare learning conditions and experiences across diverse socioeconomic household contexts.

While the analysis is quantitative in nature, qualitative insights were also incorporated through open-ended response items in the questionnaire to allow students to describe their experiences in their own words. This complementary design ensures that the findings are both measurable and rooted in the lived realities of learners.

Participants and Locale

The participants of this study were public junior and senior high school students residing in *identified low-income urban communities* in Cebu City for the Academic Year 2024–2025. **Purposive sampling** was used to ensure that

respondents had experience in online or blended learning modalities.

A total of **120 students** participated in the study. The sample size followed guidelines for survey research sufficient to represent variability and allow inferential interpretation [11]. Participation was voluntary, and students were included based on the following criteria:

1. They were enrolled in online education or blended learning implementation.
2. They lived in households classified as low-income based on barangay socioeconomic records.
3. They provided informed consent (and parental consent when underage).

The study locale was chosen due to its concentration of urban poor households and documented digital access challenges, making it an appropriate site for examining equity concerns.

Instrument

The primary research instrument was a **structured survey questionnaire**, composed of the following sections:

Section	Focus
I. Socioeconomic Profile	Household income, device ownership, and learning environment conditions
II. Digital Access	Type of devices, internet connectivity, and platform availability
III. Learning Engagement	Attendance, task completion, participation frequency
IV. Perceived Learning Outcomes	Self-assessed academic understanding and performance
V. Open-Ended Reflections	Challenges, coping strategies, and experiences

The questionnaire was validated by three experts in educational research and community studies. Reliability testing yielded a **Cronbach's alpha of 0.87**, indicating high internal consistency.

Data Gathering Procedure

1. **Approval and Coordination** – Formal permission was sought from school administrators and barangay officials to conduct the study.
2. **Orientation and Consent** – Participants and parents were informed of the study's purpose, confidentiality measures, and voluntary nature.
3. **Survey Administration**
   Questionnaires were distributed in person and online (via Google Forms) depending on accessibility.
4. **Collection and Verification** – Responses were checked for completeness, and unclear entries were clarified with participants when necessary.

All ethical considerations were observed, including confidentiality, anonymity, and the right to withdraw at any time.

Data Analysis

Data were analyzed using both **descriptive** and **inferential** statistics.

- **Descriptive statistics** (frequency, mean, and percentage distribution) summarized access conditions, engagement levels, and perceived outcomes.
- **Pearson's correlation analysis** was used to examine the relationship among: o Digital access.

o Learning engagement

o Perceived academic performance

This analytical approach is consistent with studies examining equity and digital learning disparities [9, 7].

Responses from the open-ended portion of the questionnaire were analyzed using content analysis to identify recurring themes that contextualize the quantitative results.

Ethical Considerations

The study adhered to ethical standards for educational research. Participation was voluntary, no identifying data were collected, and results were reported in aggregate form. Informed consent and assent were strictly observed.

ANALYSIS AND DISCUSSION

This chapter presents the findings of the study on the impact of online education on learning equity among students in selected low-income communities in Cebu City. Data are organized based on the study's objectives, focusing on (1) digital access, (2) learning engagement, and (3) perceived learning outcomes. The results are interpreted in relation to current literature and the broader discourse on educational equity in digital learning environments.

1. Digital Access in Online Learning

Table 1 presents students' access to digital devices and internet connectivity during online learning.

Table 1:Access to Digital Learning Resources

(n = 120) **Digital Resource Access**

	Frequency(f)	Percentage(%)
Uses Mobile Phone Only	68	56.67%
Uses Laptop/Desktop	22	18.33%
Uses Shared Device	30	25.00%
Type of Internet		
Prepaid Mobile Data	79	65.83%
Home Wi-Fi Subscription	29	24.17%
Public/Free Wi-Fi Access	12	10.00%

Interpretation. The majority of students relied on mobile phones and prepaid data, which are often unstable for extended academic tasks. Only a small proportion had access to personal laptops or home Wi-Fi. These findings are consistent with Aguilar [7] and Lapada et al. [5], who found that the digital divide in Philippine education is primarily shaped by device scarcity and unstable connectivity. This indicates that students' capacity to participate in online learning is dependent on household economic conditions, revealing a clear equity gap.

2. Student Engagement in Online Learning

Table 2 shows students' level of participation and academic involvement in online classes.

Table 2 : Level of Student Engagement in Online Learning

Engagement Indicator	High	Moderate	Low
Attendance in classes	37.50%	41.67%	20.83%
Submission of Activities	32.50%	46.67%	20.83%
Class Participation	29.17%	43.33%	27.50%

Interpretation. A large portion of students demonstrated moderate engagement, while notable percentages reported low attendance and participation.

Students with unstable internet access reported frequent disconnections and an inability to join synchronous sessions. These results align with Xie, Gulinna, and Rice (2020), who emphasized that technological limitations directly suppress student engagement, regardless of motivation or teacher instructional quality.

3. Perceived Learning Outcomes

Table 3 illustrates students' self-assessment of learning performance during online classes.

Table 3: Students' Perceived Learning Outcomes

Perceived Outcome	Agree (%)	Neutral (%)	Disagree (%)
I understood the lessons clearly	28.33%	37.50%	34.17%
I felt confident during activities	30.83%	33.33%	35.83%
I believe I performed well	26.67%	38.33%	35.00%

Interpretation.

Most students expressed uncertainty or lack of confidence in their academic performance. They attributed this to difficulty concentrating at home, minimal teacher feedback, and limited peer academic support. These findings mirror Toquero [6], who noted that the home environment becomes a critical determinant of learning in remote educational setups.

4. Correlation Analysis

Correlation tests revealed:

- Positive relationship between digital access and engagement ($r > 0.60$)
- Positive relationship between engagement and learning outcomes ($r > 0.65$)

This indicates that students with better access to digital tools are more engaged, and those who are more engaged perform better academically. This supports Van Deursen & Van Dijk's (2019) digital divide model, which argues that resource gaps translate into achievement gaps.

DISCUSSION SUMMARY

The findings strongly indicate that online education, as currently implemented in low-income communities, does not promote learning equity. Instead, socioeconomic disparities shape who can learn effectively online and who is left behind. Thus, unless schools and local governments directly address access, support environments, and digital pedagogy, online learning risks reproducing and deepening existing educational inequalities.

The findings of the study highlight the complex interplay between technological access, socioeconomic conditions, and learning engagement in shaping the educational experiences of students in low-income communities in Cebu City. Consistent with the theoretical premise that educational equity is influenced by structural inequalities [12], the results demonstrate that the transition from face-to-face instruction to online learning environments did not evenly benefit all learners.

1. Digital Access and Resource Disparities

A significant portion of respondents reported limited or shared access to digital devices, particularly smartphones, which served as the primary medium for online learning. Laptop and desktop ownership remained low, reflecting economic constraints that align with the findings of Soriano *et al*. [13], who argued that low-income Filipino households engage in "device rationing" during online schooling. Further, unstable and low-bandwidth internet connectivity, often relying on prepaid mobile data, created frequent disruptions in synchronous classes and hindered the timely submission of requirements.

These access limitations indicate that while the online modality is theoretically inclusive, the digital divide persists as an equity barrier.

Students with inadequate digital resources experienced difficulty accessing learning platforms, leading to lower participation and reduced academic engagement.

2. **Learning Engagement in Online Environments**

The shift to online learning significantly altered students' study behaviors and patterns of participation. Many respondents reported challenges such as difficulty concentrating, lack of motivation, and increased academic fatigue. These observations parallel the conclusions of Aguilar [7], who found that online learning environments often impose greater self-regulation demands compared to traditional classrooms, especially among younger learners.

Students with access to stable internet and personal learning devices demonstrated higher levels of engagement, supporting the assertion of Bao [14] that technological reliability is a prerequisite for effective digital learning. Meanwhile, those experiencing connectivity problems and limited device availability frequently fell behind, leading to a widening gap in academic performance.

3. Socioeconomic and Environmental Barriers

The findings also underscore the influence of home environments on learning. Overcrowded living spaces, lack of quiet study areas, and household responsibilities were reported as significant obstacles. Many students assumed caregiving and domestic roles during school hours, particularly in families where parents worked outside the home. This aligns with the findings of Del Castillo *et al*. [15], which showed that home-based learning amplifies gendered and socioeconomic labor expectations in Filipino households.

These environmental constraints hindered students' capacity to engage consistently in learning activities, suggesting that equity in education extends beyond access to technology and must consider broader sociocultural and economic conditions.

4. Perceived Learning Outcomes and Academic Performance

Despite encountering challenges, some students expressed appreciation for the flexibility of online learning, particularly regarding time management and pacing. However, the

majority reported that they felt they learned less compared to face-to-face instruction. This perception mirrors the findings of Adsuara *et al*. [16], who noted that reduced teacher-student interaction and delayed feedback may contribute to diminished academic confidence and comprehension in online modalities.

Moreover, performance inequalities emerged more distinctly during the online learning period. Students with adequate technological support and conducive home environments consistently scored higher in assessments, while those facing technological and domestic challenges struggled to maintain academic standing.

5. Implications for Learning Equity

The cumulative analysis reveals that the transition to online education, while necessary during the pandemic, exacerbated pre-existing educational inequalities in low-income communities. The digital divide remains a structural challenge, and addressing it requires more than basic distribution of devices or free data packages. As emphasized in recent educational equity frameworks [17], equity-centred digital transformation in education must be systemic, encompassing:

- Infrastructure development (affordable broadband access in underserved barangays)
- School-supported digital literacy training for students and families
- Community-based study hubs or shared learning spaces
- Strengthened teacher competencies in differentiated online instruction

6. Synthesis

The findings indicate that equitable online learning requires aligning digital access, instructional support, and socioeconomic considerations.

Without addressing these interconnected factors, online education risks reinforcing the very inequities it seeks to overcome.

RECOMMENDATIONS AND CONCLUSIONS

This study examined the impact of online education on learning equity among students in low-income communities in Cebu City, Philippines. The findings indicate that while online learning provided continuity of education during periods of school closure, it simultaneously amplified pre-existing inequalities. Limited access to digital devices, unreliable internet connectivity, and challenging home environments created significant barriers to consistent participation and engagement. Students with greater access to technological resources and supportive learning environments were better positioned to benefit from online education, while those facing socioeconomic hardships were at risk of academic disengagement and declining performance.

Furthermore, the study highlights that online learning environments demand higher levels of self-regulation, autonomy, and digital literacy, skills that are unevenly developed across learners due to socioeconomic disparities. Although some students recognized the flexibility offered by online education, many perceived a decline in understanding and mastery of lessons compared to face-to-face instruction. These insights underscore that learning equity is not merely a function of access to online platforms, but a holistic interplay of technology, instruction, household conditions, and socio-economic context.

RECOMMENDATIONS

Based on the findings, the following recommendations are offered:

For Schools and Teachers

1. Strengthen blended learning models, combining face-to-face and online instruction to accommodate diverse learning needs.
2. Integrate student support interventions such as virtual tutorials, remedial programs,

and flexible deadlines for students with connectivity challenges.

3. Enhance teachers' digital pedagogy skills through continuous professional development focusing on inclusive and engaging online instructional strategies.
4. Implement differentiated instruction approaches, acknowledging that students have varying levels of digital access and learning support at home.

For Local Government Units (LGUs) and Community Organizations

1. Expand community-based learning hubs equipped with stable internet access, shared devices, and supervised study spaces.
2. Subsidize internet connectivity in underserved barangays through negotiated low-cost rates with telecom providers.
3. Mobilize barangay-level volunteers or youth tutors to assist students who require academic reinforcement at home.

For National Policy and Educational Planning

1. Invest in long-term digital infrastructure to improve broadband access in urban poor and geographically underserved communities.
2. Embed digital equity frameworks into DepEd and CHED strategic education plans, ensuring resource distribution prioritizes disadvantaged learners.
3. Develop policies on sustainable device provision, maintenance, and replacement, particularly for students from low-income families.
4. Strengthen monitoring and evaluation systems to continually assess the outcomes of digital learning reforms and address emerging equity gaps.

POLICY IMPLICATIONS

The study reinforces the need for systemic reforms that go beyond emergency-based solutions. Ensuring equitable access to quality education in a digital era requires:

- Holistic and multisectoral collaboration involving schools, families, local governments, private technology providers, and national agencies.
- Institutional frameworks that guarantee technology access as a learning right, not a privilege contingent on socioeconomic status.
- Educational planning that prioritizes resilience and inclusivity, enabling students from low-income communities to participate meaningfully in digital learning environments.

By addressing digital access inequities, improving online teaching capacity, and strengthening community and policy supports, the education sector can move toward a more just and inclusive system where all learners, regardless of socio-economic background, can thrive.

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