



Learning Delivery Modalities in Philippine Basic Education During the COVID-19 Period

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Abstract

Background and Aim: The COVID-19 pandemic compelled education systems worldwide to adopt alternative learning delivery modalities to ensure educational continuity amid school closures, mobility restrictions, and unequal access to digital technologies. In the Philippines, while previous studies have documented localized experiences of remote learning, comprehensive national-level analyses using administrative education data remain limited. This study aimed to describe the distribution of learning delivery modalities in Philippine basic education during the COVID-19 period and examine variations by sex, school level, school sector, and school year.

Materials and Methods: This descriptive quantitative study utilized publicly available administrative data from the Department of Education (DepEd) Data Bits for School Year (SY) 2021–2022, with SY 2020–2021 data included for year-to-year comparison. Learner enrollment by learning delivery modality served as the primary outcome measure, while information and communication technology (ICT) indicators were incorporated to contextualize disparities in digital access. Descriptive statistics were used to summarize learner distribution across modalities, demographic characteristics, school levels, sectors, and school years.

Results: Printed Modular Distance Learning (PMDL) remained the predominant learning modality in SY 2021–2022, serving 20,688,555 learners (75.1% of total enrollment). Blended learning accounted for 3,989,922 learners, while Online Distance Learning enrolled 2,105,824 learners. Differences by sex were minimal, whereas marked variations were observed across school levels and sectors. PMDL was most prevalent in elementary education and public schools, while online and blended modalities were more common among senior high school students and private schools. Compared with SY 2020–2021, blended learning increased by 1,111,692 learners and online distance learning by 159,786 learners.

Conclusion: Philippine basic education relied primarily on printed modular instruction to sustain learning during the pandemic, reflecting efforts to minimize dependence on internet connectivity. However, the uneven distribution of digital and blended modalities highlights persistent inequalities in educational access. These findings provide a national baseline for understanding learning modality utilization and underscore the importance of developing resilient, multi-modal education systems that integrate printed, offline digital, online, and blended approaches for future emergencies.

Keywords: Basic Education; COVID-19; Distance Learning; Modular Learning; Online Learning; Digital Inequality

Introduction

The COVID-19 pandemic produced one of the largest disruptions to schooling in recent history. School closures and public health restrictions interrupted ordinary classroom routines and forced education systems to preserve learning continuity while protecting health and safety. International organizations described the disruption as a system-wide education crisis because it affected schooling, learner welfare, teacher work, household routines, and educational equity at the same time (United Nations, 2020; UNESCO, 2020; UNICEF, 2020). The World Bank emphasized that remote learning during school closure required more than digital platforms; it required appropriate delivery channels, teacher support, learner engagement, household access, and workable implementation arrangements (Muñoz-Najar et al., 2021).

In the Philippines, the Department of Education responded through the Basic Education Learning Continuity Plan, which formalized learning delivery modalities for SY 2020–2021 and subsequent pandemic school years (Department of Education, 2020a, 2020b). The plan recognized that learners did not have uniform access to the internet, devices, adult supervision, or home learning spaces. It therefore allowed schools to use printed modular distance learning, digital modular learning, online distance learning, television-based and radio-based instruction, homeschooling, and blended learning (Department of Education, 2022a). This multi-channel policy response reflected guidance that emergency education systems should not rely on a single technology when access is uneven (OECD,





2020; Muñoz-Najar et al., 2021), and it matched the reality that emergency remote teaching in the Philippines operated under unequal infrastructure and household conditions.

The distinction between emergency remote teaching and planned online learning is central to this interpretation. Hodges et al. (2020) argued that emergency remote teaching is a temporary crisis response, unlike carefully designed online education that is planned, resourced, and supported over time. Bozkurt and Sharma (2020) similarly emphasized that pandemic teaching arrangements should be understood in relation to crisis conditions. In the Philippine modular context, this distinction matters because printed modules could preserve learner-content interaction when connectivity was limited, but they also reduced opportunities for real-time teaching presence and social presence unless feedback, monitoring, and teacher communication were deliberately organized.

Distance education frameworks further show why modality labels alone cannot describe instructional quality. Moore (1989) identified learner-content, learner-instructor, and learner-learner interaction as core forms of distance education, while the Community of Inquiry framework emphasizes cognitive presence, teaching presence, and social presence in mediated learning environments (Garrison et al., 2000). Printed modular learning can support structured engagement with learning materials, but it may weaken immediate learner-instructor and learner-learner interaction when modules are not paired with timely feedback, consultation, or peer communication. Meta-analytic evidence also indicates that distance and blended learning outcomes depend on design, interaction, learner support, implementation quality, and context rather than modality labels alone (Bernard et al., 2004; Means et al., 2013).

Digital inequality was a central condition shaping pandemic education. The digital divide includes unequal device access, connectivity, online skills, patterns of use, and benefits obtained from technology (Hargittai, 2002; Selwyn, 2004; van Dijk, 2006; van Deursen & van Dijk, 2011). Warschauer (2003) argued that technology access must be understood as part of social inclusion because hardware and connectivity have educational value only when learners can use them within supportive social and institutional conditions. Recent reviews further describe first-level, second-level, and third-level digital divides involving access, skills, and outcomes (Scheerder et al., 2017; Lythreathis et al., 2022). These levels help interpret why online learning may appear more strongly in sectors with greater digital readiness, while printed modular learning remains central where access and meaningful use are constrained.

Philippine studies during the pandemic documented these concerns through institutional analyses, surveys, and localized accounts. Toquero (2020), Joaquin et al. (2020), and Tria (2020) discussed how Philippine education institutions adjusted to flexible and remote learning. Lapada et al. (2020) reported teachers' concerns regarding readiness and institutional support. Barrot et al. (2021) found that Filipino learners faced online learning difficulties associated with home learning environments, mental health, and access conditions, while Rotas and Cahapay (2020) reported student difficulties in remote learning during the crisis. Research on modular learning also documented practical challenges for teachers, learners, and parents when printed learning packets became a major delivery route (Dangle & Sumaoang, 2020; Bustillo & Aguilos, 2022).

These localized surveys and qualitative accounts are valuable because they capture perceptions, difficulties, and classroom experiences. However, national administrative tabulations provide a complementary view of systemic institutional behavior, the scale of modality adoption, and distributional patterns across the basic education system. Publicly available DepEd Data Bits provide national counts of learners by learning delivery modality, sex, school level, sector, and school year comparison, together with contextual indicators on school computers and internet connectivity (Department of Education, 2022a, 2022b; Open Data Philippines, 2023). This study fills that gap by providing a national descriptive mapping of modality adoption during the COVID-19 period, with comparisons by sex, school level, sector, and school year, and with ICT indicators used as contextual evidence.





Objectives

This study describes, compares, maps, and contextualizes learning delivery modalities in Philippine basic education during the COVID-19 period using public administrative tabulations from DepEd Data Bits. Specifically, it sought to answer the following questions:

1. What was the overall distribution of learners across learning delivery modalities?
2. How did the distribution of learning delivery modalities vary by sex?
3. How did the distribution of learning delivery modalities vary across elementary school, junior high school, and senior high school?
4. How did the distribution of learning delivery modalities vary across public schools, private schools, and SUCs/LUCs?
5. How did learner counts by modality change from SY 2020-2021 to SY 2021-2022?
6. How do national and regional school ICT indicators contextualize the dominance of printed modular distance learning and the limited reach of online and digital modalities?

Literature Review

Pandemic education research repeatedly distinguishes emergency remote teaching from ordinary online learning. Planned online learning is designed through intentional decisions about content delivery, interaction, assessment, teacher presence, and learner support, whereas emergency remote teaching is organized rapidly to preserve instruction during a crisis (Hodges et al., 2020). Bozkurt and Sharma (2020) described this distinction as essential because crisis teaching should be judged in relation to what it was designed to accomplish under emergency conditions. Ferri et al. (2020), Adedoyin and Soykan (2020), and Dhawan (2020) similarly showed that online learning during COVID-19 created opportunities for continuity but also exposed technological, pedagogical, and social barriers.

School closures also raised concerns about learning disruption and widening inequality. Engzell et al. (2021) found evidence of learning loss during school closures in the Netherlands, while Kuhfeld et al. (2020) projected potential achievement effects from COVID-19 school closures in the United States. These studies are not directly comparable to the Philippine administrative data analyzed here because they focus on achievement outcomes, but they show why learning continuity became a policy priority. International guidance from UNESCO (2020), UNICEF (2020), the United Nations (2020), and the World Bank (Muñoz-Najar et al., 2021) emphasized that learning continuity policies had to preserve access while recognizing that learners without connectivity or devices faced greater risk.

Distance learning theory helps explain why different delivery modalities provide different forms of support. Moore (1989) emphasized three types of interaction: learner-content, learner-instructor, and learner-learner. Printed modules primarily strengthen learner-content interaction because learners can read, answer, and return structured materials without continuous internet access. However, printed modules provide weaker learner-instructor and learner-learner interaction when they are not accompanied by teacher feedback, monitoring, consultation schedules, parent guidance, or peer communication. Moore et al. (2011) also cautioned that online learning, e-learning, and distance learning should not be treated as identical categories. The Community of Inquiry framework adds that cognitive presence depends on teaching presence and social presence as well as content engagement (Garrison et al., 2000). For this reason, printed modular dominance should be interpreted as a reach strategy whose instructional quality depends on the feedback and support systems attached to it.

Digital inequality research provides the second theoretical basis for the framework. Hargittai (2002) identified online skills as a second-level digital divide beyond physical access, while van Dijk (2006), Selwyn (2004), and Warschauer (2003) cautioned that devices and connectivity produce educational value only when they are usable within supportive social and institutional conditions. Scheerder et al. (2017) and Lythreath et al. (2022) organize this literature into first-level, second-level, and third-level divides involving access, skills, meaningful use, and educational benefits. These levels help interpret Philippine sector differences: private schools may show higher online shares when connectivity, devices, and platform routines are more available, while public schools may rely more strongly on printed modular learning when national reach must be preserved under uneven access conditions.





Philippine pandemic education literature shows how these theoretical issues appeared in local experience. Joaquin et al. (2020), Toquero (2020), and Tria (2020) described institutional adjustment to flexible and remote learning in the Philippines. Lapada et al. (2020) reported that teachers faced issues related to readiness, training, and institutional support. Barrot et al. (2021) found that learners' online learning challenges involved home environment, access, and mental health, while Rotas and Cahapay (2020) reported difficulties experienced by Philippine students in remote learning. Although many of these studies focus on higher education or localized samples, they show that modality adoption was embedded in readiness, household conditions, and institutional support.

Printed modular learning became especially important in the Philippine basic education response. Dangle and Sumaoang (2020) documented modular distance learning implementation in Philippine secondary public schools, while Bustillo and Aguilos (2022) connected modular learning challenges in the countryside to the digital divide. Cahapay (2020) examined the Basic Education Learning Continuity Plan in relation to inclusiveness for Indigenous learners. These studies support the interpretation of printed modules as an equity-oriented access route, but they also indicate that access through printed materials does not remove the need for teacher feedback, monitoring, and learner support.

DepEd policy documents provide the administrative context for modality adoption. The Basic Education Learning Continuity Plan set out modalities for learning continuity under public health restrictions (Department of Education, 2020a, 2020b). DepEd Data Bits later summarized learner counts under learning delivery modalities and school ICT conditions (Department of Education, 2022a, 2022b). Open Data Philippines (2023) lists DepEd Data Bits as a public dataset. Together, emergency remote teaching, interaction theory, digital divide theory, Philippine modular learning literature, and DepEd administrative data form the basis of the conceptual framework used to describe modality distribution at the national scale.

Conceptual Framework

The conceptual framework defines modality adoption as the descriptive outcome of an emergency education delivery system. The first element is the pandemic policy context, consisting of school closures, the Basic Education Learning Continuity Plan, and learning continuity under restricted face-to-face instruction. The second element consists of filtering factors through which modality distribution is described: school level, sector, sex, school year, and ICT environment. The third element is the descriptive outcome, namely the distribution of learners across printed modular distance learning, digital modular learning, online distance learning, television-based instruction, radio-based instruction, homeschooling, and blended learning.

ICT indicators are treated as environmental constraints and contextual indicators, not predictors. Public school computer availability, learner-computer ratios, and school internet connectivity are used to help interpret why some modalities were more feasible as mass-reach options than others. The framework guides descriptive interpretation rather than causal estimation: it maps how modality adoption varied across available administrative categories and interprets those distributions in relation to emergency policy, interaction requirements, and digital access conditions.

Methodology

This study employed a descriptive quantitative research design using publicly available administrative data from the Department of Education (DepEd), Philippines. The data were obtained from the DepEd Data Bits database (Dataset ID: plimfvv8-51m1-75rj-tzrw-2zbf8xj96las), retrieved on 03 January 2023 through the Philippine Open Data Portal. The dataset is accessible at the DepEd website (<https://www.deped.gov.ph/alternative-learning-system/resources/facts-and-figures/datasets/>) and the Philippine Open Data Portal (<https://data.gov.ph/index/public/dataset/deped-data-bits/plimfvv8-51m1-75rj-tzrw-2zbf8xj96las>) (Open Data Philippines, 2023). The analysis focused on two administrative tabulations: Learning Delivery Modality and Functional Computers and Internet Connectivity, which provided national-level information on learners' instructional modalities and schools' digital infrastructure during the COVID-19 pandemic (Department of Education, 2022a, 2022b).





The primary outcome was learner count by learning delivery modality. The modality categories were printed as modular distance learning, digital modular distance learning, online distance learning, television-based instruction, radio-based instruction, homeschooling, and blended learning. Subgroup comparisons were based on the available tabulations by sex, school level, and sector. School level was defined as elementary school, junior high school, and senior high school. The sector was defined as public, private, and SUCs/LUCs, referring to state universities and colleges or local universities and colleges that offered basic education.

Table 1 provides the modality variables and operational definitions used in this study. These definitions were used to standardize labels across tables and figures. The abbreviated label ODL was standardized as Online Distance Learning. The data review checked category labels, numerical totals, and consistency between reported percentages and learner counts. Learner shares were recalculated from counts when needed. A minor reporting inconsistency was observed for other modalities in the overall distribution: the learner count corresponds to approximately 2.8% of the total, whereas the DepEd table reports 2.4%. Recomputed shares were used because they were derived directly from learner counts and allow the percentages to remain consistent across tables; the DepEd-reported percentages were retained in the table for transparency.

Table 1: Learning modality variables and definitions.

Variable or category	Operational definition in this study
MDL (Print)	Printed modular distance learning using printed self-learning modules and related learning packets.
MDL (Digital)	Modular distance learning is delivered through digital files or offline digital resources rather than printed copies.
Online Distance Learning	Distance learning is delivered through internet-enabled platforms and online communication.
TV-Based Instruction	Remote instruction using self-learning module content converted to video lessons for television delivery.
Radio-Based Instruction	Remote instruction using self-learning module content converted to radio scripts or audio lessons.
Homeschooling	A home-based modality recognized by DepEd as part of learning delivery choices during the period.
Blended Learning	In the DepEd context, blended learning refers to face-to-face instruction combined with one or more distance learning modalities. Where the DepEd Data Bits category does not identify the exact combination used by each school, the term is retained as the official category label rather than treated as one uniform implementation across all schools.
Sex	Male and female learner groups in the DepEd Data Bits learning modality tabulation.
School level	Elementary School, Junior High School, and Senior High School.
Sector	Public, private, and SUCs/LUCs offering basic education.

For the sex comparison, the tabulation provided learner counts for printed modular distance learning, online distance learning, and blended learning only. Percentages within sex were therefore calculated using the sum of the available categories for each sex. The sex analysis is limited to these shared categories and does not represent the entire modality universe. For level and sector comparisons, reported percentages were retained because the subgroup tables displayed printed modular distance learning, online distance learning, and blended learning as the main categories. Smaller modalities were not separately displayed in those subgroup tables.

Changes between SY 2020-2021 and SY 2021-2022 were described using absolute and percentage change. Absolute change was computed as the learner count in SY 2021-2022 minus the learner count in SY 2020-2021. Percent change was computed relative to the SY 2020-2021 count. No inferential tests were conducted because the data are national administrative summaries rather than a probability



sample. ICT variables, including functional computers, learner-computer ratios, and school internet connectivity, were used only to contextualize national and regional modality patterns and not to infer individual access, household connectivity, or causal determinants.

Results

Table 2 and Figure 1 present the overall learner distribution by learning delivery modality. Across the overall categories, the total learner count was 27,560,661. Printed modular distance learning was the dominant arrangement, accounting for 20,688,555 learners, or 75.1% of the total when recalculated from counts. Blended learning followed with 3,989,922 learners, or 14.5%, while online distance learning accounted for 2,105,824 learners, or 7.6%. Other modalities, including digital modular distance learning, television-radio-based instruction, and homeschooling, accounted for 776,360 learners, or 2.8%, when recalculated from counts.

Table 2: Overall distribution of learners by modality.

Modality	Learners	Reported Percent (%)	Recomputed Share (%)
MDL (Print)	20,688,555	75.1	75.1
Blended Learning	3,989,922	14.5	14.5
Online Distance Learning	2,105,824	7.6	7.6
Other modalities: MDL (Digital), TV-Radio Based Instruction, Homeschooling	776,360	2.4	2.8

Note. The reported percent follows the DepEd tabulation. The recomputed share is calculated from learner counts in the table. For other modalities, the recomputed share aligns the percentage with the learner count, while the percentage printed in the DepEd table is retained for transparency.

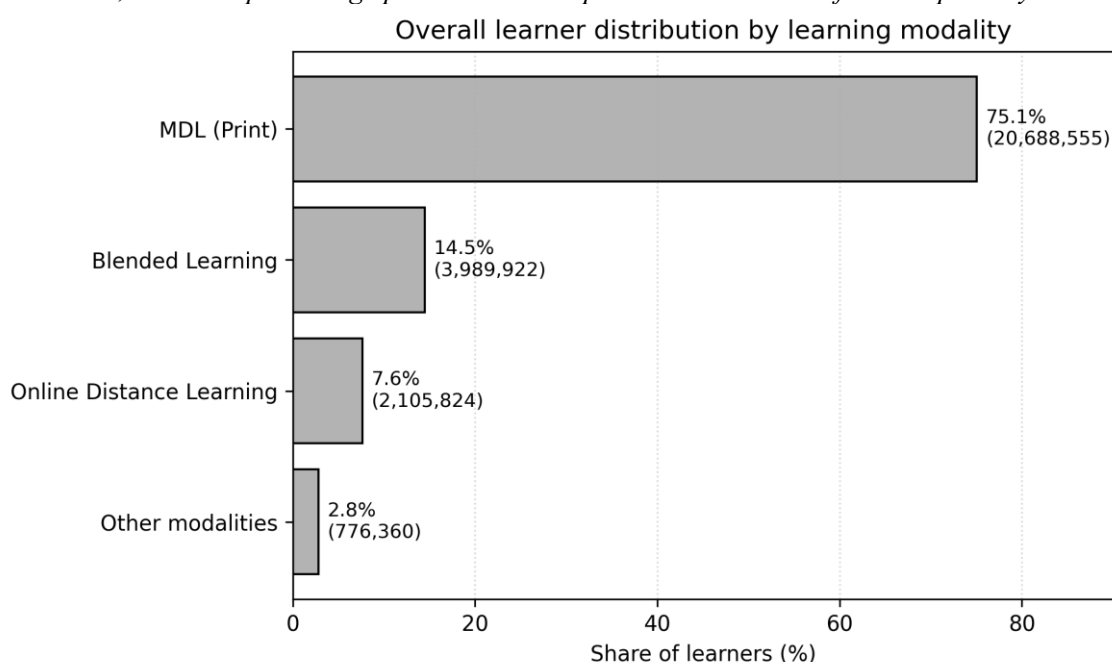


Figure 1. Overall learner distribution by modality.

Table 3 and Figure 2 show the available modality distribution by sex. Among male learners in the common categories, printed modular distance learning accounted for 10,650,000 learners, or 78.0%. Online distance learning accounted for 1,020,000 learners, or 7.5%, and blended learning accounted for 1,990,000 learners, or 14.6%. Among female learners, printed modular distance learning accounted for 10,030,000 learners, or 76.4%, online distance learning for 1,090,000 learners, or 8.3%, and blended learning for 2,000,000 learners, or 15.2%.

Table 3. Modality distribution by sex.

Sex	Modality	Learners	Share within sex (%)
Female	Blended Learning	2,000,000	15.2
Female	MDL (Print)	10,030,000	76.4
Female	Online Distance Learning	1,090,000	8.3
Male	Blended Learning	1,990,000	14.6
Male	MDL (Print)	10,650,000	78.0
Male	Online Distance Learning	1,020,000	7.5

Note. Percentages are calculated within sex using the modality categories available in the sex tabulation.

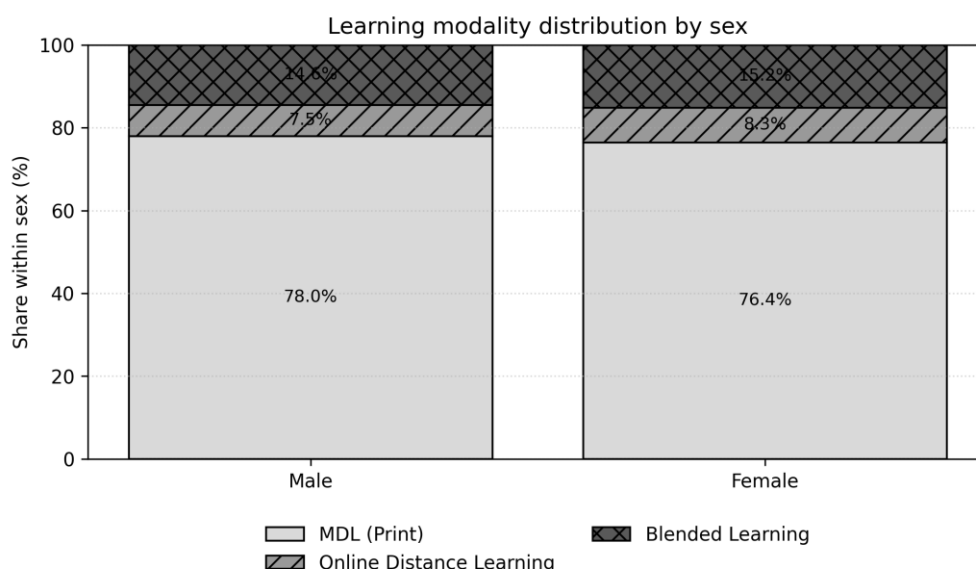


Figure 2. Modality distribution by sex

Table 4 and Figure 3 present modality distribution by school level. Printed modular distance learning accounted for 12,110,000 elementary learners, or 80.8%, compared with 6,350,000 junior high school learners, or 72.5%, and 2,240,000 senior high school learners, or 58.5%. Online distance learning rose from 5.1% in elementary school to 8.7% in junior high school and 15.1% in senior high school. Blended learning also increased by level, from 12.4% in elementary school to 15.6% in junior high school and 20.1% in senior high school.

Table 4. Modality distribution by school level.

Level	Modality	Learners	Reported share within level (%)
Elementary	MDL (Print)	12,110,000	80.8
Elementary	Online Distance Learning	762,000	5.1
Elementary	Blended Learning	1,850,000	12.4
Junior High School	MDL (Print)	6,350,000	72.5
Junior High School	Online Distance Learning	762,000	8.7
Junior High School	Blended Learning	1,370,000	15.6
Senior High School	MDL (Print)	2,240,000	58.5
Senior High School	Online Distance Learning	578,000	15.1
Senior High School	Blended Learning	767,000	20.1

Note. Reported shares follow the DepEd level tabulation. Smaller modalities are not separately displayed in this subgroup table.

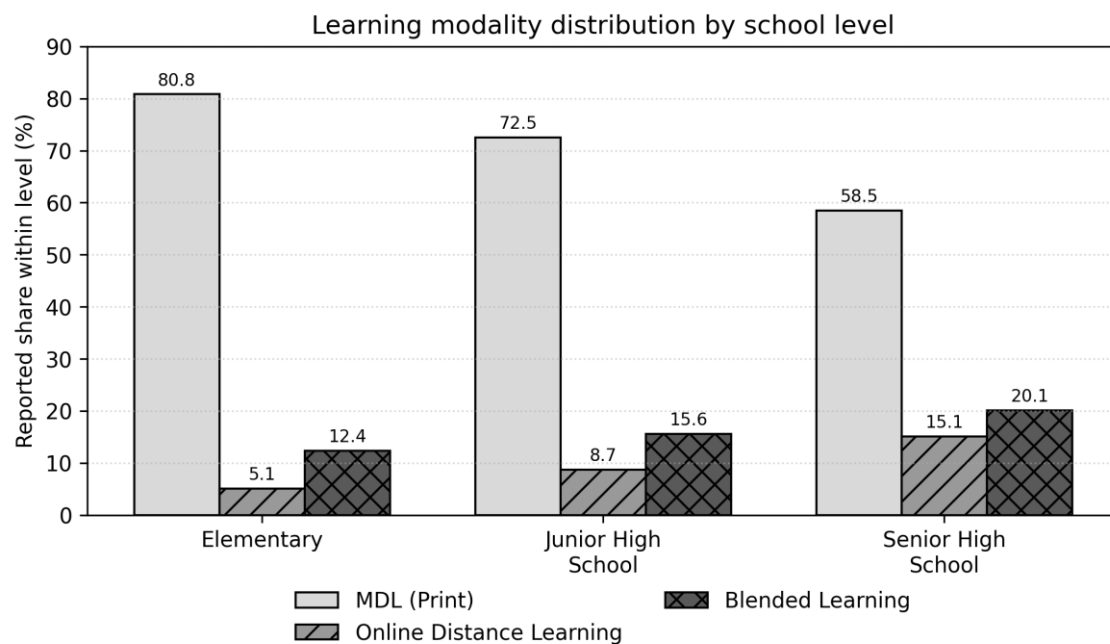


Figure 3. Modality distribution by school level

Table 5 and Figure 4 show the strongest distributional divide in the dataset. In public schools, printed modular distance learning accounted for 19,800,000 learners, or 82.0%, while online distance learning represented 708,000 learners, or 2.9%, and blended learning represented 2,970,000 learners, or 12.3%. In private schools, online distance learning accounted for 1,370,000 learners, or 41.3%, while printed modular distance learning accounted for 855,000 learners, or 25.9%, and blended learning accounted for 967,000 learners, or 29.3%. This contrast indicates that modality adoption was strongly patterned by institutional sector and likely reflected unequal access conditions, although the tabulation does not identify individual household income or school-level resources.

Table 5 Modality distribution by sector

Sector	Modality	Learners	Reported share within sector (%)
Public	MDL (Print)	19,800,000	82.0
Public	Online Distance Learning	708,000	2.9
Public	Blended Learning	2,970,000	12.3
Private	MDL (Print)	855,000	25.9
Private	Online Distance Learning	1,370,000	41.3
Private	Blended Learning	967,000	29.3
SUCs/LUCs	MDL (Print)	42,400	39.3
SUCs/LUCs	Online Distance Learning	22,400	20.8
SUCs/LUCs	Blended Learning	38,300	35.5

Note. Reported shares follow the DepEd sector tabulation. Smaller modalities are not separately displayed in this subgroup table.

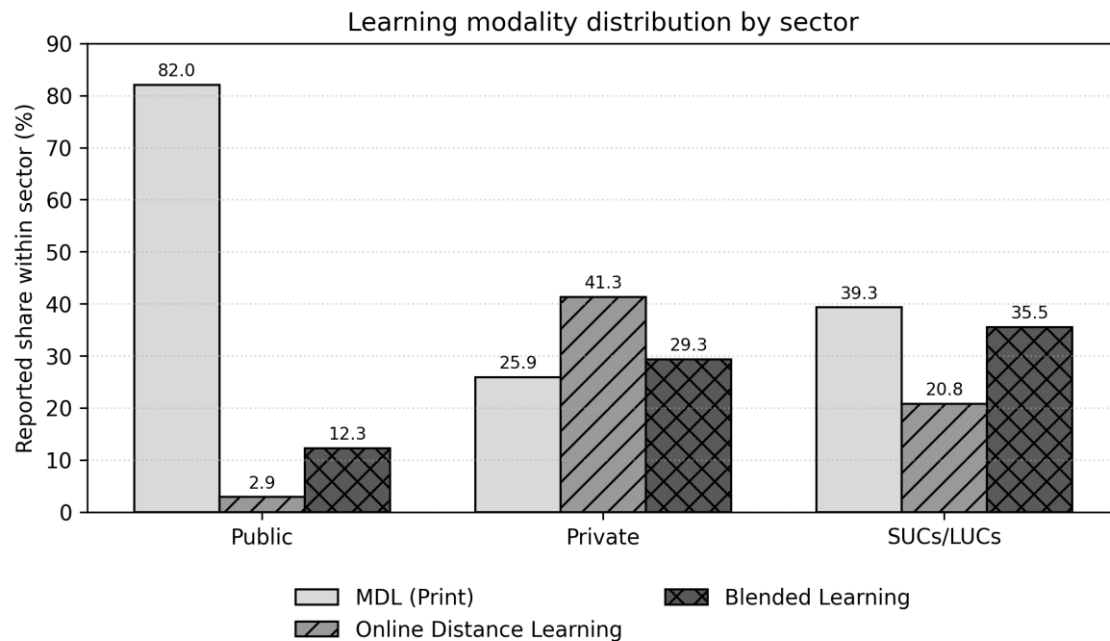


Figure 4. Modality distribution by sector

Table 6 and Figure 5 describe changes from SY 2020-2021 to SY 2021-2022. Printed modular distance learning remained nearly stable, decreasing by 74,756 learners, or 0.4%. Digital modular distance learning increased by 123,643 learners, or 22.8%, while online distance learning increased by 159,786 learners, or 8.2%. Television-based instruction decreased slightly, while radio-based instruction increased by 18,667 learners, or 30.4%. Homeschooling decreased by 5,192 learners, or 19.0%. The largest absolute change was in blended learning, which increased by 1,111,692 learners, or 38.6%. This increase suggests a strategic pivot toward mixed delivery arrangements in the second pandemic school year, even as printed modular learning remained the dominant access route.

Table 6. Change in modality adoption from SY 2020-2021 to SY 2021-2022.

Modality	SY 2020-2021 Learners	SY 2021-2022 Learners	Change	Percent change (%)
MDL (Print)	20,763,311	20,688,555	-74,756	-0.4
MDL (Digital)	543,357	667,000	123,643	22.8
Online Distance Learning	1,946,038	2,105,824	159,786	8.2
TV-Based Instruction	7,280	6,991	-289	-4.0
Radio-Based Instruction	61,433	80,100	18,667	30.4
Homeschooling	27,300	22,108	-5,192	-19.0
Blended Learning	2,878,230	3,989,922	1,111,692	38.6

Note. Change is computed as SY 2021-2022 learner count minus SY 2020-2021 learner count.

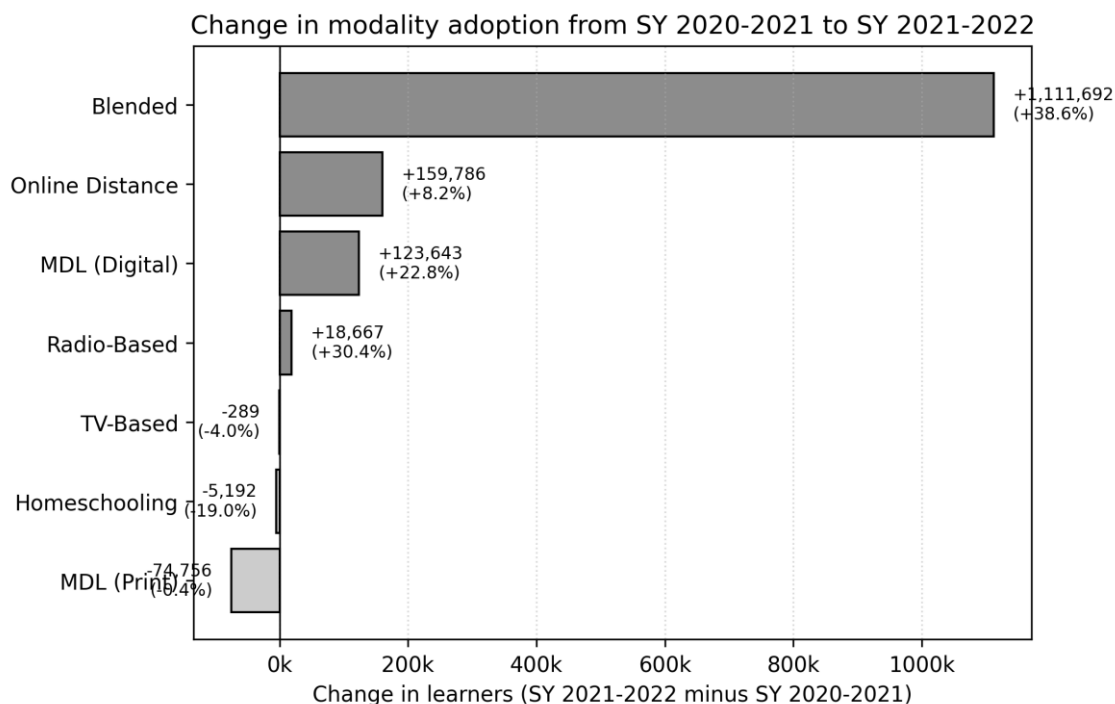


Figure 5. Change in modality adoption from SY 2020-2021 to SY 2021-2022.

Discussion

The findings show that Philippine basic education during the COVID-19 period was organized around printed modular distance learning as the main access route, with online and blended modalities distributed unevenly by level and sector. Rather than repeating every statistic, three patterns are most important: printed modular distance learning carried the largest national learner load, sector differences were bigger than sex differences, and blended learning expanded substantially in the second pandemic school year. These patterns align with the Basic Education Learning Continuity Plan, which allowed schools to use delivery arrangements suited to public health conditions and access constraints (Department of Education, 2020a, 2020b).

The dominance of printed modular distance learning reflects a reach-versus-quality dilemma. Printed modules reduced dependence on continuous internet access and, therefore, helped preserve national reach. However, distance education theory shows that content delivery alone is insufficient for strong learning support. In Moore's (1989) terms, printed modules mainly support learner-content interaction, while learner-instructor and learner-learner interaction require feedback, communication, and monitoring. In Community of Inquiry terms, low-interaction delivery can weaken teaching presence and social presence even when cognitive tasks are provided (Garrison et al., 2000). The pedagogical cost of relying on a low-interaction modality for most learners is therefore not captured by access counts alone.

The modest differences by sex shown in Table 3 and Figure 2 suggest that modality separation in the available national administrative data was more strongly sector-based and level-based than gender-based. Female learners had slightly higher shares in online distance learning and blended learning, but the differences were small relative to the dominance of printed modular distance learning. Because the sex tabulation is aggregated and does not include all modality categories, the results cannot identify household-level mechanisms, learner preferences, or gendered experiences of remote learning.

Level differences were more visible. Table 4 and Figure 3 show that reliance on printed modular distance learning declined from elementary to senior high school, while online distance learning and blended learning increased. This pattern may reflect differences in learner age, curricular organization, platform readiness, teacher specialization, and household willingness to support online participation among older learners. It also aligns with the national ICT context, where learner-computer ratios were lower in senior high school than in elementary school. In the ICT tabulation, the national ratio was 19 elementary learners per computer, 9 junior high school learners per computer, and 3 senior high school learners per computer, while school internet connectivity was 64.2% for elementary schools, 72.2% for junior high schools, and 67.3% for senior high schools (Department of Education, 2022b). These figures



do not prove causation, but they help contextualize why online and blended arrangements were more visible at higher levels.

Sector differences were the most pronounced. Table 5 and Figure 4 show that public schools were overwhelmingly associated with printed modular distance learning, while private schools had much higher shares of online distance learning and blended learning. This pattern is consistent with digital inequality theory, which emphasizes that access, skills, and educational benefits from technology are socially and institutionally patterned (Hargittai, 2002; Selwyn, 2004; van Dijk, 2006; Scheerder et al., 2017; Lythreath et al., 2022). The sector pattern does not identify individual household income or school-level resources, but it indicates that modality adoption was connected to unequal learning-access conditions across institutional settings.

The year comparison in Table 6 and Figure 5 indicates a system in transition rather than a complete shift away from printed modules. Printed modular distance learning declined only slightly, while blended learning increased by 1,111,692 learners, or 38.6%. Online distance learning also increased, but by a smaller absolute amount than blended learning. These changes suggest that the system began moving toward more mixed delivery arrangements by SY 2021-2022, while printed modules continued to serve as the largest access route. This interpretation is consistent with pandemic education research showing that learning systems adapted over time but remained constrained by readiness and access conditions (Lapada et al., 2020; Barrot et al., 2021; Bond et al., 2021).

ICT indicators provide a useful context for interpreting why online and digital modalities remained limited. DepEd Data Bits reported 1,828,196 computer units in public schools, and more than four-fifths of schools at each level had functional computers. At the same time, school internet connectivity was not universal, and regional indicators were uneven. Across regions, elementary learner-computer ratios ranged from 5 to 44 learners per computer, junior high school ratios from 4 to 15, and senior high school ratios from 2 to 6. Internet-connected elementary schools ranged from 46.4% to 97.9% across regions, while junior high school connectivity ranged from 50.8% to 95.4% and senior high school connectivity from 54.2% to 78.7%. These figures show that school computers existed, but high learner-computer ratios and uneven connectivity limited the feasibility of individual home-based online learning during lockdown, especially where household connectivity was also uneven.

The results also reinforce the distinction between modality adoption and learning effectiveness. The data show how learners were distributed across modalities, but they do not show achievement, engagement, attendance, feedback quality, teacher workload, parental support, or learner well-being. Evidence from school closure studies indicates that learning disruption can be substantial (Engzell et al., 2021; Kuhfeld et al., 2020), but the administrative tabulations analyzed here cannot estimate learning loss. The contribution of the analysis is to map the emergency delivery architecture of the Philippine basic education and identify where modality inequality was most visible.

From a policy perspective, the findings suggest that emergency learning continuity requires both mass-reach and interaction-rich arrangements. Printed modular distance learning offered a practical way to reach learners without continuous internet access, but it must be supported by feedback systems, teacher consultation, learner monitoring, and targeted assistance for households with limited learning resources. Strengthening online and blended learning requires infrastructure, device access, teacher professional development, accessible platforms, and offline alternatives for communities where connectivity remains unstable. A resilient crisis plan should therefore combine printed, offline, digital, online, broadcast, and blended channels rather than depend on a single delivery mode.

Knowledge Contribution

This study contributes a national baseline of learning delivery modality adoption in the Philippine basic education during the COVID-19 period. It maps the emergency delivery architecture of the system by showing how learner counts were distributed across modalities at the national scale and how those distributions varied by sex, school level, sector, and school year. The evidence identifies printed modular distance learning as the central mass-reach modality and shows that digital and blended arrangements were distributed unevenly by level and sector.

The study also contributes to educational policy discussion by linking modality distribution to the ICT context while keeping infrastructure indicators as contextual evidence rather than estimated determinants. This national baseline can serve as a reference point for future research on post-pandemic recovery, learning loss, modality transition, and the rebuilding of interaction-rich learning systems after emergency remote teaching.





Recommendation

First, learning continuity planning should preserve multi-channel delivery rather than assume universal online access. Printed materials, offline digital files, online platforms, broadcast lessons, and blended arrangements each serve different access conditions. Second, printed modular distance learning should be strengthened through structured teacher feedback, learner progress monitoring, parent guidance, and mechanisms for early identification of disengagement. Third, digital and blended learning expansion should prioritize public schools and lower levels where online distance learning shares were lowest. Investments in connectivity, devices, teacher training, and accessible learning platforms should be aligned with regional ICT gaps. Fourth, hybrid infrastructure should be developed for schools with limited internet connectivity but available computer units, including offline digital servers, LAN-based school repositories, locally accessible learning resources, and organized device-sharing systems.

Fifth, future administrative datasets should link modality adoption with attendance, completion, learner performance, teacher support, and household access indicators while protecting privacy. Such data would help distinguish between reach, implementation quality, and learning outcomes. Sixth, longitudinal studies should track learners who were under printed modular distance learning, especially the 20,688,555 learners in SY 2021-2022, to examine whether their transition back to face-to-face schooling is associated with different learning recovery patterns compared with learners who experienced online or blended modalities. Future research may also examine regional patterns using school-level or division-level data and investigate how modality choices affected teachers' work and learner support practices.

Data Availability

The data used in this study were obtained from DepEd Data Bits, a publicly available administrative database maintained by the Department of Education (DepEd), Philippines. The dataset is registered in the Philippine Open Data Portal under Dataset ID: plimfvv8-51m1-75rj-tzrw-2zbf8xj96las. The data were accessed through the DepEd Data Bits repository (<https://www.deped.gov.ph/alternative-learning-system/resources/facts-and-figures/datasets/>) and the Philippine Open Data Portal (<https://data.gov.ph/index/public/dataset/deped-data-bits/plimfvv8-51m1-75rj-tzrw-2zbf8xj96las>) on May 1, 2026. Because the dataset is publicly available and anonymized, no permission was required for its use in this study.

Ethical Considerations

This study used aggregated public administrative data. The analyzed tabulations do not contain names, learner-level identifiers, household identifiers, school-level records, or private personal information. The analysis was descriptive and did not attempt to identify individual learners, teachers, schools, or households. Because the study used publicly available aggregate data, the risk to individual privacy is minimal.

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