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"There was no learning": a phenomenon in mathematics education after modular distance learning

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ABSTRACT

Modular instruction, limited scaffolding, reduced monitoring, and heavy reliance on home support contributed to what many teachers described as a period where "there was no learning," resulting in compounded academic and motivational deficits. This study investigated the challenges mathematics teachers faced while transitioning from modular distance learning to face-to-face instruction, particularly the persistent disruptions in classes and the interventions they implemented in response. Using a phenomenological case study design, qualitative data were collected from eighteen elementary and secondary mathematics teachers through interviews, focus group discussions, and classroom observations. Findings revealed that foundational learning gaps, pre-emptive resistance to mathematics, delayed curriculum pacing, teacher overload, and resource scarcity are the products of modular instructions and learning disruptions. Many students lacked mastery of basic operations, struggled with comprehension, and exhibited low confidence, making grade-level instruction difficult to sustain. In response, teachers implemented structured remediation, peer tutoring programs (e.g., math aiders), community-based support mechanisms (e.g., Mobile Learning Hub and Distance Learning Center), localized materials, and extended instructional time. The findings suggest that mathematics learning recovery requires more than content delivery; it demands systematic rebuilding of foundational skills and student engagement. The study stressed the need for structured bridging curricula, flexible pacing policies, sustained remediation programs, and stronger school–community partnerships to ensure resilient and equitable mathematics education.

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1. INTRODUCTION

Mathematics education is essential for developing critical thinking, problem-solving, and real-world application skills, which are central to mathematical literacy in the 21st century [1]. However, the field is currently facing a global learning crisis due to major educational disruptions. In the Philippines, persistent low achievement and weak foundational skills remain evident, with learners performing below global benchmarks. Results from Programme for International Student Assessment (PISA) 2022 show that only a small proportion of students reached minimum proficiency, indicating difficulties in basic tasks and real-life application [2]. Other assessments reveal early and compounding learning deficits, including weak number sense, limited conceptual understanding, and poor problem-solving skills [3]. These challenges were intensified by school closures, with learning losses in numeracy persisting for years after the return to face-to-face instruction [4].

National data further highlight this crisis. The Second Congressional Commission on Education (EDCOM II) reported extremely low proficiency rates in high school, with only 1.36% in grade 10 and 0.4% in grade 12 reaching proficiency [5]. Similarly, Early Language, Literacy, and Numeracy Assessment (ELLNA) 2024 results show that about 70% of grade 3 learners struggle with basic literacy and numeracy skills, while National Achievement Test results indicate declining proficiency by grade 6 [5]. These findings suggest that many learners fail to meet expected standards, which may also reflect overly high proficiency benchmarks [5], [6]. The shift to remote learning disproportionately affected vulnerable learners, with 79% of parents in Southeast Asia reporting slower learning progress [7]. Major barriers included limited internet access, psychosocial stress, and financial constraints [8]. Despite the implementation of learning continuity plans (LCPs), student satisfaction remained low due to limited access to materials and communication gaps [9]. Learning loss persisted, while classroom disruptions further undermined student achievement and motivation [4], [10]. This led to a widespread perception among learners that "no learning" occurred during flexible learning periods [9]. In response, the Philippine education sector implemented initiatives such as LCPs, flexible learning modalities, and alternative delivery methods including printed modules, television, and radio instruction [7], [9], [11]–[14]. Programs like mEducation demonstrated promising results in improving learning outcomes [14]. Curriculum reforms, including the MATATAG framework and ARAL Program, emphasize foundational skills, targeted interventions, and instructional recovery [15]–[17].

Despite these efforts, a critical gap remains in understanding the pedagogical and psychosocial dimensions of the "no learning" phenomenon. Learning loss results from the interaction of technical, instructional, and socio-emotional factors [18]. The digital divide, limited home support, and lack of structured interaction hindered effective learning, particularly among disadvantaged students [7], [18]. Moreover, remote learning reduced opportunities for feedback, engagement, and motivation, reinforcing the perception of ineffective learning [14], [19]. Recent studies conceptualize learning loss as a multidimensional phenomenon involving cognitive regression, motivational decline, and reduced academic engagement following prolonged school disruptions [17], [20].

Beyond declines in content mastery, students also experienced weakened self-regulation, reduced learning persistence, and decreased academic engagement which are critical for sustained mathematics learning [21], [22]. These is due to the hierarchical and cumulative structure of the discipline, where gaps in prerequisite knowledge constrain the acquisition of higher-order concepts and problem-solving skills [23], [24]. These disruptions increases learners' cognitive load, particularly when foundational skills are not yet automated. When students are required to process new mathematical concepts while simultaneously reconstructing missing prior knowledge, working memory becomes overloaded, leading to errors, slower processing, and reduced comprehension [25]. Learners with weak foundational numeracy struggle to engage in complex problem-solving tasks due to limited cognitive capacity and lack of fluency in basic operations [26], [27]. Moreover, students facing ongoing foundational gaps often develop avoidance, low confidence, and negative attitudes toward math and are more disengaged and less motivated academically, especially when instructional pacing mismatches their understanding [24], [28], [29].

While current reforms focus on content delivery and recovery, greater attention must be given to learner engagement and psychological readiness. Strengthening mathematics education remains central to building a resilient education system capable of addressing both current gaps and future disruptions [16], [30]. To develop evidence-based strategies and translate research into practice and policy. Teachers' experiences with learning gaps can guide the creation of diagnostic assessments, bridging programs, and targeted professional development for math educators. This study's insights can help school leaders and policymakers create flexible pacing policies, allocate remediation resources, and enhance school-community partnerships for learning recovery. This study bridges teacher experiences to systemic responses, enhancing theoretical understanding and providing actionable solutions for post-disruption math education.

This study examined the learning gaps experienced by elementary and secondary mathematics teachers during the transition from modular distance learning to face-to-face instruction, as well as the interventions implemented to address these gaps. Specifically, it sought to answer the following:

- What learning gaps and challenges in mathematics emerged as a result of modular instruction and learning disruptions?
- What remediation strategies and instructional interventions were implemented by mathematics teachers to address these learning gaps?

2. METHOD

2.1. Research design

This study employed a phenomenological case study design to explore the challenges faced by mathematics teachers and the interventions they implemented. A descriptive approach was used to capture teachers lived experiences during the transition from modular to face-to-face instruction [31]. The bounded system consisted of mathematics teachers within a single school division in the Philippines. The integration of phenomenology and case study design is appropriate for this study as it allows for an in-depth exploration of teachers lived experiences (phenomenology) within a specific and bounded educational context (case study).

2.2. Study site

The study was conducted in a school within an island community in Western Visayas, Philippines. The division includes elementary and secondary schools serving diverse learners from urban, rural, and geographically isolated areas. The site was selected due to its transition from modular to face-to-face instruction, providing context to examine learning gaps, foundational issues, and instructional adaptations across the K–12 curriculum.

2.3. Participants

A total of 18 mathematics teachers from elementary and secondary schools were purposively selected. Inclusion criteria were: i) current mathematics teaching position; ii) experience during modular learning; and iii) involvement in the transition to face-to-face instruction. Participation was voluntary and approved prior to data collection.

Table 1 shows the teacher-participants pseudonyms, the grade levels taught and other professional responsibilities or qualification. The table indicates that the participants are from elementary and secondary level and have instructional and administrative positions. It is also shown in the table that the participants taught subjects not aligned to mathematics as their area of specialization.

Table 1. Participant pseudonyms, grade level taught, and additional information

Participant	Grade level taught	Additional information
Amy	Senior high school	Holds a master's degree in mathematics
Cristy	Grade 8, 9, and 10	With units earned in a master's degree in mathematics. Not a resident of the island where the school is located.
Ken	Grade 9 and senior high school	Designated mathematics coordinator
Kris	Grade 8 and 9	Designated Aralin Panlipunan (Social Studies) coordinator. Not a resident of the island where the school is located.
Rob	Grade 10	Holds a master's degree in mathematics
Shan	Grade 7	Designated as Teen Center coordinator and Guidance alternate. With units earned in a master's degree in mathematics.
Nes	Senior high school	Designated ICT, LIS, and sports coordinator
Jud	Senior high school	Designated SBM wins coordinator, SBM coordinator, public affairs coordinator, and property and supply incharge
Gay	Grade 3	Holds a master's degree in educational management. Adviser of one grade 3 section
Glad	Grade 5	Adviser of one grade 5 section
Herl	Grade 4	Adviser of one grade 4 section
Jos	Grade 4, 5, and 6	Designated mathematics and planning coordinator
Jun	Grade 2	Adviser of one grade 2 section
Lyk	Grade 2	Designated teacher in-charge
Quen	Grade 3	Adviser of one grade 3 section
Nad	Kindergarten	Adviser of the kindergarten section
Myl	Grade 2	Adviser of one grade 2 section
Irene	Grade 4	Adviser of one grade 4 section

2.4. Data collection and analysis

Data was collected using multiple qualitative methods. Semi-structured interviews were conducted with all participants, followed by two focus group discussions (elementary and secondary) to validate themes and deepen insights. Classroom observations were conducted to triangulate data and contextualize teachers' experiences [31]. Reflexive field notes were maintained throughout the process. Data were gathered in English, Filipino, and Hiligaynon, audio-recorded with consent, and transcribed verbatim. The researchers acknowledge their professional background in mathematics education, which may influence interpretation of the data. To address this, reflexivity was practiced through continuous self-examination and documentation of assumptions during data collection and analysis. This helped ensure that findings remained grounded in participants' perspectives rather than researcher preconceptions.

Thematic analysis following Braun and Clarke [32] was used to identify patterns in the data. Transcripts were reviewed and translated after initial familiarization. Descriptive coding was conducted using Taguette [33]. Emerging themes were discussed, linked to literature, and used to construct descriptive narratives for each participant.

3. RESULTS AND DISCUSSION

This phenomenological case study addressed two research questions: the challenges faced by mathematics teachers and the interventions implemented to address these challenges. Four major themes emerged: i) learning gaps due to modular instruction; ii) pre-emptive resistance and weak foundations; iii) delays in instructional pacing; and iv) remediation and systemic responses.

3.1. Learning gap as a byproduct of modular instruction

A major finding is the significant learning gap caused by prolonged modular instruction, resulting in low engagement, weak mastery, and difficulty transitioning to higher-level mathematics. Teachers consistently described students as unprepared for more complex topics. Amy explained that students experienced difficulty adjusting to advanced lessons after two years of modular learning:

> "*The transitions in the learning of the students over the past two years that we did not have face-to-face, they depended on modular learning. They have low interest and learning in the subject, especially in math. The learners are somewhat in culture shock when introduced to General Mathematics. It was not basic and already had complicated topics, so it was hard for them.*"

This gap is further compounded by the absence of prerequisite knowledge, making it difficult to proceed with grade-level competencies. As Rob emphasized:

> "*The gap is really big. The learning gap of the students is due to the pandemic and learning disruptions. During this time, we did not have face-to-face classes, and they depended on modules. Some students had difficulty in their studies, so how can we teach the competencies now when they have not understood the previous competencies needed for the current lesson?*"

Teachers also noted that students' understanding remained superficial due to independent, unguided learning. Kris observed:

> "*They learned through modular learning, but their understanding is not firm and deep because they only studied at home. Because of the two-year gap, many students still have limited knowledge and are not yet well-prepared to face new lessons.*"

In addition, instructional materials were described as insufficient, with modules lacking detailed explanations. As Cris stated:

> "*There is little discussion in our modules. Sometimes the solutions are not fully explained, so students cannot understand how the answers were derived.*"

At the elementary level, the learning gap manifested in severe foundational deficiencies. Nad described:

> "*Close to none. Even in writing their names, letters, and numbers, some students do not know how to hold a pencil or recognize them.*"

These findings indicate that the learning gap is not temporary but a lasting consequence of prolonged reliance on modular and remote learning contributes to significant learning loss in mathematics where conceptual understanding depends on guided instruction, scaffolding, and timely feedback [20], [21], [27]. Since mathematics is cumulative in nature, gaps in foundational knowledge disrupt students' ability to engage with higher-order concepts, creating a mismatch between curriculum expectations and actual learning readiness [24].

3.2. Pre-emptive resistance and weak foundational skills

Beyond cognitive gaps, students developed a pre-emptive resistance to mathematics, often perceiving it as inherently difficult even before instruction begins. This mindset is strongly linked to weak foundational skills. Ken explained that students' negative perceptions stem from inadequate preparation in earlier grades:

> "*The first issue is the students' resistance. Whenever we talk about math, they automatically perceive it negatively and anticipate difficulty even with simple numbers. One factor is their weak foundation from elementary years, where they were expected to master basic operations before entering high school.*"

This perception is reinforced by limited exposure to effective problem-solving approaches. Nes shared:

> "*They were not aware of simpler methods for solving problems, so they tend to think that mathematics is always difficult to learn.*"

Teachers also observed behavioral effects such as disengagement and reduced attention. Irene described:

> "*The ability of our grade 4 students is low. Some write numbers incorrectly, and they cannot understand simple tasks. They would rather run around and play, and they cannot sit still during lessons.*"

What appears as low mental capacity is actually a regression in foundational learning. Quen explained:

> "*They are non-readers, and because of modular learning for two years, they are stuck in that time. It is as if they skipped grades 1 and 2.*"

Thus, resistance to mathematics is not merely attitudinal but rooted in disrupted learning and missing foundational competencies. Learning loss in mathematics is associated with decreased academic motivation, increased disengagement, and the development of negative learning identities, particularly when students lack prerequisite skills and when learners encounter tasks that exceed their current level of understanding, they are more likely to experience frustration and avoidance behaviors, reinforcing perceptions that mathematics is inherently difficult [24], [25], [27], [29].

3.3. Learning gaps causing delays in instructional pacing

The presence of learning gaps has significantly disrupted instructional pacing, forcing teachers to reteach prerequisite concepts before proceeding with the curriculum. Rob explained how this affects lesson delivery:

> "*I cannot push through with my lessons immediately because students do not have the prerequisite knowledge. We need to reteach previous lessons before proceeding. If the gap is large, their learning will also be delayed in the next level of mathematics.*"

Similarly, Kris reported delays due to revisiting earlier topics:

> "*Grade 9 students never had face-to-face learning in grades 7 and 8, so we must review and rediscuss previous topics. For example, they could not understand variables, so we had to go back to grade 7 Algebra. As a result, we are behind by about two weeks.*"

In some cases, delays are more substantial due to severe foundational gaps. Irene noted:

> "*We are already delayed. Some students cannot even multiply single-digit numbers, yet we are expected to teach more advanced topics. It is difficult to move forward when their basic understanding is still limited.*"

Assessment results further confirm these gaps. Jos shared:

> "*We conducted an assessment, and many students scored very low. Even with simple items like 4 + 3 or 5 + 1, some only got 2 or 3 out of 10. They do not know how to multiply or divide.*"

Teachers emphasized that mastering foundational skills takes priority over strict adherence to curriculum pacing. As Glad stated:

> "*You cannot continue with your lesson if students do not understand the basics. The schedule becomes delayed because we need to go back to previous lessons.*"

These findings highlight a shift in instructional priorities from curriculum coverage to foundational recovery. Mathematics learning is sequential and cumulative, the absence of prerequisite knowledge necessitates reteaching, which inevitably delays instructional pacing [27]. Post-pandemic classrooms require adaptive pacing strategies that emphasize depth of understanding rather than strict adherence to timelines [23]. From an instructional perspective, this shift reflects a move from curriculum coverage to mastery-oriented teaching, where ensuring foundational competence becomes essential for sustainable learning progression. However, such adjustments also increase teacher workload and create systemic challenges, particularly when curriculum policies remain rigid [21].

3.4. Remediation and systemic interventions

To address these challenges, teachers implemented remediation, peer tutoring, and localized interventions as primary strategies. These approaches aim to rebuild foundational knowledge before advancing to higher-level content. Kris described the necessity of continuous review and support systems:

> "*We must review and rediscuss lessons to help students understand current topics. We also proposed Math Aiders and established learning hubs where students can ask questions and access resources.*"

Peer tutoring emerged as a key strategy, allowing students to learn from their peers in more accessible ways. Ken explained:

> "*We selected students with high competence in math, called Math Aiders, and assigned them to assist those with low competence, especially those at frustration level.*"

Rob further highlighted its effectiveness:

> "*We implemented a program where fast learners assist slow learners in small groups. We also provide remediation sessions and organize activities like Math Day to support learning.*"

In contexts where teacher capacity is limited, community-based remediation was utilized. Shan shared:

> "*Since teachers cannot cater to all students, we bring remediation to the community. We pair students so that those who are good in math can guide others, and we conduct home visitations.*"

Teachers also adapted instructional materials and strategies to match students' levels. Jun explained:

> "*I do not strictly follow the book. I adjust the level of difficulty based on students' comprehension and simplify problems so they can understand them better.*"

Additionally, localized instructional resources were developed to support learning. Jos described:

> "*We created Mathepedia, a simplified version of lessons that even parents can understand. It follows the 'I do, we do, you do' approach to guide students step by step.*"

Despite persistent constraints such as limited time and resources, these interventions reflect teachers' adaptive responses and commitment to addressing learning gaps. Community-based interventions and parental involvement further enhance learning recovery by extending instructional support beyond the classroom, particularly in resource-constrained contexts [17]. Moreover, peer tutoring has been shown to be an effective strategy for improving academic performance and engagement, as it provides immediate feedback, promotes collaborative learning, and allows students to learn at an appropriate pace [34].

4. LIMITATIONS, IMPLICATIONS, AND RECOMMENDATIONS

This study explored how elementary and secondary mathematics teachers in an island school reacted to the phenomenon of "there was no learning" during the shift from modular distance learning to full face-to-face instruction. Qualitative case studies focus on specific contexts, limiting their findings to geographical and institutional settings rather than aiming for statistical generalizability. The island's setting, infrastructure limitations, and resource constraints define the challenges recorded. The results should be seen as context-specific insights, not universal claims about all Philippine schools. Flyvbjerg [35] argues that detailed, context-rich descriptions can clarify complex educational issues relevant in similar contexts.

One limitation of the study is its reliance on teachers' perspectives. While interviews, focus group discussions, and classroom observations were triangulated to gather data, the perspectives of students, parents, and administrators were not systematically analyzed. The findings emphasize the teachers' views on learning gaps, student resistance, and remediation efforts. Future research could benefit from a multi-stakeholder approach for a more comprehensive understanding of mathematics education after disruptions. The study also identifies learning gaps and instructional delays but lacks quantitative measures of changes in student achievement. The focus was primarily on lived experiences and instructional adaptations rather than on statistical validation. Longitudinal and mixed-methods studies could further explore how remediation programs impact learning outcomes over time.

Considering these limitations in mind, several implications emerge. First, the findings emphasize the need to rethink curriculum pacing and competency expectations after disruptions [15]. Teachers reported that following MELC timelines strictly was unrealistic because of foundational gaps. Curriculum frameworks should include structured bridging or recovery phases to revisit prerequisite skills before introducing grade-level competencies. Educational reforms should focus on depth rather than breadth, considering student readiness levels. Second, the study highlights the importance of foundational numeracy in advancing mathematics [4]. Students struggle with algebra, functions, and advanced concepts without mastering basic operations, fractions, and place value. Investing in early-grade numeracy, conducting diagnostic assessments at the start of each school year, and implementing continuous formative review are crucial for sustainable recovery [14], [15]. Third, findings indicate that teacher workload and systemic constraints greatly impact instructional quality. Teachers in the study handled various grade levels, out-of-field subjects, administrative roles, and remediation tasks. Educational institutions should review policies on teacher deployment, subject alignment, and administrative assignments to avoid burnout and ensure recovery efforts don't depend solely on teacher sacrifice [9], [14], [15]. Fourth, the study shows that learning recovery involves both academic and psychosocial aspects. Students' resistance to mathematics, low confidence, and short listening stamina show that emotional and motivational aspects need attention alongside cognitive gaps. Programs like peer tutoring, math-focused school events, and community remediation show that rebuilding confidence and engagement is as crucial as reteaching content [10], [14]. Lastly, the findings highlight the significance of community and parental involvement [18]. Modular instruction burdened families, many of whom couldn't support learning [36]. Strengthening school-community partnerships, offering simplified guides for parents, and creating localized learning hubs can help address inequities during future disruptions.

To address prerequisite gaps, we recommend that policy-makers implement a formal bridging curriculum at the start of each academic year, focus resources on disadvantaged schools, and ensure module clarity and accessibility. School leaders need to integrate structured remediation into timetables and formalize peer tutoring, while diagnostic numeracy assessments guide interventions. Mathematics teachers should use differentiated instruction, spiral reviews, and continuous formative assessments to identify misconceptions and mitigate math anxiety. Future research should explore long-term outcomes of remediation, compare rural and urban divisions, and incorporate student and parent perspectives on the "no learning" phenomenon.

5. CONCLUSION

Each can tell a story of how to rebuild mathematics learning after large-scale disruption and sustained institutional commitment to foundational skills, teacher support, and equitable resource provision to ensure that future disruptions do not reproduce the same gaps. This study presents the lived experiences of mathematics teachers during the transition from modular distance learning to full face-to-face instruction in an island school. The finding revealed that the prolonged modular instruction lead to the phenomenon "there was no learning" which reflects not a total absence of instruction, but a profound erosion of foundational numeracy skills, weakened student engagement, and systemic instructional delays. Learning gaps, pre-emptive resistance to mathematics, teacher overload, and resource scarcity collectively disrupted curriculum pacing and deep conceptual understanding across grade levels. Despite these challenges, teachers demonstrated resilience and innovation through remediation, peer tutoring programs, community-based interventions, and localized instructional materials. These efforts highlight that recovery in mathematics education is both an academic and psychosocial process requiring structured support, flexible policies, and collaborative engagement among schools and communities.

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AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C	: **C**onceptualization	I	: **I**nvestigation	Vi	: **Vi**sualization
M	: **M**ethodology	R	: **R**esources	Su	: **Su**pervision
So	: **So**ftware	D	: **D**ata Curation	P	: **P**roject administration
Va	: **Va**lidation	O	: Writing - **O**riginal Draft	Fu	: **Fu**nding acquisition
Fo	: **Fo**rmal analysis	E	: Writing - Review & **E**diting		

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

ETHICAL APPROVAL

This study was conducted openly and respectfully, ensuring the anonymity and safety of the participants. Permission was obtained from the school's heads. The participants were provided with informed consent for data collection, and participation is voluntarily. All data were used solely for academic purposes and were handled responsibly to avoid misrepresentation of the experiences. The findings were presented truthfully and with due respect to the participants and community.

DATA AVAILABILITY

Participants provided informed consent; however, it did not include data sharing, so direct access to the data is unavailable to protect their confidentiality. Nonetheless, the authors are willing to provide more detailed information from the interviews and observations.

REFERENCES

[1] Organisation for Economic Co-operation and Development (OECD), *PISA 2022 assessment and analytical framework*. Paris, France: OECD Publishing, 2023, doi: 10.1787/dfe0bf9c-en.

[2] Organisation for Economic Co-operation and Development (OECD), *PISA 2022 results: Factsheets – Philippines*. Paris, France: OECD Publishing, 2023.

[3] M. C. M. Tanquilan and L. S. Lomibao, "A systematic literature review of non-STEM students' mathematics journey in tertiary STEM programs," *Journal of Innovations in Teaching and Learning*, vol. 5, no. 1, pp. 49–53, 2025, doi: 10.12691/jitl-5-1-8.

[4] R. Banerjee and T. Bharati, "Learning disruptions and academic outcomes," *Economics of Education Review*, vol. 107, p. 102650, 2025, doi: 10.1016/j.econedurev.2025.102650.

[5] EDCOM II Communications, "Student proficiency rates plunge from 30% in Grade 3 to 0.47% in Grade 12," Jan. 2026. [Online]. Available: https://edcom2.gov.ph/student-proficiency-rates-plunge-from-30-in-grade-3-to-0-47-in-grade-12/. Accessed: Feb. 12, 2026.

[6] K. C. P. Santos, L. P. Cagasan, K. B. Loberiza, A. D. Tenorio, A. J. G. Angeles, and M. A. B. Lapitan, "Examining the DepEd's national assessments: A review of framework, design, development, psychometric properties, and utilization," Philippine Institute for Development Studies, Philippines, 2025. [Online]. Available: https://pidswebs.pids.gov.ph/CDN/document/pidsdps2525.pdf.
[7] A. Maddawin, P. Morgan, A. Park, D. Suryadarma, T. Q. Long, and P. Vandenberg, "Learning disruptions during the COVID-19 pandemic: Evidence from household surveys in Southeast Asia," *International Journal of Educational Development*, vol. 107, p. 103053, 2024, doi: 10.1016/j.ijedudev.2024.103053.
[8] S. J. Acebes, J. Malitante, N. Tuble, and R. Bongolto, "Academic goals and learning strategies of pre-service teachers during emergency online learning in the Philippines," *Journal of Artificial Intelligence in Education & Learning Innovation*, vol. 1, no. 1, pp. 32–49, 2025, doi: 10.56003/jaieli.v1i1.569.
[9] R. A. Pineda, "Resilience amid academic disruption: The role of LCPs among school communities," *TEM Journal*, vol. 14, no. 2, pp. 1548–1562, 2025, doi: 10.18421/TEM142-53.
[10] E. C. Burns, A. J. Martin, R. J. Collie, and T. Mainhard, "Perceived classroom disruption undermines the positive educational effects of perceived need-supportive teaching in science," *Learning and Instruction*, vol. 75, p. 101498, 2021, doi: 10.1016/j.learninstruc.2021.101498.
[11] F. M. Cervantes, "CHED pushes for flexible learning for HEIs in August," *Philippine News Agency*, Jun. 2020. [Online]. Available: https://www.pna.gov.ph/articles/1101519. Accessed: Mar. 2, 2026.
[12] G. P. Cuaton, "Philippines higher education institutions in the time of COVID-19 pandemic," *Revista Romaneasca pentru Educatie Multidimensionala*, vol. 12, no. 1, Suppl. 2, pp. 61–70, 2020, doi: 10.18662/rrem/12.1sup2/247.
[13] K. T. Lagat, "Education amidst COVID-19 disruption: Perceived difficulty in implementing flexible learning strategies of teacher education faculty members in a state university," *Philippine Social Science Journal*, vol. 3, no. 3, pp. 142–150, 2020, doi: 10.52006/main.v3i3.264.
[14] E. King and D. Suryadarma, *Building resilience in education systems*. Tokyo, Japan: Asian Development Bank Institute, 2025. [Online]. Available: https://escuelanueva.org/wp-content/uploads/2025/02/building-resilience-education-systems.pdf.
[15] F. T. Dayagbil, D. R. Palompon, L. L. Garcia, and M. M. J. Olvido, "Teaching and learning continuity amid and beyond the pandemic," *Frontiers in Education*, vol. 6, p. 678692, Jul. 2021, doi: 10.3389/feduc.2021.678692.
[16] Department of Education, "Adoption of the national learning recovery program in the Department of Education," DepEd Order No. 013, s. 2023, Pasig City, Philippines, 2023. [Online]. Available: https://www.deped.gov.ph/wp-content/uploads/DO_s2023_013.pdf. Accessed: Aug. 21, 2025.
[17] R. Donnelly and H. A. Patrinos, "Learning loss during COVID-19: An early systematic review," *Prospects*, vol. 51, no. 4, pp. 601–609, 2022, doi: 10.1007/s11125-021-09582-6.
[18] L. Panther, K. A. Allee-Herndon, K. Perrotta, and S. Cannon, "I can tell you stories: Teacher education during educational disruption," *The Teacher Educator*, vol. 56, no. 3, pp. 327–345, 2021, doi: 10.1080/08878730.2021.1918302.
[19] D. J. V. Abad and E. M. Abad, "Self-paced learning practices during educational disruption in a public higher education institution," *East Asian Journal of Multidisciplinary Research*, vol. 2, no. 5, pp. 1957–1968, 2023, doi: 10.55927/eajmr.v2i5.3819.
[20] P. Engzell, A. Frey, and M. D. Verhagen, "Learning loss due to school closures during the COVID-19 pandemic," *Proceedings of the National Academy of Sciences*, vol. 118, no. 17, p. e2022376118, 2021, doi: 10.1073/pnas.2022376118.
[21] S. Hammerstein, C. König, T. Dreisörner, and A. Frey, "Effects of COVID-19-related school closures on student achievement: A systematic review," *Frontiers in Psychology*, vol. 12, p. 746289, 2021, doi: 10.3389/fpsyg.2021.746289.
[22] M. Kuhfeld, J. Soland, B. Tarasawa, A. Johnson, E. Ruzek, and J. Liu, "Projecting the potential impact of COVID-19 school closures on academic achievement," *Educational Researcher*, vol. 49, no. 8, pp. 549–565, 2020, doi: 10.3102/0013189X20965918.
[23] A. Schleicher, *The impact of COVID-19 on education: Insights from education at a glance 2020*. Paris, France: OECD Publishing, 2020.
[24] Organisation for Economic Co-operation and Development (OECD), *The state of global education: 18 months into the pandemic*. Paris, France: OECD Publishing, 2021.
[25] F. Paas and J. J. G. van Merriënboer, "Cognitive-load theory: Methods to manage working memory load in the learning of complex tasks," *Current Directions in Psychological Science*, vol. 29, no. 4, pp. 394–398, 2020, doi: 10.1177/0963721420922183.
[26] K. De Witte and L. Gambi, "The pandemic, socioeconomic disadvantage and learning outcomes in Belgium," In S. V. Schnepf, L. Volante, D. A. Klinger, O. Giancola, & L. Salmieri, *The pandemic, socioeconomic disadvantage, and learning outcomes – Cross-national impact analyses of education policy reforms.* Publications Office of the European Union, 2024, doi: 10.2760/800165.
[27] J. E. Maldonado and K. De Witte, "The effect of school closures on standardised student test outcomes," *British Educational Research Journal*, vol. 48, no. 1, pp. 49–94, 2022, doi: 10.1002/berj.3754.
[28] A. E. Foley, J. B. Herts, F. Borgonovi, S. Guerriero, S. C. Levine, and S. L. Beilock, "The math anxiety–performance link: A global phenomenon," *Current Directions in Psychological Science*, vol. 26, no. 1, pp. 52–58, 2017, doi: 10.1177/0963721416672463.
[29] UNESCO, *Reimagining our futures together: A new social contract for education*. Paris: United Nations Educational, Scientific and Cultural Organization, 2021, doi: 10.54675/ASRB4722.
[30] Department of Education, "Implementing rules and regulations of Republic Act No. 12028: Academic recovery and accessible learning (ARAL) program act," Pasig City, Philippines, 2024. [Online]. Available: http://deped.gov.ph/wp-content/uploads/IRR_R.A.-12028_ARAL-ACT.pdf. Accessed: Aug. 21, 2025.
[31] R. K. Yin, *Case study research and applications*, 6th ed. Thousand Oaks, CA, USA: Sage Publications, 2018.
[32] V. Braun and V. Clarke, "Using thematic analysis in psychology," *Qualitative Research in Psychology*, vol. 3, no. 2, pp. 77–101, 2006, doi: 10.1191/1478088706qp063oa.
[33] J. Saldaña and M. Omasta, *Qualitative research: Analyzing life*. Thousand Oaks, CA, USA: Sage Publications, 2016.
[34] K. J. Topping, "A theoretical model of intergenerational tutoring: Advancing the field," *Journal of Intergenerational Relationships*, vol. 18, no. 1, pp. 88–105, 2020, doi: 10.1080/15350770.2019.1646182.
[35] B. Flyvbjerg, "Case study," in *The Sage handbook of qualitative research*, 4th ed., N. K. Denzin and Y. S. Lincoln, Eds. Thousand Oaks, CA, USA: Sage Publications, 2011, pp. 301–316.
[36] L. Moscoviz and D. K. Evans, "Learning loss and student dropouts during the COVID-19 pandemic: A review of the evidence two years after schools shut down," Center for Global Development, Mar. 2022. [Online]. Available: https://www.cgdev.org/publication/learning-loss-and-student-dropouts-during-covid-19-pandemic-review-evidence-two-years.

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