Empowering Learners: A Holistic Approach to Pedagogical Adaptation and Institutional Support Through Grounded Theory

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Abstract: This study explores the responses of junior high school mathematics educators in the Carcar City Division to learning loss. The loss was brought about by the disruptions caused by the COVID-19 pandemic. It aims to understand the strategies they implemented to address these challenges. Employing a qualitative design grounded in Straussian Grounded Theory, the research draws insights from key informant interviews and focused group discussions with teachers and administrators from the division's three largest public schools. Findings reveal a range of innovative and context-responsive strategies such as peer tutoring, differentiated instruction, remedial interventions, and the use of blended learning modalities. The institutional support also plays a vital role in the success of learning recovery programs as well as the support coming the community. These two sources of support create a strong foundation for addressing learning gaps. Hence, the study culminates in the development of the substantive theory: Adaptive Student Learning Recovery, which outlines three interrelated pillars for effective learning recovery: pedagogical adaptation, social learning support, and institutional intervention. Pedagogical adaptation includes responsive teaching strategies tailored to students' needs; social learning support highlights the roles of parents, peers, and community in sustaining student engagement; and institutional intervention refers to systemic efforts in leadership, resource allocation, and policy support. Despite persistent challenges—including technological disparities, limited instructional time, and socio-economic barriers—educators demonstrated resilience and a strong commitment to equitable learning recovery. The study offers a framework to guide future interventions and policymaking in post-pandemic mathematics education.

Keywords: Learning loss, counteractions, pedagogical adaptation, social learning, institutional intervention, adaptive learning recovery theory.

1. Introduction

Teaching and learning systems were globally disrupted because of the pandemic, and as a fundamental discipline, education in mathematics spans across academic and vocational areas within the education sector (Dunford, 2022). Consequently, the influence of the school closures towards math teaching is projected to be extensive and intricate, and prolonged school closures have increased learning loss around the world (Hevia et al., 2022). From an ontological perspective, the disruption of the education systems caused by the widespread virus fundamentally altered the very nature of instruction, especially in mathematics, creating a need for a re-examination of the foundational principles underlying education in this discipline.

Learning loss denotes that it is a "diminishment of know-how and abilities, whether specific or else broad, or impediments in educational improvement, naturally arising from extended breaks in a learner's educational journey" (Huong and Na-Jatturas, 2020). Ever since the pandemic began, there have been a greater emphasis on measuring learning loss to reduce educational disparities (Kuhfeld, 2019) and dropout rates, as well as to lessen the effects of learning loss (Hevia et al., 2022). Following the pandemic, there has been a modification in mathematics education in the Philippines, with schools integrating blended learning models and digital tools, while teachers focus more on conceptual understanding and critical thinking to address significant learning gaps.

Now that the face-to-face classes have already re-opened, the National Learning Camp (NLC) was started by the Department of Education as part of the National Learning Recovery Program (DepEd Order No. 14, s. 2023) aiming to address learning loss and advance student outcomes in priority areas including reading, science, and math (Mateo, 2023). In the landscape of research in teaching mathematics, there exists an obvious disparity in terms of research in qualitative manner, particularly regarding those diverse strategies and practices adopted by teachers in post-pandemic. Hence, this study aspires to form a theory founded on the Straussian model of grounded theory that explored the question of how teachers counteract educational setbacks or learning loss in mathematics, and to deliver actionable recommendations to support students in recovering from learning disruptions.

2. Methodology

This research used the Straussian Grounded Theory design of Strauss as well as Corbin, to examine how learning loss within mathematics should be targeted. A qualitative design approach was utilized to enable theory development that is based precisely on the data, so that the findings truly represent the experiences of participants.

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This also aimed to uncover the counteractions and its influences to learning loss mitigations by teachers in the Carcar City division for the school year 2024-2025 as basis for crafting a proposed theory to mitigate learning loss.

Specifically, this study sought to answer the following:

1. What are the counteractions provided by the teachers to mitigate learning loss?
2. How do these counteractions mitigate learning loss?
3. What theory can be proposed based on the findings of the study?

The researcher conducted the study in the secondary schools in the Carcar City Division with emphasis on the three largest schools (Gelacio C. Babao Sr. Memorial National High School, Carcar Central National High School, and Ocana National High School). The schools were chosen because they are big schools and are influential in Carcar City. In this study, the sampling criteria were junior high school mathematics teachers with certain eligibility for the objectives of the study which are Teacher I, Teacher III, Master Teacher, and School Administrator. Their present teaching assignment must be in any of the top three big schools in the Carcar City Division that would also represent schools with large teacher population and the varied teaching conditions. Participants should also have experience of teaching in a post-pandemic world and of adjusting teaching methods to compensate for learning loss caused by the pandemic. They also need to be willing to speak and share openly about the challenges and triumphs they have had as they try to address learning loss.

This study utilized researcher-made instruments, including a Key Informant Interview (KII) Guide, Focused Group Discussion (FGD) Guide, and a Document Analysis Tool, to collect comprehensive qualitative data. The KII guided facilitates in-depth interviews with junior high school mathematics teachers and administrators, exploring strategies, challenges, and the effectiveness of interventions addressing learning loss. The FGD guide promoted collaborative discussions among teachers to share collective insights and experiences on post-pandemic teaching adaptations. The document analysis tool examined lesson exemplars, focusing on the incorporation of counteractions made by the teachers that mitigates learning loss.

All instruments undergone expert validation or content expert validation with a rating of 4.77. These experts are the core faculty members of graduate education from a state university of the Philippines.

3. Results and Discussion

Following interviews and focus groups with the participant junior high school mathematics teachers and saturation of data, the data collected were transcribed and analyzed concurrently using Strauss and Corbin's (1990) three stages coding process.

A. Open Coding

1) Counteractions in Mitigating Learning Loss during Remote Learning

The informants emphasized that different reactions were taken to respond to the difficulties of students, parents, and teachers, with strategies seeking to increase access to learning, increase instructional quality, and increase parental engagement so as to avoid an educational break. To offset the absence of face-to-face interaction, teachers developed video lessons that students could watch back in their own time and designed learning activity sheets with context for better understanding (Secker et al., 2022; Domato et al., 2024). Schools also established Community Learning Centers (CLCs) where students could get help and access supplemental materials, particularly those with minimal support at home (Sharma, 2015).

To make learning more accessible and engaging, modular learning was linked with online instruction, allowing students with internet access to use digital resources and receive live teacher support, while teaching and assessment were digitalized for better monitoring of progress. Teachers also participated in professional collaboration, sharing practices that made modular studies more effective and learners' studies more on par with one another (Weddle et al., 2020; Khalid et al., 2016). These collective efforts from parents, teachers, school leaders, and partners underscore the potential for teamwork and innovation even within the constraints of remote education.

To address learning losses, DepEd introduced national programs focusing on mastery of foundational skills, including the National Learning Camp (NLC), National Mathematics Program (NMP), Catch-Up Fridays, and the National Reading Program. NLC was launched as a learning recovery program to enhance literacy and numeracy through remedial, enrichment, and camp-style activities that provide focused instruction and leave no student behind (Dionglay & Callo, 2024; Pascual et al., 2023; Hamoc, 2024). Despite challenges in full implementation due to limited time, space, and budgetary constraints, teachers continued to implement intervention strategies, use digital resources, collaborate with colleagues, and work with stakeholders, highlighting that the success of these initiatives rests on educators' ability to adjust and the education sector's commitment to addressing long-term pandemic-induced learning loss (Yin & Mohamad, 2023).

B. Axial Coding

The informants emphasized that "different reactions were taken to respond the difficulties of students, parents, and teachers," and that such strategies "have sought to increase access to learning, increase instructional quality, and increase parental engagement so as to avoid an educational break." To support students' learning and offset the "absence of face-to-face interaction between teachers and students," teachers developed video lessons which students could "watch back in their own time" (Secker et al., 2022) and designed "learning activity sheets with context" for better understanding and adoption of lessons (Domato et al., 2024). Schools also developed Community Learning Centers (CLCs) where students could get help and access supplemental materials, especially those who had "minimal support at home".

To make materials "more accessible and engaging," modular learning was linked with online instruction, giving students with internet access opportunities to use digital resources and

receive live teacher support, even while using printed modules. Teaching and assessment were also "digitalized to allow much better monitoring of progress," making learning more interactive. Teachers participated in professional collaboration, a strategy "long demonstrated as an effective method of professional growth and to positively impact student results" (Wilmarie & Ericson, 2022), and "shared practices" that made modular studies more effective and learners' outputs "more on par with one another" (Khalid et al., 2016). These collective efforts from parents, teachers, school leaders, and partners underscore the potential for teamwork and innovation within the constraints of remote education.

To help address learning losses brought about by the pandemic, DepEd introduced national programs that "focuses on mastery of forms and foundational skills," including the National Learning Camp (NLC), National Mathematics Program (NMP), Catch-Up Fridays, and the National Reading Program. The NLC was launched as a learning recovery program to "enhance literacy and numeracy skills of learners" through remedial, enrichment, and intervention activities that provide "focused instruction that meets them at their point of learning" (Dionglay & Callo, 2024) Although full implementation faced difficulties due to time, space, and budgetary constraints (Oravec & McLaughlin, 2022), teachers continued to "do what they can to make the best of learning situations" by implementing intervention strategies, collaborating with colleagues, and working with stakeholders, emphasizing that learning recovery depends on educators' ability to adjust and the education sector's commitment to addressing the "long-term consequences of pandemic-induced learning loss" (Yin & Mohamad, 2023)

The axial coding process resulted in three major categories: Pedagogical Adaptation, Social Learning Support, and Institutional Intervention. These categories capture the core strategies and challenges encountered in addressing learning loss in mathematics during and after the pandemic. The researcher reviewed and connected the codes to core categories, developed a paradigm model, and integrated the relationships among categories to align them with the research questions.

Pedagogical Adaptation highlights teachers' instructional strategies such as combining modular and online learning, using recorded video lessons, contextualized materials, and digital tools, while also noting persistent learning gaps. Social Learning Support emphasizes parental involvement in module-based learning and the varying capacity of parents to assist learners, which at times led to increased student dependence. Institutional Intervention focuses on administrative and stakeholder support through resource provision and Community Learning Center initiatives, which brought learning closer to students but required stronger reinforcement to maximize participation. Together, these categories underscore the collaborative yet challenging efforts to mitigate learning loss in mathematics.

C. Generated Theory

The study generated the Theory of Adaptive Student Learning Recovery, centered on the phenomenon of *Student*

Learning Recovery and supported by three interdependent pillars: Pedagogical Adaptation, Social Learning Support, and Institutional Intervention. This theory recognizes learning recovery as a holistic and collaborative process rather than a purely instructional task. Consistent with DepEd initiatives such as the Basic Education Learning Continuity Plan, Self-Learning Modules, learning recovery frameworks, and digital platforms like LRMDS and DepEd Commons, the theory emphasizes adaptive teaching, systemic support, and strong home–school partnerships as essential to bridging learning gaps and ensuring equitable educational recovery in the post-pandemic landscape (DepEd Order No. 018, s. 2020).
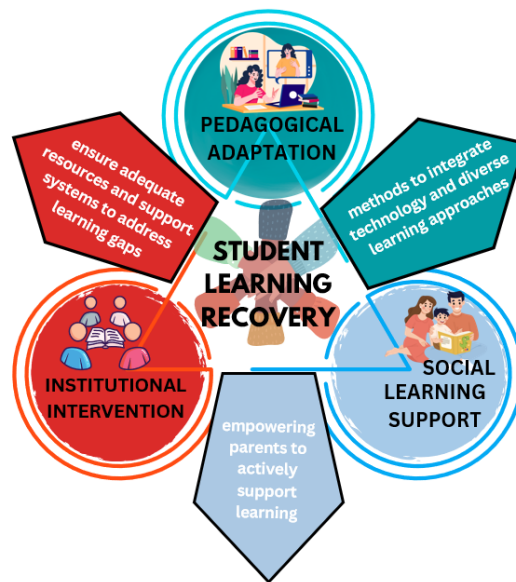

Fig. 1. Theory of adaptive student learning recovery

The theory generated in this study affirms that Student Learning Recovery is most effective when schools and teachers are supported structurally and socially. Recovery strategies must be tailored to contextual realities, especially in resource-constrained environments. Moreover, sustained collaboration among educators, school leaders, and parents is essential in building resilience and closing learning gaps.

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