Navigating the KS2-to-KS3 Mathematics Transition: Rural Filipino Students' Paradoxical Experiences

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Abstract

For rural Grade 7 students in Leyte, Philippines, the move into secondary mathematics means navigating not just harder content, but overcrowded classrooms, multi-hour commutes, and homes with no books or internet. Yet this study found that challenge itself is not the enemy, the real risk is challenge under exhaustion. This study explored the KS2-to-KS3 mathematics transition experiences of 15 purposively selected Grade 7 students through in-depth semi-structured interviews, analyzed using reflexive thematic analysis within three theoretical frameworks. Analysis revealed five themes: the contradictory nature of challenge as both motivator and stressor, compound ecological barriers, prior knowledge gaps in fractions and pre-algebra, teacher responsiveness and peer scaffolding as critical protective factors, and dynamic affective patterns of confidence and anxiety. Critically, all 15 students identified their teacher, not technology, not textbooks, as their primary lifeline. These findings informed the "Bridging Pathways" program, a low-cost, four-component intervention requiring no digital infrastructure, designed for immediate adoption in under-resourced rural schools. This study advances equity-focused mathematics education by demonstrating that teacher development, not infrastructure investment, is the most accessible lever for rural transition support in the Philippines.

Keywords: *transition experiences, mathematics education, rural students, Key Stage 3, peer scaffolding*

1. Introduction

The transition from Key Stage 2 (KS2) to Key Stage 3 (KS3) constitutes one of the most consequential junctures in students' mathematical learning trajectories. In the Philippine K–12 Basic Education curriculum, KS2 encompasses Grades 4 through 6 (primary education) and KS3 commences with Grade 7, the first year of Junior High School. This structural boundary is partially analogous to the KS2-to-KS3 transition in the British national curriculum from which these designations originate (Department of Education [DepEd], 2023), though important institutional differences exist: in the Philippine context, students typically remain in the same school and transition between teachers who know them, rather than experiencing the full-school change characteristic of the British secondary transition. These contextual distinctions matter for interpretation and are addressed further in Section 1.1. The transition is nonetheless characterized by marked intensification of curriculum demands, fundamental shifts in pedagogical orientation, and heightened assessment expectations (Bicknell & Hunter, 2018; DepEd, 2023). Over recent decades, global education systems have increasingly embraced constructivist and problem-solving frameworks at KS3; nevertheless, persistent challenges, including elevated student anxiety, eroding mathematical confidence, and pronounced performance dips remain widespread across international contexts (Boaler, 2015; Luttenberger et al., 2018). In the Philippine basic education landscape, the implementation of the K to 12 reform has rendered this transition especially consequential, as students are expected to engage with elevated standards of mathematical understanding and demonstrate higher-order thinking skills from the earliest months of secondary schooling (Mangarin & Caballes, 2024; Hodgen et al., 2018).

Existing scholarship characterizes the KS2-to-KS3 mathematics transition as a multidimensional and frequently disruptive process shaped by interlocking academic, affective, and contextual forces (Rose et al., 2024; Baria & Gomez, 2022). International and local studies consistently document that exposure to a more abstract, conceptually demanding KS3 curriculum can heighten stress, undermine motivation, and erode students' sense of mathematical competence (Hodgen et al., 2020; Wijaya et al., 2022; Luttenberger et al., 2018). Concurrently, research has identified several protective factors capable of attenuating these difficulties: strong teacher–student relationships, supportive peer networks, and preparatory programs that consolidate prior knowledge while providing timely formative feedback (Kutsyuruba et al., 2015; Wang, 2023; Adewusi et al., 2023), the latter invoked for its cross-

contextual principle of teacher responsiveness as a compensatory mechanism in under-resourced settings. Collectively, these findings establish that the KS2-to-KS3 transition is not merely a curricular boundary crossing but a deeply context-embedded experience through which students negotiate new academic expectations, unfamiliar classroom norms, and rapidly shifting self-perceptions as mathematics learners (Tang & Zhu, 2024; Mirza & Hussain, 2018).

In rural Philippine contexts, students navigate additional layers of complexity that remain largely invisible in the urban-centric literature. Geographic isolation, arduous commutes, severely limited access to learning resources, and endemic socioeconomic constraints collectively diminish students' physical readiness, cognitive availability, and access to academic support (Gocotano et al., 2021; Barrett et al., 2018; Bammou et al., 2024). Cultural norms surrounding family responsibilities and community roles further shape the conditions under which students can engage with mathematics (Sengonul, 2022; Utami, 2022). While some rural schools cultivate close-knit learning communities, strong teacher–student rapport, and community-embedded initiatives that serve as protective resources, the precise interaction of these academic, social, and environmental forces during the critical KS2-to-KS3 transition remains insufficiently examined in the Philippine context (Gocotano et al., 2021; Mohammadpour & Yon, 2024).

Several significant gaps persist in the literature, particularly with respect to rural Philippine settings. The preponderance of existing research on the KS2-to-KS3 transition is situated in urban or better-resourced contexts, rendering the unique transition experiences of rural learners systematically underrepresented (Mohammadpour & Yon, 2024; Gocotano et al., 2021). Comprehensive qualitative studies that privilege students' own accounts, and that rigorously examine how personal, instructional, and contextual factors converge during KS3 adjustment remain scarce (Prananto et al., 2025; Parmar et al., 2025; Baria & Gomez, 2022). The specific lacuna this study addresses is the absence of in-depth, student-centered qualitative accounts of the KS2-to-KS3 mathematics transition in rural Philippine settings. Given the subjective, affective, and context-bound nature of these experiences, a qualitative inquiry centered on students' situated realities is both methodologically appropriate and empirically timely (Rose et al., 2024; Baria & Gomez, 2022).

1.1 Terminological Note: KS2/KS3 in the Philippine Context

The present study employs the KS2 and KS3 designations as they appear in the Philippine DepEd curriculum documentation, which formally adopted this British-derived terminology in the K–12 reform. However, the institutional realities these labels describe in the Philippines differ in important ways from their British referents. In England, the KS2-to-KS3 transition typically involves a change of school, simultaneous transition from a generalist primary teacher to multiple subject specialists, and the social disruption of leaving a peer cohort structural disruptions that are central to why the transition has been studied as a transition in the British and European literature, and that shape much of the affective and social difficulty documented therein. In the Philippine context studied here, Grade 7 students remain in the same campus and school community, retain continuity with many classmates, and transition primarily in terms of curriculum content depth and pedagogical expectations rather than institutional environment. This distinction matters considerably for how the international literature is used in this paper. Studies of British and European transitions that document anxiety, peer disruption, or identity threat associated with school change may be measuring a structurally different event from the one experienced by the Filipino students in this case; they are cited here for their conceptual frameworks and for findings about curricular and affective dimensions of transition that do plausibly transfer, rather than as parallel evidence of the same phenomenon. The challenges documented in this case increased content abstraction, heightened assessment expectations, and the compounding effects of rural socioeconomic constraints are the primary drivers of transition difficulty, and readers should interpret the KS2/KS3 framing and the international literature citations accordingly.

1.2 Theoretical Framework

This study integrates three complementary theoretical lenses to illuminate the multidimensional nature of rural Grade 7 students' KS2-to-KS3 mathematics transition, each addressing a distinct analytical layer.

Schlossberg's Transition Theory (1981) furnishes a framework for understanding individual variation in adaptation through the four S's: Situation, Self, Support, and Strategies. Applied to this context, the framework illuminates how situational demands, specifically, the accelerated abstraction of KS3 mathematics interact with students' personal self-efficacy beliefs, available peer and familial support structures, and individual coping repertoires to determine whether the transition is experienced as manageable or overwhelming (Schlossberg, 1981; Anderson et al., 2012). This framework is particularly valuable for interpreting why students with ostensibly similar academic backgrounds respond so differently to identical curricular demands.

Bronfenbrenner's Ecological Systems Theory (1979) maps transition experiences across nested environmental strata. The microsystem encompasses immediate classroom and home environments, including overcrowded classrooms and the absence of dedicated study spaces. The mesosystem captures tensions between institutional expectations and material home conditions, while the exosystem reflects how agricultural parental occupational patterns pervasive in rural Leyte systematically reduce the availability and quality of academic support at home. The macrosystem encompasses broader cultural norms, national education policies, and socioeconomic structures that frame and constrain all lower-level systems. This framework renders visible the structural forces operating across multiple ecological levels that compound KS3 barriers for rural learners, while simultaneously identifying protective ecological factors (Bronfenbrenner, 1979).

Vygotsky's Sociocultural Theory (1978), and particularly the concept of the Zone of Proximal Development (ZPD), illuminates how peer scaffolding and teacher mediation enable individual students to access mathematical understanding beyond their current independent capacity. Within resource-constrained rural settings, this makes structured social interaction in the classroom a primary and often irreplaceable learning mechanism (Vygotsky, 1978). Collectively, these frameworks address individual adaptation (Schlossberg), environmental layering (Bronfenbrenner), and social learning mechanisms (Vygotsky), providing a coherent, multi-level theoretical architecture through which rural Grade 7 students' transition experiences can be systematically analyzed and interpreted. Their combined explanatory logic is synthesized in Section 3.4.

1.3. Statement of the Problem

This study investigates the KS2-to-KS3 mathematics transition experiences of Grade 7 students in a rural secondary school in Leyte, Philippines, with specific attention to the factors that shape these experiences and the design of a structured support program responsive to identified student needs. The study is guided by the following research questions:

1. What are the transition experiences of Grade 7 students after moving to Key Stage 3 Mathematics?
2. What factors influence the transition experiences of Grade 7 students in Key Stage 3 Mathematics?
3. What evidence-based support program, grounded in students' identified experiences and needs, can be proposed to assist Grade 7 students in navigating the KS2-to-KS3 mathematics transition in rural secondary schools?

2. Methodology

This section of the study encompasses the design, locale, participants, instruments used, data collection procedure, data analysis, trustworthiness of the data and ethical considerations of the study. Data collection for this study has been completed; all interviews were conducted and analyzed prior to the writing of this manuscript. The Bridging Pathways program presented in Section 3.3 is a design proposal informed by the completed empirical findings and has not yet been implemented or empirically evaluated.

2.1 Research Design

This study employs an interpretive-explanatory qualitative case study design to investigate Grade 7 students' KS2-to-KS3 mathematics transition experiences in a rural secondary school in Leyte, Philippines. Following Yin's (2018) canonical framework, a case study was selected as the most appropriate design because it enables in-depth, holistic examination of a bounded, contemporary phenomenon within its real-life context. The rural secondary school constitutes the bounded case, and the unit of analysis is Grade 7 students' collective and individual transition experiences at the KS2-to-KS3 mathematics boundary.

An explanatory qualitative case study design was selected because the study moves beyond describing what students experience to explaining why and how specific personal, instructional, and ecological factors converge to shape those experiences in this particular rural context. The bounded rural site, clearly delimited unit of analysis, and use of participant accounts as both descriptive and explanatory evidence distinguish this design from generic qualitative approaches. Furthermore, this study leans toward the interpretive end of this spectrum: the three theoretical frameworks function as sensitizing lenses that organize analysis rather than as formal propositions to be tested. The "explanatory" dimension refers to the analytical move from describing what students experience to interpreting the personal, instructional, and ecological conditions that shape those experiences, not to causal mechanism-tracing in the post-positivist sense.

2.2 Research Participants

Participants comprised 15 Grade 7 students enrolled in a rural secondary school in Leyte, Philippines, during the 2025–2026 school year. This sample size is consistent with established guidelines for qualitative case study inquiry, wherein purposive samples of 10 to 20 participants are considered sufficient to generate depth and contextual richness without sacrificing analytical manageability (Creswell & Poth, 2018; Yin, 2018). Purposive sampling ensured that participants possessed direct, sustained experience of the KS2-to-KS3 mathematics transition amid the socioeconomic and geographic challenges characteristic of rural Leyte, including agricultural household livelihoods, limited instructional resources, and endemic infrastructural constraints.

Recruitment was conducted in collaboration with the school's Mathematics Department and administration. Guardian consent and student assent were obtained in writing, and voluntary participation was assured with explicit guarantees of confidentiality and the unconditional right to withdraw without academic penalty. Inclusion criteria required participants to have: (a) completed the KS2-to-KS3 transition within the current school year; and (b) maintained an attendance rate of 75% or above during the first grading period, ensuring that accounts reflected sustained, engaged experience of the transition rather than fragmented impressions shaped by repeated absence. These criteria ensured that all participants possessed direct, continuous, and comparable exposure to the KS2-to-KS3 mathematics transition in this rural context. It is important to acknowledge a selection effect inherent in the ≥75% attendance criterion: students whose chronic absenteeism is itself produced by the very ecological barriers this study documents: protracted commutes, household labor obligations, and financial constraints were systematically excluded from the sample. The most severely marginalized students, those for whom these constraints are most acute, are therefore not represented in the data. The findings and the Bridging Pathways program that follows should be understood as targeting the moderately rather than the severely constrained segment of the rural student population. All students identified as eligible met both criteria. The deliberate exclusion of teachers, administrators, and other stakeholders preserved the study's learner-centered analytical focus. Table 1 presents a demographic summary of the participants.

Table 1. Participant Demographic Overview (N = 15)

Characteristic	Detail
Setting	Rural secondary school, Leyte, Philippines
Grade level	Grade 7 (KS3 Year 1)
School year	2025–2026
Sample size	15 purposively selected students
Sampling criterion	Completed KS2-to-KS3 transition within the current school year; ≥75% attendance, first grading period
Data collection window	Mid-October to early November 2025
Participant codes	P1–P15 (anonymized identifiers)

Note. All participants were legal minors; guardian consent and student assent were obtained prior to data collection.

2.3 Research Instrument

Data were collected using a researcher-developed semi-structured interview guide comprising 25 open-ended questions organized according to the three research objectives. The semi-structured format allowed participants to articulate transition experiences in their own terms while affording the researcher flexibility to pursue emerging accounts through targeted probing, within an anticipated session duration of 20 to 30 minutes.

Content validity was established through expert review by a panel of three validators with substantive expertise in mathematics education, educational psychology, and language evaluation. Items were rated on a four-point Likert-type scale for relevance and clarity using Lawshe's (1975) Content Validity Ratio approach. In addition to quantitative ratings, the validators provided qualitative feedback that further strengthened the instrument. These included suggestions to refine ambiguous or complex questions, simplify language to match the comprehension level

of Grade 7 students, avoid leading or biased questions, and ensure that each item was directly aligned with the research objectives. Based on these recommendations, the researcher revised the interview guide to enhance its clarity, coherence, and overall quality.

Following expert validation, the instrument was pilot tested with a small group of Grade 7 students not participating in the main study; minor revisions to item sequencing and wording were incorporated based on pilot observations.

2.4 Data Collection Procedure

Data collection was conducted through individual semi-structured interviews from mid-October to early November 2025. Prior to commencement, the researcher obtained ethics approval from the Research Ethics Committee of Leyte Normal University, as well as administrative approvals from the school division superintendent, district supervisor, and school principal. Written guardian consent and student assent were obtained prior to any research contact, with explicit assurances of voluntariness, confidentiality, and the right to withdraw without academic penalty.

Interviews were conducted individually in a quiet, private school space during mutually convenient timetable slots, lasting approximately 20 to 30 minutes per session. Audio recordings were made with participants' explicit permission, supplemented by researcher field notes capturing contextual observations and non-verbal cues. Where students incurred incidental transport costs, modest reimbursements covering travel expenses only were provided not contingent on participation and not intended as incentives. Following each interview, audio recordings were transcribed verbatim, cross-checked for accuracy against field notes, and stored securely using anonymized participant identifiers.

2.5 Data Analysis

Interview data were analyzed using Braun and Clarke's (2006, 2019) six-phase reflexive thematic analysis: familiarization, initial code generation, theme construction, theme review, theme definition and naming, and production of a coherent interpretive narrative. Initial coding generated approximately 180 discrete codes across the 15 transcripts, iteratively consolidated into 12 candidate themes and refined into five final themes, two under Objective 1 and three under Objective 2. Themes were retained only where they contributed analytically distinct, non-redundant insight; an earlier seven-theme structure was condensed after review, merging experiential and structural environmental constraints into a single theme and integrating peer-mediated learning with teacher-structured peer activities into a unified social learning theme. The resulting five themes are organized across the two research objectives: two themes under Objective 1 and three under Objective 2 a structure that reflects the different analytical purposes of each objective It should be acknowledged that this alignment of themes to pre-specified research questions sits in some tension with Braun and Clarke's (2019) reflexive thematic analysis, which emphasizes data-driven emergence. In practice, the research questions functioned as organizing frames for presentation rather than as pre-determined constraints on what codes could be grouped together; the themes were generated inductively from data and subsequently mapped to the research question structure for clarity of reporting.

Participant quotations were selected for typicality and analytical depth. Interviews were conducted bilingually in Waray and English, transcribed verbatim by the researcher (a fluent Waray speaker), and lightly edited for readability without altering content; English translations of Waray passages are provided in brackets throughout.

To strengthen credibility and dependability, a research colleague with qualitative expertise conducted an independent audit of 25% of transcripts (four transcripts), confirming that codes were grounded in the data and refining two theme boundary definitions. Member checking was completed with six of the fifteen participants, who confirmed the fidelity of theme summaries to their accounts; minor clarificatory adjustments were incorporated. The remaining nine participants were unavailable due to examination schedules and household commitments, a 40% completion rate acknowledged as a limitation (Section 4.2).

2.6 Trustworthiness of the Data

Trustworthiness was established using Lincoln and Guba's (1985) four-criterion framework. Credibility was supported through extended field engagement, researcher field notes capturing interactional context and non-verbal cues during interviews, member checking of theme summaries with six of the fifteen participants, and cross-referencing of interview accounts with field note observations to check internal consistency of participant accounts across the session. It should be noted that this study relies on a single data source, semi-structured interviews and field

notes serve as a contemporaneous check on interview context rather than as independent observational data of classroom practice; the term "triangulation" is therefore not claimed. Transferability was addressed through thick description of the rural school context, participant characteristics, and the socioeconomic conditions shaping the study setting, enabling readers to assess the degree to which findings may transfer to comparable rural Philippine contexts. Dependability and confirmability were addressed through a detailed audit trail documenting research decision, coding procedures, and interpretive choices. Reflexivity was maintained through systematic researcher journaling and deliberate bracketing of personal assumptions throughout data collection and analysis.

2.7 Ethical Considerations

This study was conducted in accordance with the ethical standards of Leyte Normal University, with prior approval from the institutional Research Ethics Committee and in compliance with the Philippines' Data Privacy Act of 2012 (Republic Act No. 10173). Additional administrative approvals were secured from the school division superintendent, district supervisor, and school principal. Given that all participants were legal minors, the researcher maintained heightened attentiveness to power asymmetries inherent in institutionally affiliated school research. Information materials explicitly stated that participation was entirely voluntary, that declining, or withdrawing would carry no academic consequences, and that all responses would remain confidential. Guardian consent and student assent were obtained in writing prior to data collection. All participant identifiers were anonymized at the point of transcription; data were stored securely in password-protected files accessible solely to the primary researcher.

3. Results and Discussion

This section presents findings organized by research objective, integrating thematic analysis, interpretive analysis grounded in the three theoretical frameworks, and connections to relevant literature. Participant quotations are presented in their original form, which includes code-switching between English and Waray (the local language of Leyte), with English translations provided in brackets. Each of the 15 participants is identified by a unique code (P1–P15). The five-theme structure integrates rather than separates certain phenomena across objectives; some participant accounts therefore speak to more than one theme, and the same participant code may appear across multiple sub-sections.

Table 2. Summary of Themes and Sub-themes

Themes		Sub-themes	
1.	The Paradox of Challenge and Engagement: Heightened Difficulty as Both Motivator and Stressor	1.1	Perceived Challenge as a Motivational Opportunity
		1.2	Challenge Transformed into Stress by Competing Demands
2.	Nested Environmental and Resource Constraints	2.1	Classroom and Home Physical Environment Constraints
		2.2	Commute Fatigue and Digital Exclusion
		2.3	Restricted Parental Availability and Material Scarcity
3.	Prior Knowledge Discontinuities and Their Cognitive-Affective Consequences	3.1	Cascading Comprehension Failure
		3.2	Expectation–Reality Mismatch and Affective Dissonance
		3.3	Differential Impact of Adequate Prior Knowledge
4.	Teacher Instructional Responsiveness and Peer Scaffolding as Integrated Protective Mechanisms	4.1	Culturally Responsive, Scaffolded Instruction
		4.2	Teacher-Structured Peer Scaffolding within the Zone of Proximal Development
5.	The Dynamic Affective Triangle: Confidence, Anxiety, and Motivation	5.1	Contingent Confidence and Identity Risk
		5.2	Anxiety-Induced Retrieval Inhibition
		5.3	Externally Anchored Motivation and the Role of Process Feedback

3.1 Objective 1: Transition Experiences of Grade 7 Students After Moving to Key Stage 3 Mathematics

Analysis of student accounts yielded two overarching experiential themes: the paradoxical coexistence of challenge and engagement, and the nested environmental and resource constraints that frame and constrain students' daily engagement with KS3 mathematics. Together, these themes document what the KS2-to-KS3 transition felt like from inside students' lived experiences.

3.1.1 The Paradox of Challenge and Engagement: Heightened Difficulty as Both Motivator and Stressor

The first theme captures the complex and often contradictory nature of the transition experience as reported by Grade 7 students in this rural context. Rather than a uniformly negative disruption, the move into KS3 mathematics is marked by a paradoxical dynamic: heightened academic demands simultaneously function as sources of intellectual stimulation and sources of debilitating stress. Critically, which of these two valences dominates depends not on the difficulty of the content itself, but on the interplay between instructional quality and the cognitive resources students have available after meeting their non-academic obligations. This theme is composed of two sub-themes: perceived challenge as a motivational opportunity, and challenge transformed into stress by competing demands. Together, these sub-themes reveal how the same curricular reality can be experienced in fundamentally different ways depending on the conditions under which students encounter it.

3.1.2 Perceived Challenge as a Motivational Opportunity

Several participants described the increased difficulty of KS3 mathematics with a sense of intellectual stimulation rather than pure discouragement, illustrating how perceived challenge is not uniformly negative: its affective valence depends substantially on instructional clarity, the availability of academic success experiences, and the degree to which non-academic demands encroach on cognitive resources.

As P1 shared, “Math feels harder now kay damo it new topics [because there are many new topics], but I still find it enjoyable. Before, math was easy just addition and multiplication. Now there are variables and unknowns and I have to think more. Pero na-enjoy ko pa rin [But I still enjoy it] because every time I understand something hard, I feel like I actually got smarter.” This account illustrates how, when scaffolded instruction is present and mastery experiences are available, increased cognitive demand can be reframed by students as evidence of growth. Challenge functions as motivational fuel rather than as a barrier under these conditions.

However, this same sense of intellectual engagement is not uniformly sustained.

3.1.3 Challenge Transformed into Stress by Competing Demands

For other participants, the identical curricular demands become overwhelming when non-academic responsibilities compete for their limited cognitive resources. P3 described this tension explicitly: “Math exciting gad lalo na kon bago it lesson [Math is really exciting especially when the lesson is new], pero danay it stresses me because makuri ig balance it schoolwork ngan mga trabahuon ngan responsibilities ha balay [but it often stresses me because it is hard to balance schoolwork with household chores and responsibilities at home]. Pag-uli ko tikang ha iskwelahan, pag-abot ko ha balay puro trabaho magluto, manhugas, pagtubong han manok [When I leave school, once I get home it’s all chores — cooking, washing dishes, feeding the chickens]. By the time I sit down to review, I’m already tired and I can’t concentrate.” This account demonstrates a critical temporal dimension: it is not challenge per se but challenge under fatigue that constitutes the primary transition risk factor for students in this rural context.

Taken together, these accounts suggest that the affective experience of challenge is mediated by the interaction between curricular demands and students’ available coping capacity. This finding is consistent with Rose et al.’s (2024) observation that student transition experiences are more heterogeneous than traditional accounts suggest, with many students reporting positive adjustments despite substantial structural challenges. Within Schlossberg’s (1981) Transition Theory, P1’s account exemplifies a favorable Situation–Self interaction in which the demands of the new Situation are met by a Self that can access success experiences and reframe difficulty as progress. P3’s account illustrates the fragility of this equilibrium: when available Strategies are undermined by competing situational demands, challenge tips from motivating into overwhelming. Effective transition support must therefore address the relationship between challenge level and students’ available coping capacity, a principle operationalized in the Bridging Pathways program detailed in Section 3.3.

3.2 Nested Environmental and Resource Constraints

The second theme reveals how the structural realities of rural schooling in Leyte permeate students’ transition experiences in ways that extend far beyond the classroom. These are not isolated inconveniences but overlapping, mutually reinforcing constraints that span multiple ecological levels simultaneously foreclosing, in many cases, every available avenue of independent academic support at once. This theme comprises three sub-themes: classroom and home physical environment constraints, commute fatigue and digital exclusion, and restricted parental availability and material scarcity. Together, these sub-themes illuminate the compound nature of rural disadvantage and explain why individually modest constraints can, in combination, produce severe disruption to students’ learning during the transition.

3.2.1 Classroom and Home Physical Environment Constraints

P5 articulated this dual deprivation directly: "Our classroom has more than 30 students and it's noisy almost always. When the teacher is explaining, sometimes I can't hear properly from the back. I try to focus but the noise and the heat waray electric fan ha amon classroom [our classroom has no electric fan] make it hard to think. At home it is the same. Waray ko kalugaringon space ha balay para makag study hin mahimyang [I have no personal space at home to study quietly]. Tak kabugtuan [My brothers and sisters] are loud and there is only one table for everyone." The granularity of P5's account, including thermal discomfort as a specific learning barrier illustrates how rural resource constraints that aggregate data tends to erase manifest in students' daily learning experience.

Beyond physical space, commute-related fatigue and digital exclusion compound students' difficulties in ways that arrive before formal instruction has even begun.

3.2.2 Commute Fatigue and Digital Exclusion

P6 described this experience: "Hirayo tam balay ha eskwelahan [Our house is far from the school]. I ride a habal-habal [motorcycle taxi] and sometimes I walk. By the time I get to school I'm already tired. I cannot always study with gadgets or internet kay waray man gud kami internet ha balay [because we really don't have internet at home]. If I need to check something for homework, I have to go to the barangay hall or borrow a classmate's phone. Sometimes I just guess." The admission "sometimes I just guess" signals the precise point at which compounded constraint overrides academic engagement entirely.

A third dimension of constraint emerged in participants' descriptions of limited parental availability and material scarcity.

3.2.3 Restricted Parental Availability and Material Scarcity

P4 shared: "Busy ak kag-anak permi [My parents are always busy]. My father farms and my mother sells in the market. They leave before I wake up and come back tired. I don't ask them about math because I don't want to add to their burden. Guti la ak pwede istadihan ha balay kay waray gud libro na hatag [I have little I can study at home because no books were provided]. The school gives us some worksheets but they run out." P4's deliberate restraint in seeking help from parents not because support is absent but because the perceived cost of asking feels unfair illustrates the mechanism through which exosystem-level pressures reduce academic support at the microsystem level.

These findings are consistent with Bronfenbrenner's (1979) ecological systems framework, as the barriers described span the microsystem (classroom crowding, absent home study conditions), exosystem (restricted technological infrastructure, parental occupational demands), and macrosystem (national underinvestment in rural educational infrastructure). Research applying ecological frameworks to mathematics education demonstrates that home context accounts for a substantial proportion of achievement variation (Wei & Zhang, 2025), underscoring how material and social resources shape learning opportunities. A critical implication of this theme is that no single barrier alone is catastrophic, but their compound interaction creates a structural disadvantage that transition support interventions must address holistically rather than in isolation.

3.3 Objective 2: Factors Influencing the Transition Experiences of Grade 7 Students in KS3 Mathematics

While Objective 1 documented the phenomenological texture of students' transition experiences, Objective 2 examines the underlying personal, instructional, and social factors that shaped and explain those experiences. Three analytically distinct themes emerged: prior knowledge discontinuities; teacher instructional responsiveness and structured peer scaffolding as integrated protective mechanisms; and the affective dynamics of confidence, anxiety, and motivation. This ordering reflects an interpretive logic suggested by the data: foundational gaps appear associated with heightened vulnerability; teacher and peer responses appear to function as buffers or amplifiers of that vulnerability; and affective trajectories appear to mediate the relationship between challenge and sustained engagement. Whether these relationships are causal, directional, or mutually constitutive cannot be determined from a cross-sectional qualitative design with 15 participants; the sequence is offered as an interpretively plausible account, not a verified mechanism.

3.3.1 Prior Knowledge Discontinuities and Their Cognitive-Affective Consequences

The third theme addresses the first of three factors identified as shaping students' KS3 transition trajectories: the quality and completeness of mathematical knowledge carried forward from KS2. This theme reveals that prior knowledge functions not as a neutral background condition but as an active determinant of whether KS3 content is accessible, partially accessible, or entirely out of reach. Students who enter Grade 7 with consolidated foundational knowledge encounter the transition as demanding but manageable, while those with significant gaps face cascading comprehension failures in which new content collapses beneath the weight of missing prerequisites. This theme comprises three sub-themes: cascading comprehension failure, expectation–reality mismatch and affective dissonance, and the differential impact of adequate prior knowledge. Taken together, these sub-themes establish that addressing foundational knowledge gaps is not merely a remedial concern but a prerequisite for meaningful participation in KS3 mathematics. Fractions emerged as a particularly critical area of vulnerability.

3.3.2 Cascading Comprehension Failure

P12 described the experience vividly: "Fractions are still hard para ha ak [for me] kay waray ko ito ka master gud han elementary [because I never really mastered them in elementary]. When the teacher uses fractions to explain algebra, I get lost right away. It is like the teacher is speaking a language and I only know some of the words. I try to keep up but there are too many magkuri na terms [difficult terms]. Bago ha ak it Algebra [Algebra is new to me] and somehow it scares me the letters instead of numbers feel like a code na waray ko pa igkatapo [I was never taught]." This metaphor of partial linguistic knowledge articulates with precision the experience of foundational gaps undermining access to new learning. This finding is consistent with extensive evidence identifying fractions as both foundational for higher mathematics and persistently difficult for many learners (Ramos & Verschueren, 2024).

Beyond cognitive consequences, prior knowledge gaps generate distinct affective risks when they interact with students' anticipatory expectations.

3.3.3. Expectation–Reality Mismatch and Affective Dissonance

P13 described this dynamic: "I expected math to stay easy like before, pero na-surprise ak na makuri na pala hiya kon high school na [but I was surprised that it's already hard now that I'm in high school]. In elementary our teacher always said we were doing well. I thought I was ready. When I got the first quiz back in Grade 7 with a low score, I felt embarrassed and confused. I didn't understand why I studied the same way I always did." The expectation–reality gap illustrated here is an independent affective risk factor distinct from the knowledge gap itself. When KS2 teachers, understandably motivated to encourage, communicate that students are performing well without specifying what remains unconsolidated, they inadvertently leave students without an accurate anticipatory framework for what KS3 will demand. Within Schlossberg's (1981) framework, this constitutes a Strategies deficit: students lack the coping strategies to manage the gap between expectation and reality because they did not know the gap was coming.

In contrast, participants who entered KS3 with adequately mastered prior content demonstrated notably different transition trajectories.

3.3.4 Differential Impact of Adequate Prior Knowledge.

P15 reflected: "Han elementary ak mga grade 4 to 6 mas focus an addition and subtraction [When I was in elementary, addition and subtraction was the focus] and some basic geometry, which helps me now. I am not scared of numbers. But when the new topics go deeper and faster like when we started graphing and solving for x at the same time I feel I am still okay with the old parts but I am not ready for the new parts yet." This metacognitive clarity the ability to differentiate between consolidation challenges and genuinely novel learning demands supports more adaptive help-seeking than the undifferentiated confusion evident in P12's and P13's accounts. These findings directly inform the content prioritization in Component 1 of the Bridging Pathways program, which targets fractions, pre-algebraic reasoning, and geometric relationships as foundational priorities.

3.4 Teacher Instructional Responsiveness and Peer Scaffolding as Integrated Protective Mechanisms

The fourth theme captures the protective factor most prominently identified by students in this rural case: the instructional environment created by the teacher, and the social learning structures the teacher deliberately engineers within it. In a context where structural barriers foreclose most avenues of independent and home-based support, the classroom emerges as students' primary, and often sole site of academic scaffolding. This theme is composed of two interrelated sub-themes: culturally responsive, scaffolded instruction, and teacher-structured peer scaffolding within

the Zone of Proximal Development. This does not imply that infrastructure investment is unimportant; rather, it identifies what is actionable within existing resource conditions when structural change is not immediately available. They further establish that peer scaffolding, far from being a spontaneous resource, derives its educational value from the teacher's organizational and supervisory role.

3.4.1 Culturally Responsive, Scaffolded Instruction.

P8 described the impact of her teacher's approach: "My teacher explains more and uses simple examples like if we are learning about ratios, she uses the prices of rice or fish from the market, so it makes sense. She breaks everything into steps and if students look confused, she starts again from the beginning without getting angry. Asya nakakaintindi kami hit lesson [So we understand the lesson] even if we cannot always study with gadgets or internet. She also draws things on the board when words are not enough." What P8 identifies as effective is not any single strategy but their combination: scaffolded, responsive, multi-modal instruction deployed deliberately within the constraints of the classroom. The use of community-grounded contexts market prices of rice and fish mirrors the culturally responsive approaches documented in the ethnomathematics literature and compensates for the absence of digital supplementary resources. Research from a sociocultural perspective demonstrates that teachers who employ dialogic, scaffolded questioning strategies foster significantly deeper mathematical reasoning and higher engagement than those relying primarily on direct instruction (Machaba & Mangwiro, 2024). It should be noted, however, that the literature is not uniformly consistent on the primacy of instructional quality as a lever in under-resourced contexts: some studies identify structural and material factors class size, resource availability, infrastructure as more decisive determinants of mathematics outcomes than instructional approach alone (Barrett et al., 2018; Wei & Zhang, 2025). The present findings do not contradict this view; rather, they suggest that within the constraints of a single rural site where structural improvement is not immediately tractable, instructional responsiveness is what students perceive as most accessible and impactful a context-specific observation that should not be generalized into a claim that professional development consistently outperforms infrastructure investment across settings.

Structured peer scaffolding emerged as a second critical protective mechanism, particularly when deliberately organized by the teacher rather than left to emerge spontaneously.

3.4.2 Teacher-Structured Peer Scaffolding within the Zone of Proximal Development

P11 explained the mechanism with notable precision: "Teachers ask us to help and teach each other. Gin grugrupo kami tam teacher for small group discussion ngan activities [Our teacher groups us for small group discussion and activities]. When my classmate explains something I didn't get from the teacher, sometimes I understand faster because she uses words I use. She knows where I get confused because she got confused there too." The developmental proximity between peers that a classmate "got confused there too, only earlier" articulates with notable precision the sociocultural mechanism underlying peer scaffolding in Vygotsky's (1978) Zone of Proximal Development (ZPD). A student who mastered fractions recently occupies a closer cognitive position to the struggling student than a teacher who mastered them years ago.

Participants further identified the psychological safety of teacher-supervised peer interaction as essential to its effectiveness. P9 reflected: "Nababaro ako ha ak mga classmates who understands the lesson well [I learn from my classmates who understand the lesson well]. Sometimes we talk together about the hard parts and nagbuburoblig kami pag solve [we help each other solve problems] para mas masayon ngan madali matad-an it answer [so the answer is easier and faster to find]. There is no pressure, we can say 'I don't know' and nobody laughs. But our teacher is always nearby in case." The phrase "our teacher is always nearby in case" is analytically crucial: it identifies the supervisory structure that makes peer scaffolding educationally productive rather than risky. The risks of unmonitored peer scaffolding misconception propagation, social dynamics discouraging help-seeking, over-reliance on marginally better-positioned classmates are real and must be acknowledged. The Bridging Pathways program addresses these risks directly in Component 3 by embedding peer-learning groups within a teacher-supervised tiered structure (Bagnall et al., 2024).

Together, these sub-themes reveal that within the constraints of this single case, deliberate and responsive pedagogy combined with a purposefully structured social learning environment was perceived by students as the most accessible protective mechanism.

3.5 The Dynamic Affective Triangle: Confidence, Anxiety, and Motivation

The fifth and final theme captures the affective interior of the transition experience the emotional and motivational forces that mediate between the structural challenges students face and the academic outcomes they achieve. These forces are not peripheral accompaniments to cognitive processes but active determinants of engagement, persistence, and performance. This theme corresponds to Schlossberg's (1981) Self component of transition adaptation and illuminates how the cognitive and structural dimensions documented in preceding themes are ultimately experienced from within the student. The theme is composed of three sub-themes: contingent confidence and identity risk, anxiety-induced retrieval inhibition, and externally anchored motivation and the role of process feedback. Together, these sub-themes establish that the affective dimension of the KS2-to-KS3 transition is dynamic and context-responsive, shaped by ongoing instructional and relational experiences, and therefore constitutes a direct target for intervention design not merely a background variable to be acknowledged.

3.5.1 Contingent Confidence and Identity Risk

P14 articulated this pattern with particular clarity: "Mas confident ako yana with basic math [I am more confident now with basic math] like with fractions and simple equations I already know. I gained confidence kon dako ak scores during quizzes. But when a new topic comes and I don't understand it yet, I feel less confident again. It's like a wave lang kumbaga. After a good quiz I feel like I can do math. After a bad one, I start thinking maybe I'm just not a math person." The "wave" metaphor captures the performance-contingent nature of mathematical confidence during transition with precision. The particular risk embedded in P14's account is that repeated failure on novel topics may consolidate the identity attribution "I'm just not a math person" a shift that persists beyond the specific topic that triggered it. This is consistent with extensive research on academic self-concept including Marsh's foundational work (1990) and subsequent developments in the field (see Ramos & Verschueren, 2024) establishing that self-concept is a dynamic construct shaped by ongoing performance feedback and that early mastery experiences during transition are especially consequential for its trajectory.

A second affective dimension identified by participants was mathematics anxiety, particularly the retrieval-inhibiting effects of test conditions.

3.5.2 Anxiety-Induced Retrieval Inhibition

P10 described this experience: "Tests make me very nervous kay waray ko enough practice pag-solve [because I have not practiced enough]. I hate tests kay nakakapressure lalo na kon feeling ko dire ak prepared [because they're stressful especially when I feel I'm not prepared]. I struggle to work fast lalo na kon guti la it time na hatag [especially when the given time is short]. Sometimes I know the answer but the pressure makes me forget. After the test I can remember it again, which is the most frustrating feeling." P10's account of post-test recall is a precise description of anxiety-induced retrieval inhibition: the mathematical knowledge was present but inaccessible under test conditions. This observation has direct implications for assessment design during the transition period, suggesting that reducing time pressure and introducing process-oriented formats can materially improve the accuracy with which assessment reflects genuine student competence. Research on anxiety during educational transitions establishes that students who experience high transition-related worry are significantly more likely to develop elevated emotional difficulties with trajectories frequently persisting into the post-transition period (Donaldson et al., 2024).

A third affective dimension concerned the motivational structure of students in this rural Philippine context.

3.5.3 Externally Anchored Motivation and the Role of Process Feedback

P8 shared: "I want to do well in math because my family sacrifices a lot for my studies. Permi ako na guilty kon dire ako mag eskwela hin maupay [I always feel guilty when I don't study well]. This makes me motivated but also scared. I don't want to waste their effort. When the teacher praises even small things like saying my solution method was creative I feel like I can keep going. It's like heaven." The hyperbolic intensity of this phrase is analytically significant: it signals that process-oriented praise functions not merely as positive feedback but as momentary relief from the persistent weight of family-anchored obligation a qualitatively different affective register from simple encouragement. The motivational structure described here is externally anchored in family sacrifice and teacher praise, and is therefore vulnerable to interruption. However, P8's specific reference to a teacher praising a process quality the creativity of a solution method rather than merely a correct answer suggests that process-oriented feedback is accessible within this rural classroom and functions as a meaningful motivational resource even without material rewards. The anxiety of "I don't want to waste their effort" is structurally different from the test anxiety P10 describes; it is not situational but persistent, meaning that failure carries social meaning beyond academic performance alone.

The Bridging Pathways program's family engagement component (Component 4) addresses this directly by equipping parents with communication strategies that emphasize effort and progress rather than outcome, reducing the stakes-loading that family sacrifice unintentionally creates. Research establishes that parental emotional warmth influences adolescent mathematics performance primarily by reducing student anxiety and improving self-regulation (Donaldson et al., 2024), suggesting that the quality of parental support, rather than its academic specificity, is the critical variable.

3.6 Objective 3: The Proposed Bridging Pathways Transition Support Program

Drawing directly from the five themes identified above, this section presents the proposed Bridging Pathways Transition Support Program, a theoretically grounded, multi-component intervention framework designed to assist Grade 7 students in rural Leyte secondary schools in navigating the KS2-to-KS3 mathematics transition. Consistent with action-oriented qualitative case study traditions, this study extends beyond description to propose an evidence-informed program directly responsive to identified student needs a design output that is both methodologically appropriate and practically motivated by the applied research context (Yin, 2018). This program represents a design proposal informed by the empirical findings of this study; it has not yet been implemented or empirically evaluated, and all claims regarding anticipated benefits are framed as rationale derived from the supporting literature rather than as demonstrated outcomes. Each component is directly responsive to specific student-identified needs and is theoretically anchored in the three framework theories. The program is proposed for future piloting through a pre-post design measuring mathematics achievement, mathematics self-concept (Academic Self-Description Questionnaire II; Marsh, 1990), and transition anxiety (locally adapted Mathematics Anxiety Rating Scale – Revised; Plake & Parker, 1982) at the conclusion of the summer bridging program and at the end of the first grading period, supplemented by qualitative student and teacher reflections.

3.6.1 Component 1: Phased Foundational Remediation

Component 1 is proposed as a four-week summer bridging program delivered prior to the academic year's start, with content priorities guided by participant accounts: fractions, pre-algebraic reasoning, and geometric relationships are the identified primary focus areas. Each week would be thematically organized: Week 1 addresses fraction concepts and operations; Week 2 develops pre-algebraic thinking; Week 3 builds geometric reasoning; and Week 4 integrates these domains through applied problem-solving tasks contextualized within community-familiar scenarios from rural Leyte. Sessions would run for two hours per day, four days per week, in groups of eight to ten students facilitated by a Mathematics teacher. A brief diagnostic pre-assessment would be administered at the outset to ensure that content priorities reflect actual student needs within each cohort.

Research on pre-transition review programs provides the rationale for this design, documenting that systematic content review delivered in concentrated formats significantly enhances subsequent achievement and reduces transition-related motivational decline (Bagnall et al., 2024). However, the summer delivery model poses genuine feasibility challenges given the very barriers this study documents: students' household labor responsibilities during school vacations, family financial constraints, and the limited availability of teachers in rural schools during the summer break. These tensions are structural features of the context this program aims to serve. Implementers should treat the four-week summer format as an aspirational design and plan from the outset for a condensed in-school variant, a two-week bridging module at the start of the academic year as the primary fallback. In either format, participation must be entirely voluntary, unlinked to academic grades, and accompanied by clear communication to families. Schools piloting Component 1 should conduct a brief community readiness assessment prior to implementation.

3.6.2 Component 2: Gamified Multi-Modal Instruction

Component 2 is proposed for embedding within both the summer bridging program and ongoing KS3 classroom instruction. It is specifically designed to function within the rural resource constraints documented in this case, prioritizing engagement mechanisms that require no digital technology. Instructional materials would draw on locally available, low-cost resources: fraction tiles constructed from colored cardboard, geometric shape sets fashioned from bamboo or wire, and narrative problem contexts situated in familiar agricultural and community scenarios from rural Leyte. Proposed game-based activities include group fraction challenges, algebra relay races, and geometry explorations.

The design of these activities draws directly from the thematic findings. From Theme 2 (environmental constraints), the deliberate avoidance of digital dependency ensures the component reaches students regardless of

internet access or device availability. From Theme 4 (teacher responsiveness), the use of real-life contextual scenarios and low-cost manipulatives mirrors the exact pedagogical strategies students identified as most effective systematizing those teacher-developed adaptations into a replicable instructional format. From Theme 5 (affective dynamics), the game format creates a low-stakes social context in which mathematical effort is visible but error carries no grade consequence, directly addressing the anxiety-induced retrieval inhibition documented in Theme 5. Research provides an evidence base: project-based and game-based learning strategies produce substantially larger effect sizes than traditional instruction, with particularly strong benefits for students with lower prior achievement (Selepe & Mphahlele, 2025).

3.6.3 Component 3: Tiered Peer Support with Flexible Scheduling

Component 3 proposes a tiered support structure for implementation during the regular academic year. At the universal level, structured peer-learning groups of three to four students would meet twice weekly for 30-minute sessions to work through review problems, discuss challenging KS3 concepts, and provide mutual affective support. At the targeted level, students identified through diagnostic assessment as having significant foundational gaps would receive individual tutoring from trained peer mentors or Mathematics teachers during lunch breaks or free periods, three sessions per week.

The two-tiered architecture is directly responsive to the peer scaffolding risks identified in Theme 4's discussion: the universal tier harnesses the documented benefits of peer collaboration while the targeted tier ensures that students most at risk of misconception propagation receive structured expert or trained-mentor mediation, so that peer support functions as a genuine scaffold rather than an unmonitored coping strategy. P9's account "our teacher is always nearby in case we go wrong" is the empirical touchstone for this design: teacher proximity is what makes peer scaffolding productive. The flexible scheduling design is proposed specifically to accommodate the household responsibilities, commute demands, and variable energy levels documented in Theme 2. Research on spaced retrieval practice establishes that frequent, shorter sessions support learning more effectively than massed practice, particularly for students with lower baseline achievement (Rohrer & Taylor, 2006).

3.6.4 Component 4: Metacognitive, Affective, and Family Engagement Support

Component 4 proposes two complementary strands. The student-facing strand would comprise six biweekly 45-minute workshop sessions addressing: (1) study habit formation and time management adapted to students with household responsibilities; (2) test preparation and anxiety management, including cognitive reframing and focused breathing strategies; (3) self-efficacy building through structured reflection on mastery experiences during the transition; and (4) attention regulation strategies for crowded or noisy home and classroom environments. These workshops would be co-facilitated by the class adviser and school guidance counselor. In rural Philippine schools where a dedicated guidance counselor is not available a realistic constraint in many under-resourced settings the class adviser may facilitate all sessions, supplemented by structured session guides. A program whose delivery depends on a specialist does not present in the school is not a program that will reach the students it was designed to serve; this contingency must be planned for explicitly.

The family engagement strand comprises three quarterly sessions for parents and guardians, scheduled during existing school events quarterly card-giving days and PTA meetings to minimize travel burden. Sessions would focus on understanding the nature of the KS2-to-KS3 transition; practical strategies for supporting study habits at home without requiring direct homework assistance; and communication practices that emphasize effort, persistence, and progress over outcomes alone. The rationale for this strand draws directly from P8's account of family-anchored motivation: when family members understand that their encouragement of process rather than outcome reduces the anxiety load that family sacrifice unintentionally creates, they become active transition supports rather than inadvertent stressors. Research establishes that parental emotional warmth influences adolescent mathematics performance primarily by reducing student anxiety and improving self-regulation (Donaldson et al., 2024), suggesting that the quality of parental support, not its academic specificity, is the critical variable. This makes the family engagement strand accessible to parents regardless of their own mathematics knowledge, which is an important design consideration given the agricultural and low-literacy household contexts documented in this study.

Table 3. Bridging Pathways Program: Summary of Components, Empirical Basis, and Theoretical Grounding

Component	Empirical Basis (Themes)	Theoretical Grounding	Key Design Features

Component 1: Phased Foundational Remediation	Theme 3 (prior knowledge gaps); Theme 5 (early mastery and confidence)	Schlossberg (Self component); Vygotsky (ZPD foundational scaffolding)	Four-week summer bridging program (fractions, pre-algebra, geometry); diagnostic pre-assessment; low-resource format; condensed in-school fallback variant
Component 2: Gamified Multi-Modal Instruction	Theme 2 (environmental constraints); Theme 4 (teacher responsiveness); Theme 5 (anxiety and affective safety)	Bronfenbrenner (microsystem enhancement); Vygotsky (mediated learning through contextual tools)	Low-cost manipulatives (cardboard tiles, bamboo); community-contextualized problems; technology-free design; game-based low-stakes practice
Component 3: Tiered Peer Support with Flexible Scheduling	Theme 4 (peer scaffolding as protective mechanism); Theme 2 (commute and household scheduling constraints)	Vygotsky (ZPD and peer-mediated learning); Schlossberg (Support component)	Universal tier: peer groups of 3–4 (twice weekly, 30 min); Targeted tier: peer mentor or teacher tutoring (3x/week); teacher supervisory presence throughout
Component 4: Metacognitive, Affective, and Family Engagement Support	Theme 5 (family-anchored motivation and anxiety); Theme 1 (household demands on cognitive resources)	Schlossberg (Strategies and Self components); Bronfenbrenner (mesosystem: family–school interface)	Student workshops: study habits, anxiety management, self-efficacy, attention regulation (6 sessions x 45 min); Family sessions: 3 quarterly, co-scheduled with PTA/card-giving events; process-oriented communication training

3.7 Theoretical Synthesis

The KS2-to-KS3 mathematics transition emerges from this rural bounded case as a complex, multidimensional process that extends far beyond curricular advancement. The three theoretical frameworks together reveal a single coherent story told at three different scales.

At the individual scale, Schlossberg's (1981) four S's establish that transition outcomes are determined by the interaction of Situation, Self, Support, and Strategies and that in this rural case, the Situation (resource-scarce, curriculum-demanding) and Self (prior knowledge gaps, affective vulnerability, expectation–reality mismatch) components are frequently adverse, making the quality of Support the pivotal variable within students' reach. At the environmental scale, interpreted through Bronfenbrenner's (1979) ecological model, the pattern of Support being unevenly distributed is consistent with what that framework would predict: exosystem forces agricultural labor markets and national infrastructure underinvestment appear, through students' accounts, to reduce the academic support available at home, concentrating students' entire support burden on the school microsystem. Interpreted through Vygotsky's (1978) account of mediated development, the school microsystem specifically, teachers and peers can, under the right instructional conditions, provide access to mathematical thinking at the edge of each student's current capacity.

Together, these frameworks do not simply describe transition difficulties; they identify exactly where intervention must be targeted the Support component of students' transition ecology and why the classroom, not the family or the infrastructure, is the most tractable site for change in the short term. Each component of the Bridging Pathways program maps onto this architecture: Component 1 addresses the Self (prior knowledge gaps); Component 2 enhances the classroom microsystem through responsive, engaging instruction; Component 3 formalizes the Vygotskian peer scaffolding mechanism within appropriate supervisory structure; and Component 4 works simultaneously on Strategies (metacognitive skills) and on the family mesosystem (parental communication practices). Table 2 provides a consolidated overview of the program's architecture for reference.

4. Summary of Findings, Conclusion and Recommendations

4.1 Summary of Findings

This interpretive-explanatory qualitative case study identified five themes across two analytical objectives examining Grade 7 students' transition from KS2 to KS3 Mathematics in a rural secondary school in Leyte, Philippines. Two themes emerged under Objective 1 (transition experiences) and three under Objective 2 (influencing factors).

First, students experience heightened KS3 difficulty in contradictory ways: challenge and engagement coexist when instruction is clear and success is accessible, but the same challenge becomes overwhelming when household responsibilities and commute fatigue deplete the cognitive resources needed to engage with it.

Second, transition experiences are substantially shaped by nested, compound environmental constraints spanning the classroom, the home, and the infrastructure physical deficiencies, competing time demands, digital exclusion, and restricted parental availability whose cumulative effect is to close off every available avenue of independent academic support simultaneously.

Third, the quality of prior mathematical knowledge particularly in fractions and foundational arithmetic appears to determine whether students enter KS3 with adequate cognitive scaffolding or face cascading comprehension failure. Expectation–reality mismatch, produced in part by insufficiently specific positive feedback during KS2, constitutes an independent affective risk factor.

Fourth, teacher instructional responsiveness and teacher-structured peer scaffolding were perceived by students as the most critically important mediating factors: teachers who employ culturally grounded, scaffolded, multi-modal instruction while deliberately organizing peer interaction were described as enabling students to navigate both cognitive and contextual challenges that would otherwise compound.

Fifth, confidence, anxiety, and motivation function as dynamic, contingent affective dimensions: contingent confidence rises after mastery experiences and falls after failure; anxiety-induced retrieval inhibition under time-pressured assessment conditions causes performance to underestimate genuine competence; and family-anchored motivation creates both high drive and high stakes, making process-oriented feedback and family communication a critical program design consideration.

4.2 Conclusion

This study makes several contributions to the qualitative literature on educational transitions. It documents the situated transition experiences of rural Philippine Grade 7 students, a population persistently underrepresented in international mathematics education research and does so through extended, linguistically rich participant accounts that treat Waray–English code-switching as an analytical resource rather than a data-cleaning problem. The findings demonstrate that KS2-to-KS3 transition outcomes are not determined solely by individual student characteristics but are profoundly shaped by the interaction of pedagogical quality, ecological context, and social support structures within this specific rural bounded case.

The present case further suggests that, within the constraints of this single bounded site, teacher instructional responsiveness and structured peer scaffolding were perceived by students as the most accessible protective factors where structural inequities could not be rapidly resolved. This finding carries implications for teacher professional development prioritization in comparable rural contexts, but should be treated as a context-specific hypothesis rather than a generalizable conclusion: it rests on student perception data from a single site without classroom observation or comparison conditions, and multi-site research incorporating observational methods would be required to substantiate it more broadly. These insights are specific to this rural Leyte context; readers are encouraged to assess their transferability in light of the thick contextual description provided throughout this paper.

Several limitations require explicit acknowledgment. The single-site design constrains transferability beyond settings sharing comparable socioeconomic and geographic characteristics. Data collection relied exclusively on semi-structured individual interviews; the absence of classroom observation means that teacher instructional responsiveness is documented through student perception rather than direct evidence, introducing the possibility of recall or interpretation bias students may attribute to teacher practice what was in part their own cognitive or social adaptation. Accordingly, all findings regarding teacher instructional responsiveness and peer scaffolding should be interpreted as student-perceived rather than observed behaviors, and causal claims about teacher practice should not be drawn from these data.

The cross-sectional design captures a snapshot of one grading period and cannot establish whether identified challenges are transitional or persistent. A further selection effect deserves explicit acknowledgment: the ≥75% attendance criterion excluded students whose absenteeism is itself produced by the ecological barriers the study emphasizes meaning the most severely constrained students are absent from the data. Findings may therefore understate the severity of ecological disadvantage experienced by the full population of rural Grade 7 students at this school. Additionally, the epistemological tension between the interpretive constructivism of reflexive thematic analysis (Braun & Clarke, 2006, 2019) and the more post-positivist orientation of Yin's (2018) explanatory case study framework should be acknowledged as a design limitation: the study is better understood as interpretive-explanatory, and the themes generated should be read as analytically constructed interpretations rather than objective mechanisms. Member checking was completed by six of fifteen participants (40%); the remaining nine were unavailable due to examination schedules and household commitments the very structural constraints this study documents limiting the breadth of credibility verification. The possibility that unverified accounts contain interpretations participants would have clarified cannot be fully excluded, and this constraint should be weighed when assessing the trustworthiness of

findings. Future research should address these limitations through multi-site comparative case studies, longitudinal designs tracking cohorts from Grade 7 through Grade 10, and the incorporation of classroom observation, teacher interviews, and document analysis alongside student accounts.

4.3 Evidence-Based Recommendations

The following recommendations are grounded in the findings of this single bounded case and should be read as contextually generated propositions rather than generalizable prescriptions. Their applicability to other rural Philippine settings should be assessed against the thick contextual description provided in this paper. They are addressed to school administrators, mathematics teachers, curriculum planners, and education policymakers in rural Philippine contexts who are working in settings comparably characterized by the constraints documented here.

Implement the Bridging Pathways program with contextual adaptation. The four-component program should be piloted in rural secondary schools, with adaptation to local resource levels and scheduling constraints. Schools lacking capacity for a full four-week summer program should implement a condensed two-week in-school bridging module at the academic year's start as an interim measure.

Prioritize teacher professional development as an accessible protective mechanism. Teacher professional development warrants prioritization in settings where, as in this case, instructional quality appears through student accounts to be the most accessible protective factor, a proposition that merits testing through multi-site research before being treated as generalizable. Training should emphasize scaffolded dialogic questioning, graduated complexity progression, multi-modal representation using low-cost materials, and purposeful peer-teaching structures grounded in sociocultural principles.

Address metacognitive and affective dimensions explicitly. Support programs should deliberately cultivate time management, anxiety regulation, confidence-building, and attention regulation, recognizing that these capacities are as fundamental to successful transitions as mathematical content knowledge. Assessment design should specifically address anxiety-induced retrieval inhibition by reducing time pressure and introducing process-oriented formats.

Restructure family engagement around emotional and motivational support. Family engagement activities should equip parents with communication strategies emphasizing effort, persistence, and progress over outcomes alone approaches achievable regardless of parents' mathematics knowledge and supported by evidence that parental warmth and encouragement reduce student anxiety and improve academic self-regulation (Donaldson et al., 2024).

Adopt a multilevel ecological approach to transition support. Effective solutions must operate at the individual level (foundational knowledge, affective support), classroom level (responsive instruction, collaborative structures), family level (strengthened partnerships), and contextual level (progressive reduction of infrastructure barriers). Neither individual remediation alone nor structural improvement alone is sufficient; multilevel coordination is the defining feature of effective rural transition support.

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