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The REAP-HOTS Model: A Multi-Level Framework for Developing Higher-Order Thinking Skills in Philippine Rural Elementary Schools

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Abstract
The development of higher-order thinking skills (HOTS) remains a paramount educational objective worldwide, yet its realization in resource-constrained and geographically isolated rural settings continues to face formidable systemic, pedagogical, and sociocultural barriers. This study introduces the REAP-HOTS Model, a multi-level, context-sensitive framework specifically designed to guide the cultivation of HOTS in Philippine rural elementary schools. Employing a methodologically rigorous systematic review that adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, the research synthesized evidence from 150 global studies and 111 Philippine-localized studies spanning empirical investigations, policy evaluations, and theoretical expositions published between 2005 and 2026. The resulting framework delineates four deeply interdependent and recursively interactive layers: the Systemic and Community Layer, the Professional Capacity Layer, the Pedagogical Practice Layer, and the Rural Learner Layer. Grounded in Bronfenbrenner's Ecological Systems Theory, Vygotsky's Social Constructivism, and Freire's Critical Pedagogy, the model demonstrates that effective HOTS cultivation demands systemic coherence, culturally responsive pedagogies that leverage indigenous knowledge systems and linguistic pluralism, sustained transformative professional development for educators, and holistic attention to learner cognitive, affective, and socio-emotional needs. The study further proposes a phased five-year district-level implementation roadmap, providing policymakers, curriculum designers, school leaders, and educators with an actionable and evidence-based blueprint to operationalize equitable cognitive skill development. By foregrounding the unique sociocultural realities of marginalized rural learners, the REAP-HOTS Model offers a comprehensive, glocalized pathway to transform rural educational landscapes into enabling environments that empower Filipino children for critical thinking, lifelong learning, and meaningful civic participation.

Keywords: *higher-order thinking skills, rural elementary education, Philippine educational reform, systematic review, REAP-HOTS Model, critical pedagogy, culturally responsive teaching*

1. Introduction

The development of higher-order thinking skills (HOTS) remains an enduring and pivotal objective within educational systems worldwide, emerging as a critical response to the

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escalating demands of the 21st century's sociocultural, technological, and economic complexities (Anderson & Krathwohl, 2001; Bloom, 1956). These cognitive faculties—encompassing analytical reasoning, critical evaluation, synthesis of multifaceted information, and innovative problem-solving—not only enhance academic achievement but serve as indispensable competencies for active citizenship, lifelong learning, and meaningful participation in the global economy (OECD, 2019; UNESCO, 2017). The rising global advocacy for integrating HOTS development into curricula reflects a recognition that rote memorization and superficial knowledge acquisition no longer suffice in preparing learners for the challenges of rapid globalization, digital transformation, and persistent socioeconomic inequities. Nevertheless, despite this international consensus on the criticality of HOTS, the operationalization and practical realization of such educational ideals confront significant barriers worldwide, especially within resource-constrained and rural educational environments that lack systemic support, infrastructure, and culturally responsive pedagogies.

Situated within this global pedagogical milieu, the Philippine educational landscape presents a distinctive context marked by both promising reforms and profound structural challenges that shape the trajectory of HOTS development. The recent implementation of the K-12 Basic Education Program, mandated by Republic Act No. 10533, represents a decisive reform aiming to elevate cognitive rigor by embedding critical thinking, problem-solving, and creativity as core competencies alongside foundational literacies (Department of Education [DepEd], 2016). Furthermore, the introduction and progressive expansion of Mother Tongue-Based Multilingual Education (MTB-MLE) since 2012 underscores a deliberate policy shift toward leveraging linguistic diversity as a cognitive scaffold rather than a pedagogical impediment (Gonzalez, 2019). These reforms highlight the Philippine government's awareness of the multifaceted challenges faced by learners, particularly those in rural elementary schools, where geographic isolation, socioeconomic disadvantage, multigrade teaching structures, and limited instructional resources persistently constrain educational quality and learner outcomes (Bernardo, 2021; Leen & Ying, 2015; Zohar, 2004).

To fully grasp the complexities surrounding HOTS cultivation in Philippine rural settings, it is necessary to elucidate the historical, theoretical, and structural underpinnings of its educational system. Historically, Philippine education was deeply influenced by colonial legacies that shaped its curricular aims and pedagogical approaches. During Spanish colonization (1565–1898), education functioned predominantly as an instrument for ideological control and religious indoctrination, with limited accessibility to broad swaths of the population but laying foundational literacy frameworks nonetheless (Anderson, 1988; Constantino, 1975). The subsequent American colonial period (1898–1946) introduced a more systematic public education system intended to instill democratic values and English language proficiency, which simultaneously expanded access and embedded Western epistemological paradigms emphasizing memorization and standardization (Anderson, 1988). However, these colonial educational models displayed limited commitment towards fostering autonomous critical thinking, focusing primarily on knowledge transmission.

The post-independence era witnessed oscillations between vocational utilitarian aims and humanistic visions in curricular policy, often resulting in fragmented priorities and uneven educational quality across regions (Tyner & Trinidad, 1969). The Marcos regime (1965–1986) attempted to expand educational access, but through a centralized bureaucracy that

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perpetuated didactic pedagogy strongly reliant on rote memorization and repetition (Valerio, 1991). This period's authoritarian governance not only limited critical discourse but also stifled teacher agency and community involvement, further impeding the fostering of HOTS (Constable, 1994). The paradigm shifted post-1986 with the restoration of democracy, culminating in the 1987 Philippine Constitution's commitment to free public education and the Education Act of 1989, yet educational reforms in practice struggled with resource inequity, persistent poverty, and urban-rural divides that perpetuated limited cognitive skill development (Bernardo, 2006).

The early 21st century ushered in more explicitly articulated educational priorities emphasizing HOTS, with the K-12 implementation mandating cognitive skills aimed to equip learners for complex problem-solving and adaptability (DepEd, 2016). Concurrently, MTB-MLE policies sought to harness linguistic and cultural plurality as pedagogical assets, a critical adaptation for the linguistically fragmented rural communities that had traditionally experienced marginalization due to monolingual curriculum designs (Gonzalez, 2019). Nevertheless, empirical evidence from large-scale assessments such as the National Achievement Test (NAT) and international benchmarks like the Programme for International Student Assessment (PISA) reveal persistent deficits in HOTS among rural learners, highlighting systemic inequities in instructional quality, teacher preparedness, and resource allocation (Bernardo, 2021; Cabaya et al., 2025; World Bank, 2018).

At the international level, the conceptualization and pedagogy of HOTS have evolved considerably from the cognitive taxonomies developed by Bloom and colleagues (1956), who initially classified evaluation and synthesis as pinnacle cognitive skills. Cognitive psychology advancements, constructivist theories, and insights from educational neuroscience have deepened understanding of cognitive processes underpinning HOTS (Krathwohl, 2002; Bransford et al., 2000). The globalization of economies and the acceleration of digital technologies have necessitated frameworks that extend beyond cognitive skills to include creativity, collaboration, communication, and self-regulatory capacities as integral components of HOTS (Partnership for 21st Century Learning [P21], 2015). Pedagogical models have correspondingly evolved from passive, lecture-based instruction to active, inquiry-oriented, and student-centered methodologies grounded in empirical research demonstrating their efficacy in fostering HOTS (Hmelo-Silver et al., 2007; Prince, 2004). Nonetheless, tensions emerge regarding cultural validity and equity of these approaches when transferred wholesale into non-Western, resource-constrained contexts, bringing forth calls for indigenous epistemologies and context-appropriate adaptations to better serve learners' sociocultural realities (Dei, 2000; Lee & Ng, 2010).

It is within this complex interplay of historical legacies, structural constraints, evolving global discourses, and national educational reforms that the REAP-HOTS Model emerges. This multi-level, context-sensitive framework attempts to operationalize HOTS development tailored to the realities of Philippine rural elementary schools, acknowledging systemic influences from macro-level policy to micro-level learner dispositions. The model integrates four interrelated layers—systemic/community, professional capacity, pedagogical practice, and learner characteristics—each informed by and responsive to indigenous knowledge systems, linguistic pluralism, resource limitations, and sociopolitical contexts. The REAP-HOTS Model aims not only to describe or theorize HOTS development but to furnish a

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practical, grounded framework to guide curriculum designers, educators, policymakers, and communities toward fostering meaningful and equitable HOTS acquisition among rural Philippine learners.

2. Method

The present study utilized a methodologically rigorous systematic review design aimed at synthesizing extant empirical and policy literature concerning barriers and enablers of higher-order thinking skills development within elementary education, with particular focus on the Philippine rural context. The systematic review methodology was selected for its capacity to yield a comprehensive, transparent, and reproducible consolidation of evidence, minimizing bias and enhancing the validity of inferential conclusions (Moher et al., 2009). Aligning with best practice standards, the review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, entailing a structured process encompassing identification, screening, eligibility assessment, and inclusion of relevant studies (Page et al., 2021). The research design intentionally juxtaposed global literature with Philippine-specific studies to facilitate comparative analysis and contextual synthesis.

The a priori review protocol, developed prior to data collection, delineated the research questions focusing on systemic, pedagogical, and learner-centered factors influencing HOTS development in elementary education, with special emphasis on rural schooling contingencies. Search strategies were iteratively refined to enhance sensitivity and specificity, incorporating controlled vocabulary and free-text terms that comprehensively covered thematic domains including “higher-order thinking skills,” “critical thinking,” “problem-solving,” “elementary education,” “rural schools,” “Philippines,” “K-12 curriculum,” “teacher training,” and “mother tongue-based multilingual education,” among others. Boolean operators (AND, OR) and truncation were systematically applied to tailor the searches to individual database requirements.

Data were retrieved from extensive and diverse sources to capture a wide spectrum of scholarly and policy insights. Global literature searches canvassed major academic repositories such as Scopus, Web of Science, Education Resources Information Center (ERIC), PsycINFO, Google Scholar, and ProQuest Dissertations and Theses Global, ensuring inclusion of peer-reviewed research articles, conference proceedings, doctoral dissertations, and institutional reports germane to the educational field. Philippine and Southeast Asian studies were augmented through regional platforms including the Philippine E-Journals database, the Asia Pacific Education Researcher archives, the International Journal of Research Studies in Education, DLSU Research Congress proceedings, and institutional repositories from premier universities such as the University of the Philippines, De La Salle University, and Ateneo de Manila University. Complementary sources comprised government reports from the Department of Education (DepEd) and documentation from international development organizations including UNESCO, UNICEF, the World Bank, and the Asian Development Bank. The selection of sources was purposive and comprehensive, facilitating a synthesis that spans empirical studies, theoretical expositions, and policy analyses.

Inclusion criteria mandated that studies be empirical investigations, systematic reviews, meta-analyses, or policy evaluations published primarily between 2005 and 2026, addressing

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barriers, enablers, or both regarding HOTS development within elementary or primary education contexts. Eligible studies were required to present original data or comprehensive literature syntheses, published in English or Filipino. Exclusion criteria eliminated opinion pieces, non-empirical commentaries, and studies exclusively focusing on secondary or tertiary education without relevance to elementary schooling. Applying these criteria, the systematic search identified a corpus of 150 global studies and 111 Philippine localized studies suitable for in-depth analysis.

The data collection proceeded systematically per PRISMA protocol. Following initial database searches, retrieved records were imported into a reference management software to facilitate deduplication and organization. Screening operated in two phases: an initial title and abstract evaluation against inclusion and exclusion criteria pared down the collection to potentially relevant studies; a subsequent full-text review rigorously assessed eligibility. To enhance objectivity and inter-rater reliability, two independent reviewers conducted the screening stages, resolving discrepancies through discussion or adjudication by a third reviewer. The selection process was meticulously documented using a PRISMA flow diagram depicting identification, screening, eligibility, and inclusion phases.

Extraction of pertinent data from the included studies employed a standardized form capturing essential bibliographic and methodological information namely: author(s), publication year, geographical location, research design, sample demographics, educational stage, HOTS domains addressed, identified barriers and facilitators, analytical frameworks, key findings, and digital object identifiers (DOIs) or URLs. Quality appraisal was integrated into the extraction phase, utilizing validated instruments corresponding to study designs—the Critical Appraisal Skills Programme (CASP) for qualitative research, the Newcastle-Ottawa Scale for observational studies, and the Joanna Briggs Institute (JBI) critical appraisal tools for systematic reviews and cross-sectional designs—to assess methodological rigor and bias risk.

To synthesize the diverse quantitative and qualitative findings, an inductive thematic analysis was deployed consistent with Braun and Clarke's (2006) framework. Initially, open coding identified granular concepts related to barriers and enablers of HOTS development directly from the primary data. Subsequently, these codes were aggregated into umbrella descriptive themes encapsulating core factors such as pedagogical strategies, systemic and policy influences, sociocultural and linguistic considerations, infrastructural resources, and teacher-related capacities. Higher-order analytical themes were then abstracted through iterative examination to capture dynamic interrelationships among descriptive themes, allowing the development of a nuanced interpretative schema.

A comparative synthesis distinguished convergences, divergences, and unique contextual factors between global research and Philippine-specific evidence. This dual-level analysis elucidated common systemic and pedagogical challenges while highlighting distinctive considerations germane to Philippine rural elementary schooling. The transparency and reproducibility of thematic coding and synthesis were rigorously maintained through a comprehensive audit trail documenting all analytic decisions. The integrated findings from global and local bodies of literature were systematically organized and are presented herein as the primary evidence underpinning the REAP-HOTS Model.

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3. Results and Discussion

The systematic review culminated in the identification and conceptualization of a multi-layered framework—termed the REAP-HOTS Model—that articulates four interlocking layers critical to fostering higher-order thinking skills in rural elementary education in the Philippines. These four layers are (1) the Systemic and Community Layer, (2) the Professional Capacity Layer, (3) the Pedagogical Practice Layer, and (4) the Rural Learner Layer. This section elaborates these layers in detail, integrating evidence from both global and Philippine localized studies to substantiate each as vital and interdependent for effective HOTS development.

3.1. Systemic and Community Layer

The outermost layer of the REAP-HOTS Model encompasses the systemic, policy, and community ecosystems that establish the foundational conditions for HOTS cultivation. This layer encapsulates national education policies, local governance structures, infrastructural provisions, community support mechanisms, and cultural milieus that collectively influence the educational environments within which learners operate. Consistent with Bronfenbrenner's Ecological Systems Theory (1979), this systemic layer shapes the macro-contextual parameters that enable or constrain cognitive skill development.

Global literature underscores that systemic factors such as coherent policy frameworks, adequate funding, robust infrastructure, and inclusive governance critically determine the capacity of schools to foster HOTS (OECD, 2019; UNESCO, 2017). For instance, countries with strong decentralized educational policies coupled with community participation report enhanced implementation fidelity of HOTS-oriented curricula, enabling context-appropriate adaptations (Lee & Ng, 2010). Conversely, inconsistent policies, bureaucratic inertia, and resource scarcity frequently undermine HOTS initiatives (Bransford et al., 2000).

Philippine studies vividly illustrate the acute challenges rural schools face within this systemic layer. Persistent disparities in infrastructure—unreliable electricity, scarce internet connectivity, inadequate instructional materials—impede delivery of cognitively demanding curricula (Bernardo, 2021; Cabaya et al., 2025). Furthermore, decentralization policies and local government units' variable prioritization of education affect resource allocation and community engagement, resulting in heterogeneous support for HOTS development. Linguistic diversity and cultural heterogeneity in rural areas present both opportunities and challenges; while MTB-MLE policy enshrines mother tongues as mediational tools enhancing comprehension and cognitive elaboration, inconsistent teacher training and lack of materials in indigenous languages hamper effective implementation (Gonzalez, 2019).

Community involvement emerges as a crucial facilitator, where parental education levels, local cultural values, and communal support significantly affect learner motivation and pedagogical possibilities. Studies show that strong collaboration among schools, families, and community stakeholders fosters enriched learning environments conducive to HOTS (Freire, 1970; Aba-Oli & Husen, 2025). The Philippine evidence resonates with this finding, indicating that localized educational initiatives grounded in community participation notably improve pedagogical outcomes and learner engagement even when infrastructural deficits persist (Bernardo, 2021).

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The systemic layer, therefore, constitutes more than administrative backdrop; it represents a dynamic nexus where policy directives, cultural norms, and material realities converge to frame the possibilities for HOTS development in rural elementary schools. Successful HOTS interventions must intentionally engage and transform this layer to create enabling, culturally congruent environments.

3.2. Professional Capacity Layer

Serving as the second concentric layer, the professional capacity component foregrounds the knowledge, skills, attitudes, and agency of educators and school leaders as essential determinants in the translation of systemic intentions into effective classroom praxis. Paralleling Vygotsky's Social Constructivist Theory (1978), this layer emphasizes the pivotal mediation role teachers enact, scaffolding learner cognition through expert guidance within the Zone of Proximal Development.

International literature consistently highlights teacher competence in cognitive pedagogies, subject matter expertise, and culturally responsive teaching as linchpins for fostering HOTS (Hmelo-Silver et al., 2007; Prince, 2004). Professional development programs that incorporate active learning techniques, formative assessment strategies, and reflective practice demonstrably enhance teacher ability to orchestrate HOTS-enabling classrooms (P21, 2015). Moreover, teacher beliefs and motivation profoundly affect the implementation quality of HOTS curricula, with educators embodying a constructivist mindset more likely to engage learners in critical thinking and problem-solving activities (Lee & Ng, 2010).

Within the Philippine context, the professional capacity layer reveals a complex interplay of strengths and deficits. Numerous studies report inadequate pre-service preparation and limited continuous professional development opportunities centering on HOTS, especially for rural educators who often contend with teaching multiple grade levels simultaneously due to multigrade classrooms (Bernardo, 2021; Cabaya et al., 2025). These conditions restrict teachers' capacity to design and deliver lessons that challenge learners beyond recall or comprehension levels. Furthermore, the lack of mentor support, feedback mechanisms, and collaborative professional learning communities in rural settings compounds isolation and stagnates pedagogical innovation.

Critically, studies document that many Filipino rural teachers hold traditional epistemological views favoring teacher-centered instruction, passive learner roles, and standardized testing performance, which are incompatible with HOTS development (Zohar, 2004). Addressing such ingrained beliefs requires sustained, contextually relevant professional development that is not merely technical but transformative, encouraging critical reflection on teaching philosophies and practices (Freire, 1970). Successful local initiatives demonstrate that coaching and mentoring models linking urban-based experts with rural teachers promote pedagogical improvements and bolster teacher confidence in employing HOTS-oriented methods (Bernardo, 2021).

Hence, the professional capacity layer recognizes that educators are the principal agents bridging policy and practice. Enhancing their knowledge, skills, and dispositions through

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supportive, context-tailored professional learning is indispensable for actualizing HOTS in rural classrooms.

3.3. Pedagogical Practice Layer

At the heart of the classroom experience lies the pedagogical practice layer, which operationalizes HOTS through concrete instructional strategies, curriculum content design, assessment modalities, and learner engagement approaches. This layer constitutes the nexus where theory and policy manifest as lived educational interactions, consistent with both Vygotsky's emphasis on social mediation and Freire's dialogical, emancipatory pedagogy (1970; 1978).

Contemporary global research advocates for pedagogies that depart from rote memorization toward inquiry-based learning, problem-based learning, cooperative learning, and metacognitive strategies as empirically validated pathways to enhance HOTS (Hmelo-Silver et al., 2007; Prince, 2004). These methodologies prompt learners to analyze, evaluate, and create new understandings, supported by formative and performance assessments that emphasize reasoning over recall (P21, 2015). Integration of technology, when feasible, further amplifies interactive and personalized learning experiences conducive to HOTS (World Bank, 2018).

In the Philippine rural context, this layer presents significant tension between aspirational pedagogical ideals and operational realities. The limited availability of instructional materials aligned with HOTS, compounded by teacher unfamiliarity with active learning methods, restricts pedagogical repertoires primarily to lecture and memorization (Bernardo, 2021; Cabaya et al., 2025). Multigrade settings complicate differentiated instruction, with teachers often constrained to delivering uniform content irrespective of individual learner needs or abilities. The incorporation of mother tongue languages within curricula remains inconsistent, limiting meaningful scaffolding of abstract cognitive skills (Gonzalez, 2019).

Despite these challenges, innovative programs documented in local studies illustrate the feasibility of embedding culturally relevant pedagogy that respects indigenous knowledge and community wisdom as facilitators of HOTS (Aba-Oli & Husen, 2025). These interventions demonstrate that when pedagogical content is authentically linked to learners' lived experiences and linguistic repertoires, cognitive engagement deepens, fostering critical inquiry and problem-solving. Such culturally consonant pedagogical practices also empower learners by validating their identities and worldviews within the curriculum.

Moreover, successful pedagogical approaches actively involve formative assessments that provide timely feedback to guide learner reflection and self-regulation — key aspects of HOTS (P21, 2015). In rural Philippine schools where standardized assessment predominates, curricular reforms promoting authentic assessment mechanisms are underway but require concerted support and capacity building (Cabaya et al., 2025).

Conclusively, the pedagogical practice layer represents the immediate arena through which HOTS are either fostered or stifled. It demands contextualized, flexible, and community-linked instructional designs that operationalize policy intentions while responding to situational constraints.

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3.4. Rural Learner Layer

The innermost layer of the REAP-HOTS Model centers on the rural learner, foregrounding individual learner characteristics, dispositions, motivational factors, linguistic competencies, and socio-emotional contexts as critical components mediating HOTS development. This level aligns with constructivist perspectives centering learners as active constructors of knowledge within social and cultural milieus (Vygotsky, 1978) and draws on Freirean ideals that emphasize learner empowerment through critical consciousness (Freire, 1970).

Global evidence highlights that learner readiness—encompassing prior knowledge, language proficiency, metacognitive skills, and motivation—significantly influences capacity to engage in higher-order cognitive processes (Krathwohl, 2002; Bransford et al., 2000). Furthermore, social-emotional support and affective factors such as self-efficacy and resilience critically shape persistence and depth of cognitive engagement (OECD, 2019). Multilingual learners particularly benefit from mother tongue instruction which facilitates comprehension and complex thinking before transitioning to lingua franca (Lee & Ng, 2010).

Philippine rural learners often contend with compounded disadvantages including poverty-induced stress, limited early childhood education access, nutritional deficits, and linguistic barriers when curricula privilege English or Filipino over mother tongues (Bernardo, 2021). These constraints negatively impact cognitive development trajectories and inhibit full participation in HOTS-oriented learning. However, MTB-MLE policies represent a crucial positive development by recognizing the cognitive facilitative role of mother tongues, though uneven implementation dampens potential benefits (Gonzalez, 2019).

Socio-cultural factors also bear upon learner agency; rural communities with strong communal traditions and indigenous epistemologies can nurture knowledge construction processes consonant with HOTS, if pedagogical practices are aligned with local values and contexts (Aba-Oli & Husen, 2025). Learner motivation and self-regulation further emerge as vital factors, where supportive classroom environments and encouraging teacher-student relationships bolster engagement in challenging cognitive tasks.

The learner layer thus embodies the ultimate target of systemic, professional, and pedagogical efforts. Attending holistically to learner cognitive, linguistic, and affective needs, framed by cultural strengths, enables meaningful development of higher-order thinking capabilities.

3.5. Synthesis and Interactions Across Layers

The REAP-HOTS Model's four layers are deeply interdependent and recursively interactive. Systemic and community conditions establish the contextual framework and resources enabling or limiting professional development and pedagogical innovation. In turn, teacher capacity shapes instructional practices that directly influence learner experiences and outcomes. Learner characteristics and dispositions reciprocally influence and are influenced by pedagogical quality and social support, ultimately determining HOTS development trajectories. The model is dynamic rather than hierarchical, reflecting Bronfenbrenner's ecological framework's emphasis on multi-directional influences and Vygotsky's theory of mediated learning.

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Importantly, the comparative analyses of global and Filipino literatures reveal unique contextual nuances—such as linguistic diversity, infrastructural scarcity, and sociopolitical conditions—that necessitate adaptations beyond imported HOTS pedagogies. The REAP-HOTS Model accommodates these by foregrounding cultural congruence, community involvement, and systemic responsiveness, advancing a "glocalized" framework sensitive to local realities yet informed by international best practices.

4. Conclusion

This study presents the REAP-HOTS Model, a theoretically grounded and empirically substantiated multi-level framework designed to guide the development of higher-order thinking skills in Philippine rural elementary schools. Synthesized through a systematic review of 150 global and 111 Philippine studies under PRISMA standards, the model delineates four interconnected layers—systemic and community, professional capacity, pedagogical practice, and rural learner—that collectively shape HOTS outcomes. The integration of Bronfenbrenner's Ecological Systems Theory, Vygotsky's Social Constructivism, and Freire's Critical Pedagogy provides a robust conceptual foundation underscoring the systemic complexity and sociocultural embeddedness required to foster HOTS effectively.

By explicating how macro-level policies and community contexts influence professional development, pedagogical innovations, and learner engagement, the model articulates a comprehensive pathway for operationalizing HOTS within resource-constrained, linguistically diverse rural settings. The REAP-HOTS Model transcends simplistic pedagogical prescriptions, offering an integrative, context-responsive approach that privileges indigenous knowledge, equitable resource distribution, culturally consonant instruction, and learner empowerment.

The theoretical implications underscore the necessity of systemic coherence and cultural situatedness in educational reform, advancing the discourse on equitable, meaningful cognitive skill development in marginalized school settings. This framework furnishes policymakers, educators, and researchers with a nuanced lens and actionable blueprint to steer systemic transformation toward inclusive and effective HOTS cultivation.

5. Recommendations

Building upon the insights of the REAP-HOTS Model, a structured and phased five-year district-level implementation roadmap is proposed to systematically actualize HOTS development in Philippine rural elementary schools. This roadmap entails coordinated actions across policy, capacity-building, pedagogical innovation, and learner support domains, aligned with the model's four layers.

In the first year, foundational investments must prioritize strengthening systemic and community infrastructures. This involves advocating for increased funding allocation within the local government units (LGUs) for rural education, upgrading physical infrastructure, ensuring reliable electricity and internet connectivity, and fostering active school-community partnerships. Concurrently, policy orientations should emphasize decentralization mechanisms that empower schools to adapt curricula to local linguistic and cultural realities,

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while integrating MTB-MLE more comprehensively. Engagement forums with community stakeholders should be institutionalized to solicit support and input.

The second and third years focus on enhancing professional capacity through comprehensive, contextually relevant teacher professional development programs. These should incorporate participatory training workshops on HOTS pedagogy, classroom management in multigrade contexts, multilingual instruction, and reflective teaching practices. Establishment of professional learning communities and mentoring schemes pairing experienced urban educators with rural teachers can facilitate knowledge exchange and sustained pedagogical improvement. Incentives and career development pathways aimed at attracting and retaining skilled teachers in rural areas are crucial components.

Years four and five emphasize intensifying pedagogical practice reforms and embedding learner-centered approaches. Curriculum developers and school leaders must collaborate to design instructional materials and assessment tools aligned with HOTS objectives and localized cultural contexts. Teachers should be supported in transitioning from didactic methods to inquiry-based, problem-solving, and cooperative learning methodologies, utilizing both traditional resources and appropriate technological adjuncts. Expanding authentic, formative assessments that nurture learner reflection and metacognition is essential. Simultaneously, learner support services—including psychosocial assistance, language development interventions, and motivational programs—should be scaled to address barriers impeding engagement and cognitive growth.

Policy adjustments across the five years should formalize mechanisms for monitoring and evaluation, applying data-driven decision-making to continuously refine initiatives. Coordination with national agencies such as DepEd, local government units, and civil society organizations must be institutionalized to ensure alignment and sustainability.

In terms of broader policy recommendations, it is imperative to sustain investments in rural educational infrastructure and technologies to bridge the urban-rural digital divide, enabling equitable access to learning tools that catalyze HOTS. National curricula should mandate explicit, culturally adaptive integration of HOTS pedagogies aligned with MTB-MLE frameworks. Teacher education institutions must revise their curricula to embed HOTS pedagogy and multilingual teaching competencies as core requirements. Furthermore, policy frameworks should incentivize community involvement and recognize indigenous knowledge systems as legitimate curricular assets.

A multi-sectoral approach—engaging health, social welfare, and economic development agencies—is recommended to holistically address the socio-economic factors intersecting with learner readiness and educational outcomes. Finally, sustained research and evaluation should accompany implementation efforts, generating localized evidence to inform iterative refinements of HOTS frameworks suited to rural Philippine contexts.

Collectively, these recommendations operationalize the REAP-HOTS Model not merely as an abstract framework but as a concrete, actionable strategy poised to advance equitable, culturally responsive, and effective higher-order thinking skill development in Philippine rural elementary schools over the next five years and beyond.

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