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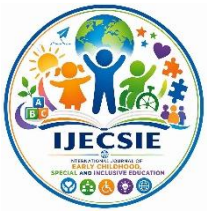

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RESEARCH ARTICLE

Advancing Inclusivity in Alternative Learning System Mathematics Education: A Qualitative Case Study of Senior High School Learners at Benguet National High School

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Abstract

This study examines how inclusive education is advanced within Alternative Learning System (ALS) Mathematics classes for Senior High School learners in a Philippine public secondary school. Grounded in inclusive education and flexible learning principles, the research explores how teachers address learner diversity in terms of prior knowledge, life experiences, and learning needs. A qualitative case study design was employed, involving purposive sampling of ALS learners and teachers. Data were gathered through semi-structured interviews, classroom observations, and document analysis of learning modules and assessment tools. Data were analyzed using Braun and Clarke's (2006) thematic analysis. Results indicate that inclusive practices in ALS Mathematics are characterized by adaptability, real-life application of concepts, and strong teacher-learner relationships. Learners demonstrated improved engagement when lessons were contextualized to everyday experiences such as budgeting and livelihood activities. However, challenges such as irregular attendance, limited resources, and gaps in foundational numeracy skills persist. The study highlights the critical role of teacher innovation and support systems in sustaining inclusive practices. The findings contribute to the understanding of inclusive pedagogy in non-traditional learning environments and underscore the need for strengthened institutional support, targeted training, and resource provision. Recommendations include enhancing teacher capacity, improving instructional materials, and expanding research on ALS education using mixed-methods approaches.

Keywords: *inclusive education, Alternative Learning System, mathematics education, learner diversity*

Introduction

Inclusive education has gained global recognition as a fundamental human right and a key driver of equitable learning opportunities for all learners, regardless of background or ability. International frameworks emphasize that inclusion is not merely about access but also about meaningful participation and achievement in learning (UNESCO, 2017). This commitment is further reinforced by the United Nations Sustainable Development Goal 4, which advocates for inclusive and equitable quality education and lifelong learning opportunities (United Nations, 2015). Within the Philippine educational landscape, inclusive education extends beyond formal schooling to encompass alternative pathways such as the Alternative Learning System (ALS), which serves out-of-school youth and adult learners who encounter barriers to traditional education. The Department of Education (Philippines) institutionalizes ALS as a flexible, non-formal education program designed to address issues such as poverty, geographic isolation, and socio-economic constraints (Department of Education, 2019).

Mathematics education within ALS presents unique challenges and opportunities due to the heterogeneous nature of learners. ALS participants often possess varied educational experiences, differing levels of foundational numeracy, and diverse life contexts that influence their engagement with mathematical concepts. As such, teachers are required to employ flexible, adaptive, and contextualized pedagogical approaches to ensure meaningful learning experiences. Differentiated instruction and contextualized learning are particularly critical in such environments, as they allow learners to connect abstract mathematical concepts to real-life situations (Tomlinson, 2014). Moreover, constructivist perspectives suggest that learning becomes more effective when learners actively construct knowledge based on their experiences (Vygotsky, 1978). Unlike traditional classrooms, ALS settings demand instructional strategies that accommodate irregular attendance, multi-age groupings, and individualized pacing, making teaching both complex and dynamic.

Despite strong policy support for inclusive education, there remains limited empirical research on how inclusivity is operationalized within ALS Mathematics instruction, particularly at the Senior High School level. Existing studies largely focus on formal school settings, often overlooking the distinct characteristics and challenges of alternative learning environments. This gap is significant, as ALS plays a crucial role in achieving educational equity and reaching marginalized populations. Research indicates that contextual factors such as limited resources, insufficient teacher training, and inconsistent learner participation significantly affect the implementation of inclusive practices (OECD, 2019). Furthermore, the diversity of ALS learners necessitates pedagogical approaches that are not only inclusive but also responsive to socio-emotional and cognitive differences.

This study addresses this gap by examining inclusive teaching practices in ALS Mathematics, focusing on the lived experiences of both learners and teachers. By exploring how inclusion is enacted in a real-world ALS context, the study provides insights into effective strategies and persistent challenges in promoting equitable learning opportunities. Specifically, the study aims to: (1) explore how inclusive education is implemented in ALS Mathematics classrooms, (2) identify effective instructional strategies that support learner engagement and participation, and (3) analyze challenges encountered in promoting inclusivity. Through this investigation, the study contributes to the growing body of literature on inclusive education and offers contextually grounded implications for policy, practice, and future research.

Methodology

This study employed a qualitative case study design to generate an in-depth and contextually grounded understanding of inclusive practices in Alternative Learning System (ALS) Mathematics education. A case study approach was deemed appropriate as it allows for a holistic exploration of complex educational phenomena within real-life settings, particularly when the boundaries between context and practice are not clearly evident (Yin, 2018). The research was conducted at Benguet National High School, focusing on Senior High School ALS learners and their Mathematics teacher. This setting was selected due to its active implementation of ALS programs catering to learners with diverse educational backgrounds and life circumstances.

Participants were selected through purposive sampling, a technique commonly used in qualitative research to identify information-rich cases relevant to the research objectives (Patton, 2015). The participants included ALS learners with varied profiles in terms of age, prior educational attainment, employment status, and learning needs, as well as the teacher responsible for facilitating Mathematics instruction. This diversity allowed for a comprehensive understanding of how inclusive practices are experienced and enacted in the classroom. Ethical considerations were observed, including informed consent, voluntary participation, and confidentiality of responses.

Data collection utilized multiple qualitative methods to ensure depth and triangulation. Semi-structured interviews were conducted to capture participants' lived experiences, perceptions, and insights regarding inclusive education and Mathematics learning. Classroom observations were carried out to document actual teaching practices, learner engagement, and interaction patterns in the ALS setting. In addition, document analysis of learning modules, activity sheets, and assessment tools was undertaken to examine how inclusivity is reflected in instructional design and materials. The use of multiple data sources strengthens the validity of the findings by allowing cross-verification of information (Creswell & Poth, 2018).

Data were analyzed using the thematic analysis framework of Braun and Clarke (2006), which involves a systematic

process of familiarization with the data, initial coding, searching for patterns, reviewing themes, defining and naming themes, and producing the final report. This approach enabled the identification of recurring patterns and meaningful themes related to inclusive practices in ALS Mathematics education. The analysis was iterative and reflective, ensuring that themes accurately represented participants' experiences.

To ensure the rigor and trustworthiness of the study, established qualitative criteria were applied. Credibility was achieved through member checking, where participants were given the opportunity to validate the accuracy of the findings. Dependability was ensured through the use of audit trails that documented the research process and decision-making procedures. Confirmability was addressed through triangulation of data sources and methods, minimizing researcher bias. Transferability was enhanced through thick description, providing detailed contextual information that allows readers to determine the applicability of the findings to other settings (Lincoln & Guba, 1985). Collectively, these measures ensured that the study's findings are credible, reliable, and grounded in the lived realities of ALS learners and teachers.

Results and Discussion

Theme 1: Flexible and Contextualized Mathematics Instruction

Teachers consistently adapted Mathematics instruction to align with learners' real-life contexts, recognizing that ALS learners bring diverse experiences shaped by work, family responsibilities, and interrupted schooling. Lessons were designed to incorporate practical applications such as budgeting, wage computation, small business transactions, and daily problem-solving scenarios. Teachers simplified abstract mathematical concepts by translating them into familiar situations, thereby reducing cognitive overload and making learning more accessible. This contextualization enabled learners to see the relevance of Mathematics in their everyday lives, transforming it from a perceived difficult subject into a functional and meaningful skill.

Moreover, teachers demonstrated flexibility in pacing and content delivery, adjusting lessons based on learners' readiness and attendance patterns. Instruction was not rigidly bound to traditional sequencing but instead followed a responsive approach that prioritized understanding over coverage. This reflects a shift from content-centered to learner-centered pedagogy, which is essential in inclusive and alternative learning environments. Studies have shown that contextualized instruction significantly improves learner engagement and comprehension, particularly among non-traditional learners (Boaler, 2016; Darling-Hammond et al., 2020).

Responses:

"Mas naiintindihan nila kapag tungkol sa pera at pang-araw-araw na sitwasyon."
(They understand better when it is about money and daily situations.)
"Ginagawa kong simple at relatable ang examples para hindi sila ma-overwhelm."
(I make examples simple and relatable so they are not overwhelmed.)
"Kapag konektado sa trabaho nila, mas interesado silang matuto."
(When it is connected to their work, they become more interested in learning.)
"Mas nagiging active sila kapag nakikita nila ang gamit ng Math sa totoong buhay."
(They become more active when they see the use of Math in real life.)

The findings affirm that contextualized instruction enhances both comprehension and engagement by anchoring learning in meaningful experiences. This aligns with the theory of Lev Vygotsky (1978), which posits that learning is constructed through interaction with social and cultural contexts. By linking mathematical concepts to real-life applications, teachers facilitate deeper understanding and retention. Furthermore, Boaler (2016) emphasizes that applied and relevant mathematics instruction increases learner motivation and reduces anxiety, particularly among those with negative prior experiences. In ALS settings, where learners often question the relevance of formal education, contextualization becomes a critical strategy for inclusion and sustained participation.

Theme 2: Learner-Centered Support and Scaffolding

Teachers provided individualized and responsive support to accommodate the varied learning needs of ALS learners. This included one-on-one guidance, breaking down complex problems into manageable steps, and offering alternative explanations tailored to learners' levels of understanding. Teachers also allowed flexible pacing, recognizing that learners progress at different rates due to differences in prior knowledge and learning conditions. Scaffolding strategies were evident in guided practice, prompting, and continuous feedback, enabling learners to gradually build confidence and competence in solving mathematical problems.

This learner-centered approach reflects an understanding that inclusion requires more than uniform instruction; it demands intentional support structures that enable all learners to succeed. Teachers acted as facilitators of learning rather than mere transmitters of knowledge, adjusting their roles based on learner needs. Research indicates that scaffolding is particularly effective in diverse classrooms, as it provides the necessary support for learners to achieve tasks beyond their independent capabilities (Wood, Bruner, & Ross, 1976).

Responses:

"Dahan-dahan ko silang ginagabayan hanggang makuha nila ang proseso."

(I guide them step by step until they understand the process.)
"Yung nahihirapan, binibigyan ko ng extra time at tulong."
(Those who struggle are given extra time and assistance.)
"Hindi ko sila pinipilit sabay-sabay, kanya-kanya ang pacing nila."
(I do not force them to move at the same pace; they have individual pacing.)
"Paulit-ulit naming ginagawa ang proseso hanggang maging malinaw sa kanila."
(We repeat the process until it becomes clear to them.)

The use of scaffolding strategies supports learners within their Zone of Proximal Development, a concept introduced by Vygotsky (1978), where learning occurs most effectively with appropriate guidance. By providing structured support and gradually releasing responsibility, teachers enable learners to develop independence and mastery. Empirical studies further confirm that scaffolding enhances academic achievement and learner confidence, particularly in mathematics education (Hattie, 2009). In ALS contexts, where learners exhibit wide variability in readiness, scaffolding is essential in ensuring that no learner is left behind, thereby operationalizing inclusive education in practice.

Theme 3: Socio-Emotional Barriers and Motivation

Learners in ALS Mathematics classes face significant socio-emotional challenges that influence their participation and learning outcomes. Many learners reported low self-confidence, often stemming from previous negative experiences with Mathematics in formal schooling. Feelings of anxiety, fear of failure, and self-perceived inadequacy hinder active engagement in classroom activities. Additionally, external responsibilities such as work, family obligations, and financial pressures further affect learners' ability to attend classes regularly and focus on learning.

Despite these challenges, learners demonstrated increased motivation when they began to understand mathematical concepts and experienced success in tasks. Teachers played a crucial role in fostering motivation by providing encouragement, recognizing effort, and creating a supportive learning environment. This highlights the importance of addressing not only cognitive but also emotional dimensions of learning in inclusive education.

Responses:
"Nahihiya ako kasi pakiramdam ko mahina ako sa Math."
(I feel shy because I think I am weak in Math.)
"Minsan hindi ako nakakapunta dahil sa trabaho."
(Sometimes I cannot attend because of work.)
"Mas ganado ako kapag naiintindihan ko na ang lesson."
(I feel more motivated when I start to understand the lesson.)
"Kapag tinutulungan ako ng teacher, mas nagkakaroon ako ng confidence."
(When the teacher helps me, I gain more confidence.)

The findings underscore the critical role of socio-emotional factors in learning, particularly in non-traditional educational settings. According to Bandura (1997), self-efficacy significantly influences learners' motivation and performance; learners who believe in their ability to succeed are more likely to engage in learning tasks. Similarly, Dweck (2006) emphasizes the importance of fostering a growth mindset to overcome fear of failure and build resilience. In ALS settings, addressing socio-emotional barriers is essential for promoting sustained participation and academic success. Inclusive education, therefore, must integrate emotional support mechanisms alongside instructional strategies to create a holistic learning environment.

Theme 4: Structural Constraints in ALS Implementation

Teachers identified several structural challenges that hinder the effective implementation of inclusive practices in ALS Mathematics education. These include limited availability of instructional materials, lack of access to technology, irregular learner attendance, and insufficient professional training specific to ALS pedagogy. Teachers often resorted to improvisation and self-developed materials to meet instructional needs, which, while commendable, indicates systemic gaps in support.

Irregular attendance poses a significant challenge, as it disrupts lesson continuity and makes it difficult to implement sequential instruction. Additionally, the absence of specialized training limits teachers' ability to fully address the diverse needs of ALS learners. These constraints highlight the disconnect between policy intentions and actual classroom conditions.

Responses:
"Kulang ang materials kaya nag-iimprovise na lang ako."
(There is a lack of materials, so I just improvise.)
"Hirap magturo kapag hindi regular ang attendance."
(It is difficult to teach when attendance is irregular.)
"Kailangan pa ng training sa ALS strategies."
(There is still a need for training in ALS strategies.)

"Minsan sariling sikap na lang ang paggawa ng teaching materials."
(Sometimes I rely on my own effort to create teaching materials.)

The findings reveal that systemic limitations significantly affect the sustainability and effectiveness of inclusive education in ALS. According to the Organisation for Economic Co-operation and Development (OECD, 2019), adequate resources, teacher training, and institutional support are critical components of successful inclusive education systems. Without these, teachers are left to navigate challenges independently, leading to inconsistencies in practice. The results suggest that achieving inclusivity requires not only teacher innovation but also strong institutional commitment and policy implementation. Strengthening support systems is therefore essential to ensure that inclusive education in ALS is both effective and sustainable.

Conclusion

The study demonstrates that inclusivity in Alternative Learning System (ALS) Mathematics education is realized through a combination of flexible instruction, contextualized teaching, and strong teacher-learner support mechanisms. Teachers play a pivotal role in adapting content, pacing, and instructional approaches to accommodate the diverse backgrounds, abilities, and life circumstances of ALS learners. By linking mathematical concepts to real-life applications and providing individualized scaffolding, teachers create meaningful learning experiences that foster engagement, understanding, and confidence. These practices reflect the core principles of inclusive education, where learning is made accessible, relevant, and responsive to all.

However, the study also reveals that such inclusive practices are often sustained through individual teacher initiative rather than systemic support. Persistent challenges including limited instructional resources, irregular learner attendance, and insufficient professional training continue to hinder the consistent and effective implementation of inclusive education in ALS settings. These structural constraints highlight a gap between policy intentions and actual classroom realities, underscoring the need for stronger institutional commitment and resource allocation. Furthermore, socio-emotional barriers such as low self-confidence and external responsibilities among learners significantly affect participation and learning outcomes, indicating that inclusion must address both cognitive and affective dimensions.

Overall, while the findings affirm that inclusive ALS Mathematics education is attainable, its sustainability depends on a comprehensive support system that integrates teacher capacity building, resource provision, and policy alignment. Inclusivity must therefore be viewed not only as a pedagogical approach but as a systemic commitment to equity and access in education.

Recommendations

1. Strengthen Teacher Training in ALS and Inclusive Pedagogy

There is a need for continuous, targeted professional development programs that equip teachers with practical skills in differentiated instruction, scaffolding, and inclusive classroom management specific to ALS contexts. Training should include hands-on workshops, mentoring, and collaborative learning communities to enhance instructional competence.

2. Provide Adequate and Contextualized Learning Materials

Educational authorities, particularly the Department of Education (Philippines), should ensure the provision of sufficient, relevant, and contextually appropriate instructional materials. These resources should support real-life applications of Mathematics and cater to diverse learner needs, reducing the burden on teachers to improvise materials.

3. Enhance Institutional and Policy Support for ALS Programs

Stronger implementation of ALS policies is necessary to bridge the gap between policy and practice. This includes allocating resources, improving monitoring systems, and providing structural support such as flexible scheduling, learning facilities, and access to technology. Institutional commitment is essential to sustain inclusive practices.

4. Address Socio-Emotional Needs of Learners

Programs and interventions should be developed to support learners' emotional well-being, self-confidence, and motivation. Guidance services, peer support systems, and positive teacher-learner relationships should be strengthened to create a holistic and inclusive learning environment.

5. Conduct Further Research Using Mixed-Methods Approaches

Future studies should integrate qualitative and quantitative methods to provide a more comprehensive understanding of ALS education. Expanding research across different regions and learner groups will enhance the generalizability of findings and inform evidence-based policy and practice.

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