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Can Artificial Intelligence Support Multigrade Teaching?: Exploring Teachers' Perceptions, Practices, and Challenges

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Abstract. Multigrade teachers face unique instructional challenges as they simultaneously manage learners from different grade levels, particularly in rural school settings where access to educational resources and technology is often limited. Although artificial intelligence (AI) has increasingly been recognized as a potential tool for enhancing teaching and learning, limited research has explored how multigrade teachers in rural Philippine classrooms perceive, utilize, and navigate the integration of AI into their instructional practices. Addressing this gap, this study explored the perceptions, practices, perceived benefits, challenges, and support needs of multigrade teachers in integrating AI into their teaching. A qualitative case study approach was employed, involving ten (10) multigrade teachers from Kadingilan II District, Division of Bukidnon, during School Year 2026–2027. Data were gathered through semi-structured interviews, focus group discussions, and classroom observations. The findings revealed that teachers perceived AI as a supportive instructional assistant rather than a replacement for their professional roles. Based on their experiences, AI helped facilitate lesson preparation, differentiated instruction, and assessment. However, they emphasized that teacher judgment, creativity, and personal interaction with learners remain essential. The major challenges identified included limited internet connectivity, inaccuracies in AI-generated materials, cultural mismatches, and the risk of over-reliance on AI. To address these concerns, teachers practiced critical evaluation of AI-generated outputs, contextual adaptation of instructional materials, and peer collaboration. Furthermore, teachers identified practical, classroom-focused training, reliable internet connectivity, adequate technological devices, offline AI resources, and clear guidelines on ethical use, data privacy, and academic integrity as essential support mechanisms. The study concludes that AI has potential as a supplementary teaching tool in multigrade classrooms, particularly when supported by adequate resources, professional development, and responsible use. The reported benefits reflect teachers' experiences and perceptions rather than measured improvements in instructional effectiveness. These findings highlight the importance of context-responsive support in promoting meaningful and equitable AI integration in rural multigrade education.

Keywords: Artificial Intelligence; Challenges and Support Systems; Multigrade Teaching; Perceptions and Practices

Introduction

Teaching in multigrade classrooms has long been recognized as one of the most challenging instructional settings, as teachers must address the diverse learning needs of pupils across different grade levels simultaneously. This responsibility becomes even more demanding in rural schools, where limited instructional resources, inadequate technological infrastructure, and fewer opportunities for professional development may affect the delivery of quality education. With the rapid advancement of artificial intelligence (AI), new opportunities have emerged to support teachers in managing instructional tasks and addressing varied learning needs. AI offers potential applications in lesson planning, instructional material development, assessment preparation, and personalized learning support, which may help teachers respond to the demands of diverse classroom settings (Miao & Holmes, 2023).

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Artificial intelligence, particularly generative AI tools, offers opportunities for teachers to prepare differentiated learning activities, develop assessment materials, generate instructional resources, and adapt explanations to learners' needs. However, the usefulness of these technologies depends on teachers' professional judgment, access to technological resources, and ability to evaluate the accuracy and appropriateness of AI-generated content. In the Philippines, the Department of Education (DepEd) issued its Foundational Guidelines on Artificial Intelligence in Basic Education (DepEd Order No. 003, s. 2026). Although these guidelines recognize AI's potential to support teaching and learning, the practical application of these policies in multigrade classrooms requires further examination, particularly in settings where one teacher handles multiple grade levels with different curriculum competencies and learning requirements (DepEd, 2026).

International studies and policy discussions have highlighted the potential of artificial intelligence (AI) to support personalized learning, instructional planning, assessment, and educational decision-making. However, concerns regarding transparency, equity, data privacy, accuracy, and teachers' readiness to use AI responsibly remain significant (Miao & Holmes, 2023). In the Philippine context, the Department of Education (DepEd) has introduced guidelines promoting the responsible and ethical integration of AI in basic education (Department of Education, 2026). Despite these developments, limited research has examined how multigrade teachers experience and integrate AI into their daily instructional practices, particularly in rural and resource-constrained schools. Specifically, there is a need to understand how teachers select and use AI tools to address multiple grade-level competencies, develop and modify AI-generated learning materials, differentiate instruction, assess learners, and manage the limitations of AI-generated content. Further investigation is also needed into how teachers evaluate the cultural and educational relevance of AI-generated materials, avoid excessive dependence on technology, and adjust their instructional practices based on actual classroom experiences. These gaps highlight the importance of qualitative research that examines how multigrade teachers understand, experience, and apply AI in their everyday teaching practices.

In view of these gaps, this study explored the perceptions and practices of multigrade teachers in integrating artificial intelligence into their teaching, particularly in lesson planning, instructional delivery, assessment, and preparation of learning materials. It also examined the benefits they experienced, the challenges they encountered, the strategies they employed to address these challenges, and the training, resources, and institutional support they considered necessary for effective and responsible AI integration. The study involved ten (10) AI-exposed multigrade teachers from Kadingilan II District, Division of Bukidnon, Philippines, during School Year 2026–2027. It specifically focused on teachers who had experience or exposure to AI tools in their professional teaching activities. The inquiry was delimited to their perceptions, reported practices, and personal experiences in using AI within their multigrade classrooms. It did not measure learners' academic performance, compare teaching effectiveness between AI-assisted and non-AI-assisted instruction, or establish the causal effects of AI integration on instructional outcomes. Instead, it documented how teachers understood and utilized AI, the opportunities and limitations they encountered, and the support they identified as necessary within their specific educational context. Through these accounts, the study provided localized insights into the realities of AI integration in rural multigrade education and contributed to a better understanding of the support needed to promote responsible, relevant, and context-responsive AI use in teaching.

Research Questions

Multigrade teachers often face unique challenges in managing instruction across different grade levels within a single classroom. With the growing presence of artificial intelligence (AI) in education, it becomes important to explore how these technologies can support teachers in balancing diverse learner needs. This study was conducted to examine the perceptions, practices, and challenges of multigrade teachers in integrating AI into their teaching. Within this scope, the study sought to answer the following questions:

1. How do multigrade teachers perceive the use of artificial intelligence in their teaching practice?
2. How do they use AI in planning, teaching, assessing, or preparing learning materials for learners from different grade levels?
3. What benefits or positive experiences have they gained from using AI in multigrade teaching?
4. What concerns, challenges, or difficulties have they encountered when using AI in their multigrade classrooms, and how do they address them?
5. What support, training, resources, or policies do they think are needed to help multigrade teachers use AI effectively and responsibly?

Scope and Delimitation

This study explored the experiences of multigrade teachers in integrating artificial intelligence (AI) into their instructional practices in rural elementary schools in Kadingilan II District, Division of Bukidnon,

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during the School Year 2026–2027. The study involved ten purposively selected multigrade teachers who had prior exposure to and experience in using AI tools for instructional purposes. Specifically, it examined their experiences in using AI for lesson preparation, instructional material development, differentiated instruction, learner assessment, and other teaching-related tasks. It also explored the challenges they encountered, the strategies they employed, and the support they needed in integrating AI into their teaching practices. The study was delimited to the participants' reported experiences, perceptions, and practices in using AI within their respective multigrade classrooms. It did not include teachers without prior AI exposure, teachers from other districts, or the quantitative measurement of teaching effectiveness and learner achievement. Furthermore, the findings were limited to the experiences of the ten participants and were not intended to be generalized to all multigrade teachers. Rather, the study aimed to provide a deeper understanding of AI integration in rural multigrade teaching contexts.

Literature Review

Artificial Intelligence in Education

Artificial intelligence (AI) has become an emerging technology in education, offering opportunities to transform instructional planning, teaching strategies, assessment, and the development of learning resources. Through machine learning, natural language processing, and generative AI, teachers can access tools that assist in producing educational content, explaining concepts, generating questions, and providing individualized learning support. These developments have expanded the role of technology from simply delivering information to assisting teachers in designing and adapting instructional experiences according to learners' needs.

Furthermore, Marzano (2026), in a systematic review of 197 studies on generative artificial intelligence in K–12 education, found that generative AI provides opportunities for personalizing learning experiences, improving assessment practices, motivating learners, and introducing innovative teaching approaches. However, the review also identified the need for continuous teacher training, appropriate educational guidelines, and stronger attention to ethical and privacy concerns. The findings suggest that although AI offers instructional possibilities, its meaningful integration requires teachers to understand both its capabilities and limitations.

Similarly, Wang et al. (2025), in their systematic review of empirical studies on generative AI in pedagogical practices, examined 28 studies published between 2022 and 2024. Their findings indicated that generative AI could support instructional efficiency through personalized learning materials, prompt feedback, idea generation, and the development of teaching resources. Nevertheless, they identified concerns involving inaccurate information, algorithmic bias, academic integrity, and uncertainty regarding the overall effectiveness of AI in education. These findings emphasize that AI should function as a supplementary instructional resource rather than an independent substitute for teachers' professional responsibilities.

The reviewed studies share the view that AI can support different aspects of teaching, particularly content preparation and instructional development. However, they also reveal that the benefits of AI depend on how teachers evaluate, modify, and apply its outputs. While Marzano (2026) provided a broad overview of AI applications in K–12 education, and Wang et al. (2025) focused on empirical evidence of generative AI in pedagogical practices, neither review specifically established how teachers manage AI integration when handling several grade levels simultaneously. This distinction is important because the instructional demands of multigrade teaching require teachers to prepare different learning activities, competencies, and assessment tasks within the same classroom environment.

Teachers' Perceptions and Acceptance of Artificial Intelligence

Teachers' perceptions play an important role in determining whether AI technologies are accepted and meaningfully incorporated into instructional practices. Their willingness to use AI is influenced by their understanding of its capabilities, perceived usefulness, confidence in operating the tools, and concerns about the possible consequences of their use. Teachers may recognize AI as a convenient resource for completing instructional tasks while remaining cautious about its accuracy, appropriateness, and potential effects on their professional responsibilities.

Arranz-García et al. (2025), in their systematic review of teachers' perceptions, strategies, and challenges in integrating AI into primary education, examined 28 studies published between 2014 and 2024. The review revealed that teachers generally recognized AI's potential to support personalized learning, critical thinking, problem-solving, and learner engagement. However, the researchers also identified insufficient teacher training, limited technological resources, inadequate institutional support, and concerns about data privacy and algorithmic bias as significant barriers. Their findings highlighted the importance of developing

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teachers' AI literacy and providing continuous professional development to support responsible classroom integration.

In a related study, Castro et al. (2025) investigated the perceptions, challenges, and opportunities of 45 rural elementary teachers in southern Chile regarding AI integration. Using a convergent parallel mixed-methods approach, the researchers found that teachers viewed AI as an opportunity to personalize learning, reduce workload, and facilitate instruction in multigrade classrooms. Notably, teachers did not generally perceive AI as a threat to their professional roles. Instead, they emphasized the importance of accessible technological resources, offline applications, and professional development suited to rural educational contexts.

The findings of these studies suggest that teachers' perceptions of AI are shaped not only by the perceived usefulness of technology but also by the conditions in which they work. Arranz-García et al. (2025) presented a broader understanding of teachers' perceptions across primary education, whereas Castro et al. (2025) provided more context-specific insights into rural teaching environments, including multigrade classrooms. However, the latter primarily examined teachers' perceptions and anticipated applications within a professional development context. Further qualitative investigation is needed to understand how AI-exposed multigrade teachers actually incorporate these tools into their everyday classroom responsibilities and how their perceptions develop through direct experience. This provides an important basis for examining whether teachers view AI as a practical instructional partner, a supplementary resource, or a tool with limitations in addressing the demands of multigrade education.

Artificial Intelligence in Instructional Planning and Differentiated Teaching

Instructional planning is particularly demanding in multigrade classrooms because teachers must address multiple grade-level competencies, prepare appropriate learning activities, and organize classroom tasks within limited instructional time. In this context, AI may offer practical assistance by generating lesson outlines, preparing differentiated worksheets, suggesting teaching strategies, and developing assessment questions for learners with varying levels of understanding.

Marzano (2026) identified personalized learning and innovative instructional practices as among the major opportunities associated with generative AI in K–12 education. Generative AI can assist teachers in modifying explanations, generating examples, and producing learning materials suited to different levels of difficulty. Similarly, Wang et al. (2025) emphasized the potential of generative AI to facilitate the development of personalized educational resources and provide instructional support. These findings indicate that AI may reduce some of the preparation demands associated with developing instructional materials and adapting content to learners' needs.

The relevance of these applications becomes more apparent in multigrade classrooms. Teachers may use AI to develop activities based on a common topic but with varying levels of complexity, prepare separate learning tasks for different grade levels, or generate examples that connect lessons to learners' everyday experiences. AI may also help teachers produce reading passages, practice exercises, and assessment materials that address different competencies within a single instructional period. However, the availability of AI-generated instructional materials does not automatically guarantee their suitability for classroom use. Teachers must still verify the accuracy of information, ensure alignment with curriculum competencies, consider learners' developmental levels, and adapt the materials to the local context. In rural and culturally diverse communities, teachers must also determine whether generated examples, language, and illustrations are appropriate for their learners. Bongala et al. (2020), in their study of multigrade schoolteachers in Albay, Philippines, identified several instructional strategies used to manage multiple grade levels. These included teaching a common topic with differentiated activities, allowing one grade level to work independently while another received direct instruction, and utilizing peer teaching or tutoring. Although the study did not examine AI, its findings demonstrate the complex planning and instructional organization required in multigrade classrooms. These practices provide a relevant context for examining how AI-generated materials and instructional suggestions may be incorporated into existing multigrade teaching strategies.

Artificial Intelligence in Assessment and Preparation of Learning Materials

Assessment and instructional material development are essential components of effective teaching. In multigrade classrooms, these responsibilities become more challenging because teachers must assess learners according to different grade-level competencies while providing appropriate learning opportunities for each group. AI may assist teachers in generating assessment questions, developing quizzes, preparing worksheets, creating reading materials, and providing alternative explanations of difficult concepts.

Wang et al. (2025) identified prompt feedback and personalized learning materials as important applications of generative AI in pedagogical practices. Likewise, Marzano (2026) highlighted the potential of AI to improve assessment methods and support more individualized learning experiences. These findings suggest that

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generative AI can serve as an instructional resource in developing varied assessment activities and learning materials.

For multigrade teachers, such applications may be particularly useful when preparing separate assessment tasks for different grade levels or modifying learning materials according to learners' abilities. For example, a teacher may use AI to generate questions of varying difficulty based on a particular lesson, develop reading passages appropriate for different reading levels, or prepare formative assessment activities for learners working independently. These applications may help teachers organize instructional resources while addressing the learning requirements of different groups.

Despite these opportunities, AI-generated assessments and learning materials require careful review. AI tools may produce incorrect answers, inappropriate examples, repetitive questions, or content that does not match the intended learning competencies. Teachers therefore remain responsible for checking the accuracy, relevance, fairness, and developmental appropriateness of generated materials before using them with learners.

Challenges in Integrating Artificial Intelligence into Teaching

Although AI offers potential instructional benefits, its integration into educational settings is accompanied by technological, pedagogical, ethical, and professional challenges. Teachers may encounter unreliable internet connectivity, limited access to devices, inadequate knowledge of AI tools, inaccurate generated information, and difficulties in determining the appropriateness of AI-produced content. Castro et al. (2025) identified resource accessibility and teacher professional development as major concerns among rural elementary teachers. Their findings emphasized that limited or absent internet connectivity may restrict access to AI applications, while the lack of context-appropriate technological and instructional resources may prevent teachers from maximizing their potential.

Similarly, Arranz-García et al. (2025) identified insufficient training, inadequate technological resources, limited institutional support, and concerns about privacy and algorithmic bias as significant challenges to AI integration in primary education. These findings indicate that teachers' ability to use AI responsibly requires more than access to technology. They also need sufficient knowledge and professional guidance to evaluate AI-generated outputs and make appropriate instructional decisions.

In multigrade classrooms, these challenges may become more complicated because teachers must consider the accuracy and suitability of AI-generated content for several grade levels. A learning activity generated for one group may not be developmentally appropriate for another. Similarly, examples and explanations produced by AI may not reflect the cultural experiences, language backgrounds, and learning conditions of rural learners. Teachers must therefore exercise professional judgment when adapting AI-generated materials to their specific classroom contexts.

Bongala et al. (2020) previously identified problems involving lesson planning, insufficient learning materials, instructional organization, and lack of training among multigrade teachers in Albay. Although their study focused on general multigrade teaching rather than AI integration, its findings illustrate the instructional conditions that may influence the adoption of emerging technologies in such settings.

Teacher Support, Professional Development, and Responsible AI Integration

The successful integration of AI into teaching requires appropriate institutional support, professional development, technological resources, and clear guidelines for responsible use. Teachers need opportunities to develop AI literacy, understand the capabilities and limitations of AI applications, formulate effective prompts, evaluate generated content, and apply AI in ways that support pedagogically appropriate instruction. Arranz-García et al. (2025) emphasized the importance of continuous professional development and institutional support in strengthening teachers' capacity to integrate AI into primary education. Their review indicated that teachers require more than basic technical knowledge; they also need the competencies to evaluate AI-generated information, address ethical concerns, and connect AI applications with instructional objectives.

Castro et al. (2025) similarly emphasized the need for professional development and technological resources that respond to the realities of rural schools. Their findings suggested that teacher training should include practical applications of AI in classroom instruction and should be accompanied by accessible resources, including offline alternatives. This is particularly relevant to multigrade classrooms, where teachers require strategies for adapting AI-generated materials to different grade levels and learning needs.

In the Philippine context, the Department of Education's DepEd Order No. 003, s. 2026, entitled Foundational Guidelines on Artificial Intelligence in Basic Education, provides an important policy foundation for responsible AI integration. The guidelines establish AI as a complementary, human-centered tool that supports teaching, learning, assessment, teacher professional development, and educational governance. They also emphasize pedagogical appropriateness, inclusion and equity, protection of human agency, and risk-

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proportionate regulation. Furthermore, the policy recognizes connectivity and infrastructure, teacher capacity, and learner preparation as major considerations in AI integration (Department of Education, 2026).

These policy directions reinforce the importance of ensuring that AI supports rather than replaces teachers' professional judgment. For multigrade teachers, responsible AI integration requires training that reflects their actual instructional responsibilities, including differentiated lesson planning, preparation of grade-level materials, assessment development, and contextual adaptation. Adequate devices, reliable connectivity, offline resources, technical assistance, and clear guidance on data privacy and academic integrity are also necessary to support meaningful implementation.

Methodology

Research Design

This study employed a qualitative case study research design to explore multigrade teachers' perceptions, practices, and challenges in integrating artificial intelligence (AI) into their teaching. A qualitative approach was considered appropriate because the study sought to understand teachers' experiences, perspectives, and instructional practices within their actual educational context rather than measure the effectiveness of AI or establish causal relationships. Specifically, the case study design allowed an in-depth examination of how AI-exposed multigrade teachers understood, utilized, and experienced AI in addressing the instructional demands of handling multiple grade levels simultaneously.

Research Locale

The study was conducted in Kadingilan II District, Division of Bukidnon, Municipality of Kadingilan, during School Year (SY) 2026–2027. These districts were selected because multigrade teaching is prevalent in rural schools where limited teacher deployment requires one teacher to handle multiple grade levels.

Research Participants

Multigrade teachers from Kadingilan District were invited to participate. Out of the teachers contacted, those with at least one year of experience in multigrade teaching and exposure to AI tools were purposively selected. A total of 13 teachers were approached; ten (10) agreed to participate and completed the consent form, while three (3) declined.

Research Instrument

The study utilized three researcher-prepared data collection instruments: a semi-structured interview guide, a focus group discussion (FGD) guide, and a classroom observation checklist. These instruments were developed based on the research objectives and questions to ensure that the information gathered was relevant to the perceptions, practices, challenges, and support needs of multigrade teachers in integrating AI. The interview guide consisted of open-ended questions designed to explore the participants' understanding and perceptions of AI, their experiences in using AI tools, and the ways these technologies were incorporated into lesson planning, instructional delivery, assessment, and preparation of learning materials. It also included questions about the perceived benefits, difficulties encountered, strategies employed to address challenges, and support needed to maximize the appropriate use of AI in multigrade classrooms. Follow-up questions and probing statements were used to encourage participants to elaborate on their experiences and provide specific examples. The FGD guide consisted of open-ended and discussion-oriented questions intended to encourage participants to share and compare their experiences of AI integration. The discussions focused on common practices, perceived advantages, challenges, coping strategies, and suggestions for improving AI use in multigrade instruction. The group discussions also provided opportunities for participants to reflect on similarities and differences in their experiences within their respective school contexts. The observation checklist was used to document relevant instructional practices and the application of AI in multigrade teaching. It focused on the preparation and utilization of AI-generated instructional materials, differentiated learning activities, classroom organization, assessment practices, and the teacher's role in evaluating and adapting AI-generated content.

Data Gathering Procedure

Data collection commenced upon approval of the Public Schools District Supervisor. Invitation letters were sent to participants, explaining the purpose of the study and the nature of their participation. Signing the letters indicated consent to participate. An informed consent form was also provided, which included agreement to participate honestly, allow audio recording of interviews, and the right to withdraw at any time. Transcripts were returned to participants for confirmation. Privacy and confidentiality were assured, and

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interviews were conducted at times preferred by participants. Teachers were given ample time to answer questions and were allowed to use the language they were most comfortable with.

Results and Discussions

Research Question 1: How do multigrade teachers perceive the use of artificial intelligence in their teaching practice?

Teachers' Perceptions of the Use of Artificial Intelligence in Their Teaching Practices

Theme 1: AI as a Supportive Tool Rather Than a Replacement for Teachers

The findings revealed that multigrade teachers generally perceived artificial intelligence (AI) as a helpful tool in performing their teaching responsibilities. Two subthemes emerged from their responses: AI as a teaching assistant and the importance of teachers' professional judgment.

Under the first subtheme, participants described AI as a tool that helps them manage the demands of teaching learners from different grade levels. One participant stated, "I perceive artificial intelligence as a supportive tool that helps me manage the complexities of teaching multiple grade levels at once" (T1). Similarly, T4 described AI as a "practical helper, not a replacement," while T5 emphasized that "AI should only serve as an assistant." These statements show that teachers recognize the usefulness of AI in supporting their instructional responsibilities.

The second subtheme emphasized the importance of maintaining teachers' professional judgment when using AI. T7 explained that AI is a "helpful tool... should complement, not replace teacher's judgment." This indicates that participants recognize the need to evaluate AI-generated suggestions before applying them in the classroom. Although AI can provide instructional ideas and materials, teachers remain responsible for selecting appropriate teaching strategies and responding to learners' needs.

These findings suggest that multigrade teachers have a positive but careful attitude toward AI. They recognize its potential to support teaching while maintaining their responsibility for instructional decisions. However, these responses represent teachers' perceptions and do not independently establish that AI improves classroom instruction or learner performance.

This finding is consistent with Miao and Holmes (2023), who emphasized the importance of human judgment and responsibility in using generative AI in education. Similarly, UNESCO (2023) highlighted that AI should support rather than replace the role of teachers. These perspectives support the participants' belief that AI can assist instructional preparation while teachers remain responsible for ensuring that learning activities are appropriate and meaningful.

Research Question 2: How do they use AI in planning, teaching, assessing, or preparing learning materials for learners from different grade levels?

Use of AI in Planning, Teaching, Assessing, or Preparing Learning Materials for Learners from Different Grade Levels

Theme 2: AI as an Aid in Preparing Differentiated Instructional Materials

The findings showed that multigrade teachers reported using AI mainly for lesson planning, assessment preparation, and the development of learning materials for learners from different grade levels. Three subthemes emerged: differentiated lesson planning, preparation of learning materials and assessments, and adaptation of activities to learners' grade levels.

The first subtheme focused on differentiated lesson planning. Participants explained that AI helps them prepare activities that address the different learning needs of their pupils. T1 shared, "I use AI mainly during lesson preparation... differentiated lesson plans, worksheets, quizzes." Similarly, T3 described using AI to suggest a "simpler activity for Grade 3, more challenging for Grade 4." These responses indicate that teachers use AI to generate instructional ideas with different levels of difficulty.

The second subtheme involved the preparation of learning materials and assessments. T2 explained, "I use AI as a guide... picture-based activities for Kindergarten, reading/writing for Grade 1." Other participants reported using AI to prepare worksheets, reading passages, quizzes, and activities suited to different grade levels. These experiences show how teachers reported using AI to assist in preparing materials for multigrade classes.

The third subtheme concerned adapting AI-generated materials to learners' abilities and curriculum requirements. Participants described using AI to simplify explanations, prepare activities under common lesson themes, and adjust the difficulty of learning tasks. However, these practices were reported by teachers during interviews. Their actual implementation and quality in classroom instruction would need to be confirmed through classroom observations and examination of instructional materials.

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The findings revealed that multigrade teachers used AI to assist in preparing differentiated instructional materials, learning activities, and assessments suited to learners from different grade levels. Participants described how AI helped them generate worksheets, simplify lessons, and prepare activities according to learners' abilities and learning needs.

During the classroom observations, the researcher noted the use of differentiated learning materials and grade-appropriate activities in the teaching-learning process. These observed practices were consistent with the participants' descriptions of how they prepared instructional materials with the assistance of AI. However, the observations of these materials and activities did not, by themselves, establish that AI was responsible for their development or that they improved learner achievement.

These findings suggest that AI may support multigrade teachers in preparing instructional materials that address different learning needs. Nevertheless, generating differentiated materials does not automatically mean that learners receive effective differentiated instruction. The suitability of the materials still depends on how teachers review, modify, and use them during classroom activities.

This finding is supported by Miao and Holmes (2023), who discussed the potential of generative AI to assist teachers in developing educational materials and learning activities. Likewise, Zawacki-Richter et al. (2019) identified personalized and adaptive learning as important applications of AI in education. These studies support the possible instructional uses of AI while emphasizing the need to examine how AI-generated materials are applied in actual teaching.

Research Question 3: What benefits or positive experiences have they gained from using AI in multigrade teaching?

Benefits or Positive Experiences Gained from Using AI in Multigrade Teaching

Theme 3: Perceived Efficiency and Creativity in Instructional Preparation

The findings revealed that multigrade teachers experienced several perceived benefits from using AI, particularly in preparing lessons and instructional materials. Three subthemes emerged: reduced preparation time, generation of creative teaching ideas, and simplification of teaching-related tasks.

The first subtheme was reduced preparation time. Several participants reported that AI helped them complete instructional preparation more quickly. T1 identified "saving time… sparks creativity… personalize learning materials" as important benefits, while T4 explained that AI "cuts planning time drastically… suggests fresh ideas." These responses indicate that teachers perceived AI as useful in reducing the time and effort required to prepare lessons for different grade levels.

The second subtheme focused on creativity and idea generation. Participants explained that AI provides suggestions for developing activities when they experience difficulty preparing lessons. T3 stated, "AI helps me save time… gives me ideas when I have difficulty." Similarly, T2 shared that AI helps in becoming "more creative in designing activities." These responses suggest that teachers value AI as a source of additional instructional ideas.

The third subtheme involved the simplification of teaching-related tasks. T6 described AI as a tool that "simplifies process… less hassle, easy to do tasks." This experience indicates that some teachers find AI convenient when completing routine instructional preparation activities.

Taken together, these findings show that teachers perceived AI as beneficial in managing their preparation workload and generating teaching ideas. However, the reported time savings were based on participants' experiences rather than measured differences in preparation time. Likewise, the reported creativity and development of engaging activities do not necessarily establish improvements in learners' participation, understanding, or academic performance.

The findings are consistent with Luckin (2018), who emphasized the potential of artificial intelligence to assist teachers in routine instructional tasks while allowing them to focus on their professional responsibilities. Similarly, Miao and Holmes (2023) highlighted the potential of generative AI to support teachers in preparing instructional materials and designing learning activities. These studies support the participants' perceptions that AI can help reduce preparation time, simplify instructional tasks, and generate creative teaching ideas. However, these benefits were based on teachers' reported experiences and did not establish actual improvements in instructional effectiveness or learner achievement. Further research involving classroom observations and learner assessments is needed to determine whether these perceived benefits lead to measurable improvements in teaching and learning.

Research Question 4: What concerns, challenges, or difficulties have they encountered when using AI in their multigrade classrooms, and how do they address them?

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Challenges Encountered in Using AI

Theme 4: Technological, Instructional, and Contextual Challenges in AI Use

The findings revealed that multigrade teachers encountered different challenges when using AI in their teaching practices. Four subthemes emerged: limited internet connectivity, inaccurate or unsuitable AI-generated content, cultural mismatch and over-reliance, and differences in teachers' experiences.

The first subtheme was limited internet connectivity. T1 identified "lack of internet" as one of the challenges encountered when using AI. T2 also reported "limited internet access." These responses suggest that internet connectivity remains a concern for some multigrade teachers, particularly when AI tools require an online connection. Such limitations may affect teachers' ability to access AI during instructional preparation.

The second subtheme involved inaccurate or unsuitable AI-generated content. T2 stated that "AI-generated materials may be inaccurate," while T5 explained that "AI-generated info not always accurate or appropriate." Other participants reported encountering difficult vocabulary, incorrect information, and activities that did not match their learning objectives. These experiences show that teachers cannot automatically use AI-generated materials without checking their content and suitability for learners.

The third subtheme focused on cultural mismatch and the risk of over-reliance. T1 identified "risk of over reliance... cultural mismatch" among the challenges experienced. Similarly, T4 and T10 described difficulties involving generic or culturally unsuitable content. These findings indicate that AI-generated materials may not always reflect the local experiences, language, and learning needs of pupils. Teachers therefore need to review and adjust the materials before using them in multigrade classrooms.

However, T6's response does not provide enough information to explain why no difficulties were encountered. Possible explanations may include differences in the frequency of AI use, types of tasks performed, access to resources, or familiarity with AI tools. These possibilities cannot be confirmed from the available interview response. Further clarification from T6 would be needed to determine the reasons behind this experience.

This contrasting response is important because it prevents the findings from suggesting that all multigrade teachers experience the same difficulties. While several participants identified concerns about internet access, accuracy, and cultural suitability, at least one participant reported using AI without encountering problems. Thus, the findings reflect varied experiences rather than a uniform pattern of difficulties.

These findings are supported by Powell and Courchesne (2024), who identified limitations in AI-generated lesson plans that required teacher review. Miao and Holmes (2023) also emphasized the need for responsible AI use and human evaluation of AI-generated information. These studies reinforce the importance of checking accuracy, relevance, and suitability before incorporating AI-generated materials into instruction.

Research Question 5: What support, training, resources, or policies do they think are needed to help multigrade teachers use AI effectively and responsibly?

Support Needed to Help Multigrade Teachers Use AI Effectively and Responsibly

Theme 5: Strengthening Teachers' Skills, Resources, and Institutional Support for AI Integration

The findings revealed that multigrade teachers identified several forms of support needed to use AI effectively and responsibly. Four subthemes emerged: practical training, access to technological resources, ethical guidelines, and continuous professional and institutional support.

Participants emphasized the need for hands-on activities that would help them use AI in preparing lessons, assessments, and differentiated learning materials. T1 stated, "Practical training programs should be provided to help teachers maximize AI tools in lesson planning and assessment." Similarly, T2 explained, "Training should include strategies for adapting AI-generated materials to different grade levels and learning abilities." These responses indicate that teachers want training directly connected to their actual classroom responsibilities.

Participants also identified the need for reliable internet connectivity, available digital devices, and offline AI resources. T1 and T10 suggested offline resources for rural schools, while T2, T7, and T9 emphasized the importance of internet access and digital devices. These responses suggest that teachers consider technological resources necessary for consistent and accessible AI use.

Moreover, participants highlighted the need for guidance on checking AI-generated information, protecting data privacy, and ensuring academic integrity. T3, T4, T5, and T10 identified ethical considerations as important areas of support. These findings suggest that teachers recognize the need to use AI carefully, particularly when preparing learning materials and handling school-related information. They suggested technical assistance, peer collaboration, community awareness, and appropriate workload policies. These

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forms of support may help teachers share experiences, address difficulties, and develop responsible practices in using AI.

The findings indicate that multigrade teachers believe successful AI integration requires more than access to AI applications. They also recognize the importance of training, technological resources, clear guidelines, and continuous support. These are participants' identified needs, and the study does not establish whether providing such support would necessarily improve instructional performance.

This finding is consistent with UNESCO (2024), which emphasized the importance of developing teachers' AI competencies and supporting human-centered AI use in education. Miao and Holmes (2023) likewise highlighted the need for guidance and responsible practices in using generative AI. These perspectives support the participants' recommendations for practical training, reliable resources, and clear policies that help teachers use AI appropriately in multigrade teaching.

Ethical Considerations

The study observed ethical principles throughout the research process. Permission was secured from the appropriate educational authorities before data collection, and written informed consent was obtained from all participants after explaining the study's purpose, procedures, and voluntary nature. Participants' anonymity and confidentiality were protected through the use of codes or pseudonyms, while their right to withdraw at any stage without negative consequences was respected. All recordings, transcripts, and observation notes were securely stored and used solely for research purposes. Classroom observations were also conducted with due consideration for learners' privacy and welfare, ensuring that regular classroom activities were not disrupted.

Conclusion

Based on the findings of the study, the following conclusions were drawn: Multigrade teachers perceived artificial intelligence (AI) as a valuable support tool in lesson planning, preparation of differentiated learning materials, and assessment. They recognized its potential to reduce preparation time, simplify tasks, and generate creative instructional ideas while emphasizing that teachers' professional judgment, creativity, and personal interaction with learners remain essential. However, these benefits reflected teachers' reported experiences and perceptions rather than empirically demonstrated improvements in teaching effectiveness or learner achievement. The integration of AI in rural multigrade teaching was influenced by several challenges, particularly limited internet connectivity, inaccurate or inappropriate AI-generated content, cultural mismatches, and the risk of over-reliance. Although most participants reported these difficulties, one teacher experienced no challenges, indicating that experiences with AI varied among teachers. These findings highlighted the importance of critically evaluating and contextualizing AI-generated materials to ensure their suitability for learners from different grade levels. The study further revealed that effective and responsible AI integration requires practical training, reliable technological resources, offline AI tools, clear ethical guidelines, and continuous institutional support. These needs were particularly relevant to rural multigrade teachers who manage multiple grade levels while working with limited resources. The study contributed to understanding AI integration in rural multigrade education by highlighting how teachers perceived and utilized AI, the challenges they encountered, and the support they considered necessary for its responsible use. However, since the study involved only ten purposively selected multigrade teachers, the findings were context-specific and may not be transferable to other educational settings. Future research may involve a larger and more diverse group of teachers and examine actual classroom practices, instructional effectiveness, and learner outcomes to provide further evidence of AI's contribution to multigrade teaching.

Recommendations

Based on the findings, the study recommended that Multigrade teachers are encouraged to participate in hands-on training and professional development activities focused on the effective and responsible use of artificial intelligence (AI). These activities should emphasize writing effective prompts, preparing differentiated learning materials, checking the accuracy of AI-generated content, and aligning instructional activities with curriculum standards. Teachers are also encouraged to collaborate with colleagues, share AI-assisted teaching resources, and adapt generated materials to learners' grade levels, abilities, and cultural backgrounds. They should continue to exercise professional judgment and ensure that AI serves as a support tool rather than a replacement for effective teaching practices. School administrators are encouraged to initiate practical school-level interventions, such as conducting Learning Action Cell (LAC) sessions, organizing peer-sharing activities, and facilitating hands-on workshops on AI-assisted lesson planning and assessment preparation. They may also establish a shared collection of reviewed, curriculum-aligned learning materials

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that teachers can adapt for different grade levels. In schools with limited internet connectivity, administrators may promote the use of downloadable instructional resources and coordinate with stakeholders to improve access to available digital devices. These initiatives may help teachers address immediate challenges in integrating AI into multigrade instruction. The Department of Education (DepEd), through its division and district offices, may prioritize capacity-building programs that address the specific needs of rural multigrade teachers. These programs should include practical AI training, development of curriculum-aligned instructional resources, and technical assistance for responsible AI integration. DepEd officials may also consider improving internet connectivity, providing appropriate digital devices, and exploring offline AI tools for schools with limited technological resources. Furthermore, clear guidelines on data privacy, academic integrity, accuracy of AI-generated content, and ethical AI use should be strengthened to guide teachers in protecting learners and maintaining instructional quality. These broader interventions may help promote equitable access to AI resources, particularly in remote and underserved schools. Parents and community stakeholders are encouraged to support school initiatives promoting responsible AI use. School-led orientations and awareness activities may help them understand the benefits, limitations, and ethical considerations of AI in education. Through collaboration with school administrators and teachers, stakeholders may also assist in identifying available resources and supporting initiatives that improve access to technology in rural multigrade schools. Future researchers are encouraged to conduct similar studies involving a larger and more diverse group of multigrade teachers across different geographical locations. Further studies may examine how AI-generated materials are actually implemented during classroom instruction through systematic classroom observations, lesson plan analysis, and assessment of learner participation and performance. Quantitative or mixed-methods research may also be conducted to determine whether AI integration contributes to measurable improvements in instructional effectiveness, differentiated teaching practices, and learner achievement. These investigations may provide stronger evidence of AI's educational contributions beyond teachers' reported experiences and perceptions.

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