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Original Research Article

Teachers' Concerns in the Adoption of Large Language Models in Rural Classrooms

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Abstract: This study explores rural teachers' perspectives on integrating Large Language Models (LLMs) into their classrooms. Utilizing a qualitative research design with focus group discussions, the research identified key concerns among 16 teacher-participants from Mindanao State University in Tawi-Tawi, Philippines. Findings reveal significant anxieties related to equitable access to technology and adequate training, questions about the reliability and effectiveness of LLMs, challenges in aligning LLM outputs with curriculum and pedagogical goals, and considerable apprehension regarding data privacy and security. While teachers recognize LLMs' potential benefits, their reservations highlight the need for comprehensive support, including robust professional development and infrastructure improvements, to ensure responsible and ethical integration of this technology in rural educational settings. The study underscores the importance of addressing these challenges to facilitate the successful and equitable adoption of LLMs in education.

Keywords: Large Language Models, AI in education, rural classrooms.

INTRODUCTION

The emergence of Large Language Model (LLM) technologies represents a significant advancement in the field of education, as these innovative tools have the potential to enhance teaching and learning experiences. However, the successful adoption and integration of these technologies in the classroom hinge upon understanding and addressing the concerns of educators who are on the front lines of this technological shift (Bernabei *et al*., 2023; Ghimire & Edwards, 2024). Ideally, teachers, as primary facilitators of learning, must embrace these innovations; their attitudes substantially influence how effectively these tools are incorporated into teaching practices. Nonetheless, as technology evolves, it often outpaces educators' preparedness to adapt to new methodologies, leading to potential resistance.

With the increasing integration of LLMs in educational settings, it becomes crucial to understand the specific challenges faced by teachers. Teachers' acceptance or resistance to new technologies fundamentally influences how these tools are implemented in classrooms. Research on this topic not only provides insights into the pedagogical implications of integrating AI in education but also highlights the organizational and systemic changes necessary for effective technology implementation. Previous studies have emphasized various aspects of LLMs integration, focusing on their efficacy in enhancing personalized learning experiences, fostering student engagement, and supporting differentiated instruction (Abidi *et al*., 2024; Dehbozorgi *et al*., 2024; Hu *et al*., 2024; Rajik, 2024). Additionally, investigations into the ethical implications of using LLMs have raised concerns about bias in AI-generated content and its potential impact on students' critical thinking skills (Essel *et al*., 2024; Fang *et al*., 2024; Rane *et al*., 2023). Such findings underscore the necessity of aligning LLMs integration with pedagogical goals and ethical standards, cultivating an educational environment that values both innovation and student welfare.

Moreover, the existing literature illuminates the importance of leadership support, collaborative practice, and the development of school-wide strategies to foster a culture of innovation while simultaneously addressing educators' anxieties (Ghimire, 2024; He *et al*., 2024; Rajik, 2023; Wang, 2024). Key insights from previous research indicate that teachers' attitudes and concerns significantly affect the successful implementation of innovative technologies (Avidov-Ungar & Eshet-Alkalai, 2011; Stumbrienė, 2024). Studies reveal that apprehensions regarding the reliability of AI, the adequacy of training, and ethical considerations—

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particularly around student data privacy—can act as barriers to the effective adoption and utilization of LLM tools (Hadi *et al*., 2024; Ullah *et al*., 2024; Yan *et al*., 2024).

Despite the exploration of the benefits and potential applications of LLMs in education, many studies fall short of addressing the specific concerns that teachers have about this technology. Most research tends to focus on technological capabilities or curricular innovations without deeply delving into the pedagogical implications from the educators' perspective (e.g. Alto, 2023; Idris *et al*., 2024; Westerlund & Shcherbakov, 2024; Yin *et al*., 2024). Consequently, there is a lack of empirical data that captures the complexities of teachers' emotions, anxieties, and reservations regarding LLMs adoption. Additionally, much of the existing research has centered on urban contexts, overlooking rural areas where access to technology may differ.

To address these gaps, the current study aims to investigate the concerns of teachers regarding the adoption of LLMs in rural classrooms and explore the implications of these concerns for the effective implementation and integration of LLMs in teaching and learning practices. Conducting this research is urgent, given the rapid adoption of AI-driven technologies, which necessitates students—particularly in regions where teachers feel overwhelmed by technological change—to be prepared for a digital future. Therefore, understanding teachers' concerns regarding LLM adoption is essential to inform stakeholders and policymakers, enabling them to address these critical issues.

The Large Language Models

LLMs are advanced artificial intelligence systems designed to understand, generate, and manipulate human language (*What is a Large Language Model*, 2024). These models fall under the category of natural language processing (NLP) and have become increasingly significant in various applications across different fields, including education, customer service, content creation, and more. LLMs are built on deep learning architectures, particularly the transformer model, which was introduced by Vaswani *et al*., in 2017. This architecture allows these models to process and generate text based on the patterns it learns from vast datasets comprising written language.

To achieve their impressive capabilities, LLMs are trained using unsupervised learning techniques on extensive corpora of text data, which can include books, articles, websites, and other written forms of communication (*AI Demystified: Introduction to large language models, 2024*). During this training process, the model learns to predict the next word in a sequence based on the preceding words, which requires substantial computational power. This is often facilitated by powerful hardware such as Graphics Processing Units (GPUs) or Tensor Processing Units (TPUs). Following the initial training, fine-tuning can occur, allowing the model to focus on specific tasks and domains, thus enhancing its effectiveness for various applications.

The scale of LLMs is another defining characteristic, determined by the number of parameters they contain (Zhao *et al*., 2023). Parameters are the weights within the neural network that the model adjusts during training, and modern LLMs can possess billions or even trillions of these parameters. This vast number allows them to capture complex patterns and nuances in language, significantly improving their performance and versatility. Beyond mere understanding, LLMs can comprehend context due to their ability to process sequences of words and their relationships. Consequently, they can perform a broad range of language-related tasks, such as text generation, summarization, translation, question answering, sentiment analysis, and functioning as conversational agents. This versatility makes LLMs valuable tools across various applications, and they can also generalize knowledge from one task to another. Once trained on large datasets, they can be fine-tuned for specific tasks with relatively smaller datasets, making the deployment process more efficient.

LLMs in Teaching and Learning

LLMs have the potential to significantly transform teaching and learning processes by providing innovative tools and resources that enhance educational experiences (Idris *et al*., 2024). By adapting to individual learners' needs, LLMs can offer customized content and feedback, assess students' understanding of various topics, and generate tailored exercises or explanations (Eapen & Adhithyan, 2023). This capability allows for a more personalized learning experience that accommodates different learning styles and paces, making education more inclusive. Additionally, LLMs can act as virtual tutors, providing students with assistance outside of classroom hours (Lieb & Goel, 2024). They can answer questions, simplify complex concepts, and offer supplementary resources related to the subject matter (Hadi *et al*., 2024; Naveed *et al*., 2023). This on-demand support is especially beneficial in large classes, where individual attention from a teacher may be limited. Moreover, educators can leverage LLMs to create teaching materials such as lesson plans, quizzes, and learning activities (Attard & Dingli, 2024; Razafinirina *et al*., 2024). By streamlining preparation tasks, LLMs enable teachers to devote more time to delivering content and engaging with their students.

LLMs also facilitate the grading of open-ended responses by providing immediate feedback, which alleviates some of the burdens on educators and allows for timely evaluations of student work (Matelsky *et al*., 2023). By identifying areas where students struggle, LLMs enable targeted interventions that can help

improve learning outcomes (Busropan, 2024). For language learners, these models are invaluable, offering grammar and vocabulary exercises, conversational practice, and instant corrections or suggestions (Pan *et al*., 2023; Zhang & Huang, 2024). This support enhances fluency and builds confidence as students practice speaking and writing.

While LLMs offer numerous advantages in education, they also present several challenges and ethical implications. A significant concern is the risk of plagiarism and threats to academic integrity, as students might use LLMs to generate essays, reports, or other projects and submit them as their own original work (Perkins, 2023). Additionally, both learners and educators may become overly reliant on LLMs for assistance, which could diminish essential skills in critical thinking, problem-solving, and creativity (Jeon & Lee, 2023).

Another notable consideration is that LLMs produce responses based on their training data, which can sometimes lead to inaccurate or misleading information (Yang *et al*., 2024). This is particularly concerning in educational settings where precision and reliability are crucial. When students depend on these models for explanations or insights, they may be less inclined to seek out original sources or engage in critical evaluation of the information they receive. Furthermore, the use of LLMs raises ethical dilemmas related to data privacy, especially if student interactions with these systems are logged or analyzed. Concerns about potential misuse or breaches of data present additional challenges regarding student confidentiality and safety.

Method

This study employed a qualitative research design to explore the concerns of teachers regarding the adoption of LLMs in rural classrooms. Utilizing qualitative methods allows for an in-depth understanding of individuals' experiences, perceptions, and subjective realities within specific contexts (Lindgren *et al*., 2020). The study involved 16 participants who were selected through purposive sampling to ensure diversity in fields of specialization and teaching experience. These participants are faculty members from the College of Arts and Sciences at Mindanao State University in Tawi-Tawi, one of the universities in the Philippines situated in rural areas.

Data collection was conducted through semi-structured interviews, with an interview guide designed to encourage participants to elaborate on their concerns related to LLM adoption by sharing specific examples and experiences. To facilitate a deeper exploration of shared concerns and collective attitudes, the interviews were organized as focus group discussions (FGDs). Thematic analysis was then employed to analyze the data gathered from the FGDs, following a process that included familiarization, coding, theme development, and refinement. To enhance both the validity and reliability of the findings, member checking was utilized, allowing participants to review and confirm the interpretations made. Ethical considerations were rigorously upheld through the process of obtaining informed consent and ensuring the anonymity of all participants.

RESULTS AND DISCUSSION

The results are presented according to the primary objectives of this study. First, it reports the specific concerns teachers have regarding the adoption of Large Language Model technologies in the classrooms. Second, it discusses how these concerns impact teachers' willingness to adopt and integrate LLM technologies into their teaching practice.

Table 1: Concerns of teachers regarding the adoption of LLMs in the classrooms

Concerns	Quotes
1. Access and Equity	"Many of our students, even us teachers, don't have reliable internet at home." "I fear that those who are already disadvantaged might fall further behind."
2. Training and Support	"We need comprehensive training to understand how to effectively use these tools. It's challenging to harness their full potential for our students." "We're often left to navigate this new technology on our own."
3. Quality and Effectiveness	"I wonder if it will actually help students grasp concepts better or just give them quick answers without fostering deeper understanding." "Reliance on these tools might reduce students' motivation to think critically and engage deeply with the material." "Students might take the information generated by these models at face value without critical evaluation."
4. Content Relevance and Curriculum Alignment	"The material generated by AI often doesn't reflect the unique experiences and backgrounds of our students." "Teachers should provide learning resources that resonate with students' lives and experiences, rather than generic outputs that may not engage them effectively." "I'm not sure if this technology complements or distracts our curriculum."
5. Teaching Pedagogy	"It's crucial that we maintain a strong pedagogical foundation and ensure that technology enhances, rather than replaces, effective teaching practices."

Concerns	Quotes
6. Dependence on Technology	"Students might rely too heavily on them for writing and problem-solving." "It's important that we teach critical thinking and encourage creativity, not just have students become passive consumers of information."
7. Privacy and Data Security	"The thought of sensitive data being stored or analyzed by AI is concerning." "We need to ensure that any technology we use is safe and protects our students' privacy at all costs."

Access and Equity

Access to technology in rural areas remains a significant barrier to the effective use of large language model technologies in the classrooms (Kukulska-Hulme *et al*., 2023). Inadequate internet connectivity and a lack of devices not only hinder students' learning experiences but also diminish teachers' willingness to adopt these innovative tools. The challenges faced in rural regions stem from various factors, including geographical obstacles, insufficient investment in infrastructure, and lower population density, which discourage internet providers from expanding their services (Galperin, 2005; Malecki, 2023; Salemink *et al*., 2017).

Participants in the FGD were aware of the diverse socioeconomic backgrounds of their students, and the limited access to LLM technologies raises concerns about equity and fairness in the classroom. As one teacher noted, "Many of our students, even us teachers, don't have reliable internet at home," emphasizing the impact of technological disparities. Another teacher added, "Not all of our students have the same access to technology," further illustrating the inequities present not only in their institution but in the entire province. Consequently, most participants agreed that when some students have access to these resources while others do not, they may hesitate to incorporate LLMs, fearing that they will burden those without the same opportunities. This apprehension is heightened if LLMs are introduced without ensuring that all students have adequate access, as those without the technology may feel excluded and frustrated rather than motivated.

In addition, many participants raised concerns about the financial implications of adopting LLM tools, including the ongoing costs of software licenses, hardware upgrades, and maintenance. One teacher expressed, "I don't think that our school can afford not just the initial investment, but also the ongoing costs for maintenance and updates." This sentiment highlights the anxiety surrounding the financial viability of implementing LLM technologies in schools. Teachers emphasized that ensuring LLMs can be integrated into existing curricula without placing an undue financial burden on school is essential for long-term success. As another teacher pointed out, "If it's not sustainable in the long run, then it's useless," underscoring the necessity of addressing sustainability alongside initial implementation.

Moreover, teachers recognized that equitable access is fundamental to promoting an inclusive learning environment. They are particularly concerned that certain students may miss out on valuable learning experiences simply due to their financial incapability or location. One teacher expressed a worry, stating, "I fear that those who are already disadvantaged might fall further behind," highlighting the potential negative impact of unequal access. Moreover, teachers question the effectiveness of integrating LLMs in their instruction if not all students can participate. They worry that the use of these technologies may not enhance learning outcomes for the entire class, thus undermining the collaborative learning environments essential for fostering understanding. As another teacher expressed, "We're like setting our students up for frustration instead of empowerment," reinforcing the critical need for equitable access to technology.

Considering these concerns, participants exhibited a strong motivation to create inclusive classrooms where all students can thrive. They emphasize that ensuring equitable access to LLM technologies, along with addressing cost and sustainability issues, is vital for the successful implementation of these tools in education. By nurturing environments where every student has the opportunity to succeed, educators can better harness the potential of LLMs while addressing the existing disparities that could hinder their effectiveness in the classroom.

Training and Support

Another significant observation emerged regarding teachers' familiarity with LLMs. Most participants reported, although they are aware of ChatGPT, but they only became familiar with these tools through their involvement in this research, revealing that even as education evolves into the digital age, there are still teachers who have not been adequately equipped to keep pace with these advancements. This indicates a gap in professional development, at least in the context of rural classrooms, regarding innovative technologies in educational settings. Despite their unfamiliarity, the teachers demonstrated a remarkable willingness to adopt LLM technology. This readiness reflects their openness to innovation and a recognition of the potential benefits that LLMs can enhance educational experiences. Such enthusiasm signals a strong desire for professional growth and a commitment to improving student learning outcomes. However, this willingness to adopt LLMs is contingent upon adequate support and guidance, which many of the participants felt was lacking.

While some educators have independently explored LLMs and used them to aid in lesson preparations and classroom activities, they often do so without any formal training. As one participant noted, "We're often left to navigate this new technology on our own." This sentiment resonates with another participant's call for structured training, asserting, "We need comprehensive training to understand how to effectively use these tools. It's challenging to harness their full potential for our students." These perspectives highlight broader issues surrounding professional development and the necessity of structured support systems. Self-directed learning can be commendable, but it often leads to inefficiencies for teachers experimenting with unfamiliar technology without proper guidance. This absence of support may result in inconsistent implementation in the classroom, where some educators successfully integrate LLMs while others struggle without a framework for effective use.

Thus, there is an urgent need for intentional and structured training programs that equip teachers with the knowledge and skills required to leverage LLMs effectively in their teaching practices. This gap in the professional development, educational institutions can empower teachers to embrace innovative technologies, eventually enhancing their instructional capabilities. Furthermore, training and support significantly shape teachers' perceptions of LLMs' value in education. When educators receive professional development that emphasizes the benefits and applications of LLMs, they are more likely to view these tools as valuable resources in their teaching repertoire. Conversely, without proper support, educators may dismiss LLMs as unnecessary or overly complex, limiting their willingness to explore and utilize these resources in the classroom.

Therefore, the successful integration of LLMs in education requires a dual approach: raising a willingness among teachers to adopt new technologies while providing the necessary training and support to ensure effective implementation. This will enhance not only educators' instructional practices but also improve student engagement and learning outcomes.

Quality and Effectiveness

Quality and effectiveness of LLMs are another primary concern of the participants in this study. Many of them questioned whether these tools genuinely enhance students' comprehension or instead serve as shortcuts that undermine deeper learning. One participant stated, "I wonder if it will actually help students grasp concepts better or just give them quick answers without fostering deeper understanding." She noted that the ability of LLMs to deliver instant information might tempt students to rely on them for quick answers, eventually detracting from the cognitive processes essential for true understanding. She also acknowledged that critical thinking and deep engagement are integral to learning and feared that LLMs could diminish students' motivation to explore topics more thoroughly.

Teachers discussed how the ready access to information provided by LLMs could compromise the learning experience, which ideally involves grappling with complex ideas, questioning assumptions, and developing insights. There was a shared concern that students might prioritize efficiency over engagement, leading to a passive learning experience. Another teacher expressed, "Reliance on these tools might reduce students' motivation to think critically and engage deeply with the material." Majority of the teachers during the FGD agreed that one of their roles as teachers in this digital innovation is to strive for a balance between utilizing technology as a resource and encouraging student autonomy, aiming to promote independent thought.

Moreover, the effectiveness of LLMs in facilitating understanding was debated among the participants. They expressed worries that excessive reliance on these tools might result in missed opportunities for active engagement and a deeper exploration of subjects. They recognized that dependence on LLMs could inadvertently reduce students' motivation to think critically and cultivate a sense of responsibility for their learning. As a result, they emphasized the importance of creating an environment where students are encouraged to question, analyze, and engage deeply with the material rather than passively receiving answers. One participant noted, "Students might take the information generated by these models at face value without critical evaluation." This statement stresses the need for critical thinking skills in an era of AI-assisted learning.

Concerns also extended to the potential risks of misuse. Teachers were apprehensive about students employing LLMs for assignments in ways that could lead to plagiarism or overly simplistic responses to complex prompts. This raised challenges about how to effectively integrate these technologies while maintaining academic standards and ensuring authenticity in student work.

Furthermore, the participants emphasized a fundamental issue concerning the accuracy and trustworthiness of information provided by LLMs. Teachers felt responsible for ensuring that students receive quality educational content that reflects sound knowledge and critical thinking. They articulated worries that if an LLM generates incorrect, misleading, or biased information, it could undermine learning and erode trust in the educational process. The variability in response quality was another key concern, as LLMs occasionally produce responses lacking context or appropriateness for educational settings, potentially leading to misunderstandings or misinterpretations in detailed assignments and critical discussions.

Lastly, the participants voiced apprehensions about the potential biases in LLM outputs. They pointed out that, since these models are often trained on data from the internet, they could inadvertently reflect societal biases, stereotypes, and misinformation. This concern was particularly critical in discussions surrounding social studies, literature, and ethics, where context and nuanced perspectives are essential for achieving accurate understanding.

Content Relevance and Curriculum Alignment

Other significant concerns arise regarding the adoption of LLMs in the classroom, particularly surrounding content relevance and curriculum alignment. One primary issue the participants expressed is the quality of the content generated by these models. Teachers were not sure if LLMs could consistently produce material that is pertinent and applicable for their students. They stressed the potential risks associated with inaccurate or inappropriate information, emphasizing that such content could misinform students, lead to misunderstandings, and disrupt the learning process. This concern is particularly vital in today's educational landscape, where misinformation can spread rapidly through various channels, making it crucial for educators to rely on trustworthy and accurate resources. As one teacher noted, "The material generated by AI often doesn't reflect the unique experiences and backgrounds of our students." This statement underlined the worry that LLMs may not adequately capture the diverse realities of their classrooms, and as a result, content generated by these models might fail to resonate with students from varied cultural, social, and economic backgrounds. Teachers recognized that understanding students' uniqueness is essential for raising an inclusive environment that encourages engagement and participation.

Additionally, teachers were concerned about the contextual understanding of LLMs; they worried that these models might struggle to grasp the unique context of their subjects or adequately address the specific needs of their classrooms. For instance, the linguistic and cultural complexities that students bring to the classroom play a critical role in their learning experiences. Consequently, educators feared that the responses generated by LLMs could be overly generalized, overlooking important tones that are essential for resonating with diverse student learning experiences. This lack of contextual awareness could hinder students' ability to connect the material to their lives, thereby impacting their engagement and motivation to learn. Another teacher emphasized the importance of content relevance, stating, "Teachers should provide learning resources that resonate with students' lives and experiences, rather than generic outputs that may not engage them effectively." This stresses a broader pedagogical principle that reinforcing connections between academic content and students' lived experiences enhances learning outcomes and promotes a deeper understanding of the material.

Furthermore, teachers pointed out that curriculum alignment presented another substantial challenge. They reiterated the amount of effort they invested in ensuring that their lessons adhered to established educational standards and learning objectives. Teachers worried that if LLMs failed to generate content that met these criteria, they might hesitate to incorporate these tools into their teaching practices. This concern is heightened by the increasing accountability that educators face in meeting standardized tests and educational benchmarks. Moreover, they discussed the dynamic nature of curriculum, which requires flexibility and adaptability, as they often need to modify their lessons based on student progress and changes in educational guidelines. The pace of educational reform can be rapid, and teachers must remain agile to ensure their instruction is relevant and effective. One teacher remarked, "I'm not sure if this technology complements or distracts our curriculum," which reflect the uncertainty many feel about the integration of LLMs. This hesitation illustrates a broader concern about maintaining the integrity and purpose of the curriculum while attempting to incorporate innovative technologies that promise to enhance learning.

Teaching Pedagogy

The discourse surrounding the integration of LLM technologies in education reveals a growing concern among teachers regarding how these tools align with their pedagogical beliefs and methods. The participants emphasized that effective teaching hinges on student engagement, critical thinking, and the promotion of a collaborative learning atmosphere. Teachers expressed doubt about whether LLMs can genuinely support or undermine these essential pedagogical principles. One participant stated, "It's crucial that we maintain a strong pedagogical foundation and ensure that technology enhances, rather than replaces, effective teaching practices." It emphasizes the importance of preserving established educational principles while integrating technology in teaching.

One prevalent concern highlighted by teachers revolves around the interactive aspect of learning. Traditional teaching methods prioritize active participation and dialogue between educators and students. However, there is apprehension that dependence on LLMs could lead to a more passive educational experience, decreasing valuable opportunities for meaningful interactions. Educators fear that students might accept LLM-generated content without the critical examination that traditional pedagogy encourages, potentially stifling a culture of inquiry and critical thinking that is imperative for student development.

Additionally, teachers stress the significance of personalized instruction tailored to the unique needs of each student. Given the diverse learning styles and preferences present in modern classrooms, there is a worry that LLMs, which tend to generate generalized responses, may not meet this critical pedagogical requirement. Another participant articulated, "I want to provide each student with resources that meet them where they are, not just what an algorithm thinks they need." This highlights the fundamental challenge of reconciling the standardized outputs from LLMs with the individualized instructional approaches that effective teaching demands.

Another issue pertains to the evolving role of the teacher as a facilitator of learning. Teachers saw themselves not just as knowledge transmitters but as guides promoting critical discussions and encouraging problem-solving skills. There was a palpable concern that the introduction of LLMs could dilute their role. Teachers questioned how to balance the use of AI-generated content while preserving their authority and expertise in the classroom. The fear was that students may become overly reliant on LLMs for information, which could undermine the teacher's standing as a mentor and intellectual leader, potentially shifting the classroom dynamic away from collaborative dialogue.

Moreover, the ethical implications of implementing LLMs in educational settings raise significant concerns among teachers. They are increasingly cognizant of the biases that may be inherent in these models due to the vast datasets used for training, which can include problematic content. This awareness prompts questions regarding their responsibility to present materials that are unbiased and adhere to ethical educational standards. Many educators worry that without proper oversight, LLMs could perpetuate stereotypes or offer skewed perspectives, contradicting their values of social justice and equity in education.

Dependence on Technology

Participants feared that relying heavily on LLMs could diminish students' critical thinking and problem-solving skills. Teachers recognized that the constant availability of answers and the facilitation of content creation could lead students to disengage from the cognitive processes that are essential for deep learning. As students become accustomed to receiving immediate responses and information from LLMs, they might not develop the necessary skills to analyze complex problems, engage in inquiry, or evaluate sources critically. This reliance on LLMs for quick solutions might discourage students from grappling with challenging concepts and forming their own reasoned arguments, as one teacher asserted, “students might rely too heavily on them for writing and problem-solving.” Such disengagement from the learning process could eventually encourage a culture of passivity, where students seek to find quick answers rather than engaging meaningfully with learning materials.

Additionally, teachers stressed that the emphasis on instant gratification provided by LLMs may contribute to a decline in persistence and resilience among students. In an era where problem-solving often requires trial and error, students may find it easier to defer to LLMs for solutions rather than pushing through difficult tasks and learning from mistakes. This shift threatens to undermine essential life skills, such as perseverance and the ability to learn from failure, which are critical not only in academic settings but also in real-world scenarios. As another teacher expressed, “I fear that when students encounter challenges, they’ll just turn to technology instead of developing the grit to tackle problems on their own.” This concern reflects a larger apprehension that students may lose the ability to navigate obstacles independently, which is vital for their growth and future success.

Moreover, the participants were in consensus that the integration of LLMs may inadvertently create a reliance on surface-level understanding rather than comprehensive learning. When students use these technologies to generate quick summaries or answers, they may miss the opportunity to engage with the material deeply and make meaningful connections across various subject areas. For instance, instead of synthesizing information from multiple sources or discussing differing perspectives, students may settle for a simplified output provided by an LLM, which can hinder their ability to construct nuanced understandings of complex topics. The teachers asserted that the richness of learning often comes from discussions, debates, and the collaborative construction of knowledge—experiences that may be undermined by an over-reliance on technology. As one teacher noted, “It's important that we teach critical thinking and encourage creativity, not just have students become passive consumers of information.” This sentiment highlights the critical role that active engagement plays in raising a robust educational experience.

Furthermore, teachers worried that too much dependence on these technologies can lead to concerns about academic integrity, as students may lean towards using AI-generated content without proper attribution or understanding, thereby blurring the lines between original thought and digital assistance. They also expressed that students may not fully grasp the importance of intellectual property rights and ethical academic writing practices, leading them to engage in plagiarism inadvertently or purposely. This raises questions about the role of educators in instilling strong ethical values in students and guiding them in directing the complexities of digital content responsibly. As the participants looked to the future, they stood firm that teachers must consider how to harness LLMs productively while reinforcing the importance of

originality and critical engagement with knowledge, ensuring that students remain active participants in their learning journeys.

Privacy and Data Security

The integration of LLMs in education undeniably offers significant advantages, yet it also raises substantial concerns regarding privacy and data security. Many participants expressed anxiety about their schools' ability to counter the rising prevalence of cyberattacks due to insufficient infrastructure and resources, with one educator stating, "The thought of sensitive data being stored or analyzed by AI is concerning." This vulnerability could expose sensitive student information, featuring the urgent need for robust cybersecurity measures in educational institutions. To mitigate these risks, educating students about privacy and data security is essential; providing knowledge on recognizing phishing attempts, understanding the importance of strong passwords, and effectively utilizing privacy settings can significantly improve their online safety. As one participant emphasized, "We need to ensure that any technology we use is safe and protects our students' privacy at all costs."

However, implementing these educational initiatives and security measures can have serious financial implications, straining already limited school budgets and diverting vital resources away from educational priorities. Additionally, schools must consider the balance between incorporating innovative technologies like LLMs and maintaining stringent data protection protocols. This balance is critical for advocating a safe learning environment where both educators and students can thrive while mitigating risks associated with emerging technologies.

CONCLUSION AND SUGGESTIONS

This study investigated rural teachers' concerns regarding the integration of Large Language Models (LLMs) in their classrooms. The findings reveal significant anxieties surrounding access and equity, the need for comprehensive training and support, concerns about the quality and effectiveness of LLMs, issues of content relevance and curriculum alignment, the impact on teaching pedagogy, and the critical need to address privacy and data security. While teachers acknowledge the potential benefits of LLMs for personalized learning and enhanced efficiency, their apprehension stems from a lack of adequate infrastructure, insufficient professional development, and ethical concerns regarding bias, plagiarism, and the potential for over-reliance on these tools. The research highlights the urgent need for policymakers and educational institutions to prioritize equitable access to technology, provide robust professional development opportunities, and foster a culture of responsible technology use that balances innovation with the preservation of effective teaching practices and the safeguarding of student data. Future research should focus on developing effective strategies to address these concerns and support the successful and ethical integration of LLMs in diverse educational settings.

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