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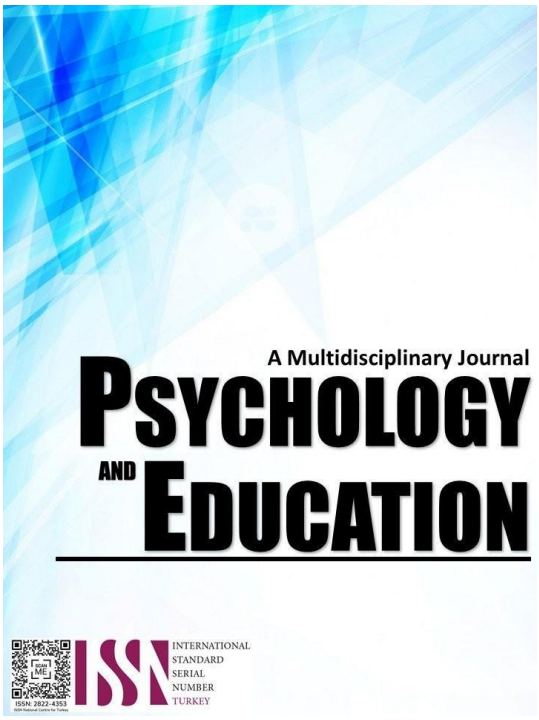

PSYCHOLOGY AND EDUCATION: A MULTIDISCIPLINARY JOURNAL

Volume: 25
Issue 7
Pages: 948-958
Document ID: 2024PEMJ2404
DOI: 10.5281/zenodo.13833996
Manuscript Accepted: 09-10-2024

Psych Educ, 2024, **25**(7): 948-958, Document ID:2024PEMJ2404, doi:10.5281/zenodo.10815592, ISSN 2822-4353

Research Article

The Role of Artificial Intelligence in Shaping Effective Teaching Strategies: A Multiple Case Study of Filipino and Indonesian Teachers

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Abstract

Artificial Intelligence is considered a technological platform that impacts the teaching and learning process, particularly on its effect on assessment and grading and influence on graduates' future careers. However, the use of AI in the field of education, specifically on effective teaching strategies and classroom management poses issues experienced by teachers in the field. The increased use of AI in the classroom faces significant challenges because of insufficient resources for complete implementation. Nevertheless, researchers ground the argument in the gap and observed the need to find out more in the context of the experiences, coping mechanisms, and insights of Filipino and Indonesian teachers regarding the role of AI in shaping effective teaching strategies to improve student learning outcomes within the Philippine and Indonesian education system. Through this study initiative, an international university collaboration is established to conduct a multiple case study using qualitative interviews to gather essential information. Face-to-face interviews and online interviews were conducted with the participants with the guide of a given research questionnaire. Thus, semi-structured interviews are conducted with three Filipino and two Indonesian teachers as participants from private schools to gather their experiences in implementing and using AI-driven teaching strategies in their classrooms, forming the basis of this multiple case study. The researchers then proceeded to analyze the gathered information using descriptive-case analysis, within-case analysis, and cross-case analysis. In the concluding part of this study, from technical obstacles to systemic issues of digital infrastructure and technological inequality, these complexities underscore the need for concerted efforts to address barriers to AI-driven education. Despite these challenges, teachers demonstrate resilience and resourcefulness in navigating technological hurdles and promoting student engagement. By investing in professional development and fostering collaboration, educators unlock the full potential of AI in education and create inclusive learning environments that empower all students to succeed in the digital age.

Keywords: *artificial intelligence, AI-driven teaching strategies, multiple case study, Filipino teachers, Indonesian teachers*

Introduction

Artificial Intelligence (AI) is expected to emerge in the education sector globally which has the potential to improve students' performance, and increase their interest and motivation toward learning. AI is considered as a technological platform that impacts the teaching and learning process particularly on its effect on assessment and grading, and influence on graduates' future careers. However, the use of AI in the field of education, specifically on effective teaching strategies and classroom management poses issues experienced by teachers in the field. The use of AI in the classroom is quite challenging and teachers do not have enough resources to implement and embrace artificial intelligence (Slimi, 2023). In the positive lens, AI like Chat GPT can streamline administrative tasks, freeing up teachers' time and resources to focus on student learning (Poola, 2023).

In the United States, a survey conducted in Hart Research, Washington, DC reported that 76% of teachers never use AI software for teaching strategies. However, the survey highlighted that when teachers use AI tools in their own work, they are most likely to use AI for planning and preparation, communication, and individualized instruction (Molyneux & Bositis, 2023). In the advent of learning in Singapore, teachers expressed disappointment that there is also not enough conclusive evidence of the promotion of AI-based educational tools such as Mentimeter, ClassPoint, and Flipgrid in teaching strategies (Teng, 2021). Meanwhile, in Indonesia, artificial intelligence (AI) has made significant advancements and contributions in many ways. AI research in the midst of the pandemic focuses on delivering prompt responses to the unprecedented situation and strives to immediately collect and process data (Utami, 2020). For instance, a literature review from the Universitas Pendidikan Indonesia titled The Use of AI in Education (Literature Review) authored by Nuryadin (2023) concluded that the use of AI in education in Indonesia has experienced significant development in recent years. Subsequently, various efforts have been made to exploit the potential of AI in increasing learning effectiveness, personalizing learning experiences, and developing adaptive curricula.

In the Philippines, a case study conducted evinced that Filipino teachers cannot perform and use AI effectively for teaching strategies. Though Filipino teachers and students are adaptive and open to changes, they still need support from the institution (Bacolod, 2020). Despite the prime opportunity of using AI technology in classroom management, Filipino educators viewed AI integration in education as a double-edged sword, presenting both advantages and challenges to the existing educational framework (Estrellado & Miranda, 2023).

Continuing with this line of thought, as interest in leveraging Artificial Intelligence (AI) to enhance the existing educational set up, the emergence of a new framework design titled "Framework of Artificial Intelligence Learning Platform for Education" (Thongprasit & Wannapiroon, 2022) presented following components: user, learning platform, intelligent technology, and curriculum, as seen in the study conducted by Artuso and Graf (2020). Adding to this narrative, this framework concluded that educational institutions need to learn, adapt, and develop AI technology because it is an important tool for teaching and learning. Thus, it was participated in by 15 experts to carry out an evaluation and it was found to be at a very good level (Mean = 4.38, S.D. = 0.67). Building upon this perspective, a mixed-methods approach investigates the instructional strategies of using Generative AI in education (Romaioli, 2022) titled "Empowering Education through Generative AI: Innovative Instructional Strategies for Tomorrow's Learners," where findings revealed the ability of generative AI to adapt content delivery has been identified as a significant advantage.

Advancing to the subsequent segment, it is mentioned that indeed educational institutions need to embrace AI technology as an important tool for teaching and learning (Thongprasit & Wannapiroon, 2022), and it actually helps teachers develop more effective teaching lessons in the classroom (Mollick et al., 2023).

However, researchers ground the argument in the gap observed while reviewing recently published literature. Researchers begin to look and argue the context of the experiences, coping mechanisms, and insights of Filipino and Indonesian teachers regarding the role of AI in shaping effective teaching strategies to improve student learning outcomes within the Philippine and Indonesian education system. Turning to the researchers, it sees this concern as an opportunity to explore more regarding the experiences of two nations.

Relative to this concern, AI will be truly a significant tool in the school, community, and the world. With its principles, collaborative and social learning not just for cognition but also for the whole human skill set (Cardona, 2023), AI could help teachers with recommendations that are tuned to their situation and their ways of practicing teaching and support with adapting found materials to fit their exact classroom needs. Notably, Tai (2020) cited that AI impelled a huge social change without directly complicating human relationships. In her journal, it is going to change not only the way we do things but also how we relate to others, and what we know about ourselves. In light of this, the use of AI in education shines a light on the issue of pedagogy, accessibility, sustainability, and the core foundations of education, which need to be reviewed and reshaped to accelerate the progress towards the achievement of SDG 4 (Walia, 2023).

Research Questions

The main purpose of this qualitative study is to explore the experiences of Filipino and Indonesian teachers in private schools in implementing AI-driven teaching strategies in their classrooms using multiple case studies. The researchers aimed to answer the following research questions:

1. What are the experiences of Filipino and Indonesian teachers in implementing AI-driven teaching strategies in their classrooms?
2. What coping mechanisms do they employ to overcome associated challenges in implementing these AI-driven teaching strategies?
3. What insights do Filipino and Indonesian teachers offer regarding the potential role of AI in shaping effective teaching strategies to improve student learning outcomes within the Philippine and Indonesian education system?
4. What explains the similarities and differences of the experiences between Filipino and Indonesian teachers?

Literature Review

Artificial Intelligence in Education

Artificial Intelligence (AI) holds the promise of solving major educational challenges, enhancing teaching methods, and driving progress toward SDG 4. Yet, the fast pace of technological advancements introduces risks and challenges that have surpassed the speed of policy discussions and regulatory measures. UNESCO is dedicated to helping Member States leverage AI's potential to achieve the goals of the Education 2030 Agenda, while ensuring its use in education aligns with the fundamental principles of inclusion and equity (Miao, 2023).

It can enhance education by automating administrative tasks, allowing teachers to dedicate more time to instruction and personalized student engagement, complementing rather than replacing human-led teaching. Therefore, AI solutions in education should be developed with collaboration and a focus on equity, addressing demographic disparities and ensuring access for all students. In addition to utilizing AI tools in education, it is essential to teach students about AI, including how to create AI technologies and recognize the associated risks (Milberg, 2024).

Moreover, Hwang (2020) refers to AIED as the use of AI (Artificial Intelligence) technologies or application programs in educational settings to facilitate teaching, learning, or decision making. With the help of AI technologies, which simulate human intelligence to make inferences, judgments, or predictions, computer systems can provide personalized guidance, support, or feedback to students as well as assisting teachers or policymakers in making decisions. Although AIED has been identified as the primary research focus in the field of computers and education, the interdisciplinary nature of AIED presents a unique challenge for researchers with different

disciplinary backgrounds.

The AI in Education (AIEd) community is increasingly examining the effects of AI systems on online education. Roll and Wylie (2016), for instance, advocate for greater integration of AI technologies in facilitating communication between students and instructors, as well as their use in educational contexts beyond traditional schooling. Meanwhile, Zawacki-Richter and colleagues (2019) conducted a systematic review of AIEd research from 2007 to 2018, highlighting a notable lack of critical reflection on the ethical implications and risks of AI systems for learner–instructor interaction. Popenici and Kerr (2017) explored the broader impact of AI on teaching and learning, identifying potential conflicts, such as privacy concerns, shifts in power dynamics, and increased control over students. These studies collectively emphasize the need for further research into how AI systems affect learner–instructor relationships, to better understand the gaps, challenges, and barriers that may hinder AI from realizing its full potential in education.

Indeed learner–instructor interaction is undeniably a key component of successful online learning. Kang and Im (2013) demonstrated that elements such as communication, support, and instructor presence significantly enhance student satisfaction and improve learning outcomes. Additionally, this interaction influences students' self-esteem, motivation to learn, and confidence in tackling new challenges (Laura & Chapman, 2009). However, there is limited understanding of how the introduction of AI systems into online learning will impact this crucial dynamic. Guilherme (2019, p. 7) predicted that AI technologies would "have a deep impact in the classroom, changing the relationship between teacher and student." As Felix (2020) suggests, further research is necessary to explore how different AI systems influence learner–instructor interaction in online education and to uncover the underlying reasons behind these effects.

Methodology

Research Design

This study used a qualitative multiple-case study as a research design. The case study was the approach used in the qualitative research used in study since this study identifies the experiences, mechanisms, insights, and the similarities and differences of the experiences between Filipino and Indonesian teachers. This offers rich perspectives and insights that can lead to an in-depth understanding of variables, issues, and problems (Crowe et al., 2011). A qualitative case study is a research methodology that helps explore a phenomenon within some context through various data sources. It explores through various lenses to reveal multiple facets of the phenomenon (Baxter & Jack, 2008). This ensures that the issue is not explored through one lens but rather a variety of lenses, allowing for multiple facets of the phenomenon to be revealed and understood.

This study used purposeful sampling in case study research (Baskarada, 2014) to choose the best participants who would give the correct information. A maximum variation sampling was used to select participants for this study. According to Zach (2020), maximum variation sampling is a method in which researchers collect data from the widest range of perspectives possible about a topic. Additionally, using the maximum variation sampling method, the researchers select a small number of cases that maximize the diversity relevant to the research question (Elmusharaf, 2016). According to Yin, a multiple-case study includes two or more cases or replications across the cases to investigate the same phenomena. To write a multiple-case study, a summary of individual cases should be reported, and researchers need to draw cross-case conclusions and form a cross-case report (Yin, 2017). With evidence from multiple cases, researchers may have generalizable findings and develop theories (Lewis-Beck et al., 2003). Therefore, the research participants in this study were Filipino teachers living in Davao City, Philippines and collaborating with Indonesian teachers in Bandung. There were a total of six (5) informants who had undergone in-depth interviews (IDIs). Three (3) Filipino teachers and (2) Indonesian educators.

Participants

With evidence from multiple cases, researchers may have generalizable findings and develop theories (Lewis-Beck et al., 2003). Therefore, the research participants in this study were Filipino teachers living in Davao City, Philippines and collaborating with Indonesian teachers in Bandung. There were a total of six (5) informants who had undergone in-depth interviews (IDIs). Three (3) Filipino teachers and (2) Indonesian educators.

Instrument

In this multiple case - qualitative research case study was conducted by the researchers through an interview to gather essential information for the study. Face-to-face interviews and online interviews were conducted with the participants with the guide of a given research questionnaire. The participants were initially expected to express themselves more effectively through written responses in the first data collection phase, while the researchers identified topics requiring further clarification during the subsequent voluntary face-to-face and online interviews. Additionally, the researchers used an interview guide validated by Dr. Erick Baloran. This was the list of questions asked during the interview. The order of the questions and the level and degree varied based on the type of interview conducted. The researchers asked questions about the experiences of Filipino and Indonesian teachers in implementing AI-driven teaching strategies in their classrooms, coping mechanisms they employ to overcome associated challenges in implementing these AI-driven teaching strategies, insights do Filipino and Indonesian teachers offer regarding the potential role of AI in shaping effective teaching strategies to improve student learning outcomes within the Philippine and Indonesian education system? and explains the similarities and differences of the experiences between Filipino and Indonesian teachers. The researchers practiced extreme caution by using open-ended questions.

Procedure

To smoothly facilitate the data collected and process of this study, a qualitative research case study was conducted by the researchers through an interview to gather essential information for the study. Face-to-face interviews and online interviews were conducted with the participants with the guide of a given research questionnaire. The participants were initially expected to express themselves more effectively through written responses in the first data collection phase, while the researchers identified topics requiring further clarification during the subsequent voluntary face-to-face and online interviews.

Thus, interviews with a semi-structured format were used in which the respondents were asked of their experiences of Filipino and Indonesian teachers among private schools in implementing AI-driven teaching strategies in their classrooms using multiple case studies. The researchers then proceeded to analyze the gathered information using descriptive-case analysis, within-case analysis, and cross-case analysis, as described by Rashid et al. (2019). Within-case analysis, a detailed exploration of a single case as an independent entity, aiming for a thorough understanding and description of the studied phenomenon is involved, as defined by Mills et al. (2010). Alongside within-case analysis, the researchers also employed cross-case analysis, which involves examining themes, similarities, and differences across multiple cases, as noted by Mathison (2004).

Later, the data were coded by the researchers and collated into themes. Through these analytical approaches, the researchers uncovered various aspects such as internet connectivity, technological issues including slow processing speeds and software crashes, disruptive impact, and classroom dynamics that affect instructional continuity, digital accessibility barriers in an online learning environment, the impact of AI-prompted learning and interactive features on students' learning, and supportive learning environment of Filipino and Indonesian teachers.

Ethical Considerations

Observing ethical standards in research is essential. At the core, this helped shape the true aims of the study, such as knowledge, truth, and avoidance of error and promoted values essential to collaborative work, such as trust, accountability, mutual respect, and fairness. To ensure ethical research, this study followed and respected the principles of research ethics from the Belmont Report (2010). These principles respect a person's autonomy, beneficence and non-maleficence, justice, informed consent, confidentiality and data protection, integrity, and conflict of interest.

Results and Discussion

Table 1. *Respondents' responses*

Themes:	*Case 1 Filipino Teacher*	*Case 2 Filipino Teacher*	*Case 3 Filipino Teacher*	*Case 4 Indonesia N Teacher*	*Case 5 Indonesian Teacher*
Poor Internet	/	/	/	/	/
Connectivity	/	/	/	/	/
Technological issues:					
a. slow processing speeds	/	/	/	/	/
b. software crashes	/	/	/	/	/
Disruptive impact:					
a. Uncontrollable classroom environment	/	/		/	/
b. Limited students' participation	/	/		/	
Classroom dynamics:					
a. Enhance students' engagement	/	/	/	/	/
b. Low digital competence				/	/
Digital Accessibility:					
a. accessible tools	/	/	/		
b. limited use of internet-based platforms	/		/		/
Tool For Effective Learning	/		/	/	
Supportive Learning Environment:					
a. Technical support system	/	/	/	/	/
b. Collaborative support system	/	/	/	/	/
c.Administrative support system				/	/

The narratives of the respondents in this study illustrate the significant impact of poor internet connectivity on the integration of AI-driven educational techniques. Teachers from both the Philippines and Indonesia highlighted various challenges, such as slow devices, unreliable signals, and limited access to online materials, particularly in rural areas.

These connectivity issues not only disrupt lesson delivery but also hinder the potential benefits of AI in education, increasing inequalities in learning.

Poor Internet Connectivity

"For me since I mentioned that I am using aral-links sometimes the problem is with the laptop because it would lag or have some delay and then for the others such as egg box investigation because it needs internet connection so the problem is with D internet connection or sometimes I don't have a wifi so I have to use my phone but I don't have a load or the signal is not good so I have to find some spots." – C1, FT1

Teachers highlighted the pervasiveness of poor internet connectivity in their stories and its tremendous impact on the integration of educational techniques driven by artificial intelligence. This is exhibited in a variety of ways including slow devices, signals that are not reliable as well as limited access to online materials especially in rural areas. As a result, teachers must overcome many difficulties to make sure that they deliver lessons smoothly and effectively using AI technology.

" I think the number one factor is internet connectivity since you need the internet when using the simulation" C3, FT3

" I think the challenges for me are the internet connectivity since we don't have wi-fi in each classroom, I should bring my cell phone to connect my data to my laptop for it to work. Also, there are some classrooms with slow signal that eventhough you have the data, it will not still be possible because of the signal." C3, FT3

The consequences of poor connections extend beyond individual classrooms to mirror wider systemic issues regarding digital infrastructure and access to technology. Thus, it is important for these problems to be tackled so that all children can get a fair education. With unreliable internet services, students cannot enjoy the advantages that come with AI-based education thus increasing inequalities in learning.

"So one limitation that I for see in implementing Ai in our country phillippines is the limited access to technology and the internet especially when you are in rural areas where the signal is not good if internet connectivity in rural areas would be improved and access to technology would be provided the use Ai driven education in the phillippines will be expanded" C1, FT1

Consequently, one needs concerted efforts towards improving internet infrastructure and widening technological accessibility particularly in disadvantaged communities. Another possible option for instructing with low connectivity may involve educators thinking about other methods such as offline resources or asynchronous learning opportunities.

"Connectivity Issues: Not all students have reliable internet at home, so some can't access online quizzes." C4, IT1

"Some students lack reliable internet or devices at home, limiting their access to online exercises." C5,IT2

In conclusion, unlocking the complete potential of AI education depends largely on addressing poor connections.

Technological Issues

"Sometimes the Ai driven technology is lagging so it affects the momentum or the flow of the teaching process" C2, FT2

The conversation concerning the difficulties of incorporating AI into learning technology can be analyzed from several angles and requires the input of different players. This discussion can be better understood using the following excerpts.

"For me since I mentioned that I am using aral-links sometimes the problem is with the laptop because it would lag or have some delay and then for the others such as egg box investigation because it needs internet connection so the problem is with D internet connection or sometimes I don't have a wifi so I have to use my phone but I don't have a load or the signal is not good so I have to find some spots." C1, FT1

"So far there is none but with D coping mechanism (INUDIBLE) in the issue with the laptop having delays" C1, FT1

Dependability and utility are indispensable considerations for AI-oriented technology. Lagging devices, incompatible laptops, constant internet connectivity for AI-facilitated tasks are recurring matters faced by teachers. These issues greatly hinder smooth lessons as well as the overall success of incorporating AI in education.

"The concerns I have regarding the integration of AI, first the defendants of the students in it, the compatibility in laptops because some Ai driven teaching activities are not fully functioning in any laptops the internet because sometimes there are Ai that needs internet connection to function." C2, FT2

Moreover, what is observed from the selected parts is the teacher's resourcefulness and resilience when dealing with technological problems. They employ patience, asking assistance from students or simply improvisation to minimize disruptions and retain engagement in class.

"The issue with the laptop having delays I just have to be patient or to ask for students who are knowledgeable with using the technology or I just have to entertain the students with questions to make D class alive and then for the internet connection I tend to use my phone as a mobile hotspot for my laptop to have internet connection and then for the signal I just have to look for some spot where in there is a good reception for the signal." C2, FT2

However, these strategies demonstrate adaptability on part of teachers while at the same time indicating that more resilient support systems and resources need to be put in place to address technical barriers.

"Also, in some schools they are not lucky enough to have a TV inside the classrooms like they use the traditional method of teaching so they can't use AI-driven technologies. And also the laptop Sister because there are laptops that are very slow, like it hangs." C3, FT3

"Tech Glitches: Occasionally, tools crash or don't work as expected." C4, IT1

"And technical glitches can disrupt the flow of a lesson, frustrating both students and teachers alike." C5,IT2

Furthermore, there are broader systemic concerns discussed here such as limited school infrastructure and inequality in accessing technology beyond individual classrooms.

Disruptive impact

"Issue with the laptop having delays I just have to be patient or to ask for students who are knowledgeable with using the technology or I just have to entertain the students with questions to make D class alive" C1, FT1

The samples provided help in illustrating the delicate nuances that most tutors face when applying AI-based teaching techniques. This provokes an intense conversation on how complicated it is to blend technology with classroom activities.

"One of the my perceive challenges is that sometimes the students are too much enjoying the activity with Ai driven teaching strategy and they already become very noisy and uncontrollable and hard to manage" C2, FT2

There are technical malfunctions and technology lags that act as bottlenecks. Although these tools have the potential of enhancing learning, the technological underpinnings of AI-driven systems can be quite capricious. These interruptions not only disrupt class flow but also make both teachers and students feel annoyed. Consequently, robust technical support systems are required along with reliable infrastructure to facilitate smooth implementation.

"It is the participation of the students because if they will not participate then it will not be possible." C3, FT3

In addition to technical aspects, there must be a balance between managing student conduct and engaging them in learning activities. Even so, AI-powered exercises might turn out to be challenging due to unexpected circumstances like kids getting too excited or noisy. In this regard, effective management of classroom dynamics becomes another key advantage of artificial intelligence use while maintaining a favorable climate for learning.

"And technical glitches can disrupt the flow of a lesson, frustrating both students and teachers alike." C4, IT2

Furthermore, among other things, the mentioned excerpts emphasize the importance of student involvement in successful adoption of AI-directed educational strategies. Otherwise, these technologies will lack their efficacy without any active participation from learners.

Classroom dynamics

"So during my discussion upon using Artificial intelligence I have witness that using Ai on my teaching makes the class more enjoyable and it makes the students engage (frequently or inaudible) to discussion and also I have observe that upon incorporating Ai students tend to better understand the lesson so it makes teaching and learning more effective for the students." C1, FT1

AI can make learning more interesting and information attractive; it relates to making it fun and interactive for a student. Interactive ways of teaching through AI should include simulations and educational songs that are helpful in ensuring better understanding of the materials provided.

"One of the my perceived challenges is that sometimes the students are too much enjoying the activity with Ai driven teaching strategy and they already become very noisy and uncontrollable and hard to manage and also sometimes the Ai driven technology is lagging so it affects the momentum or the flow of the teaching process." C2, FT2

"I think I don't see any problems for them because they are enjoying whenever there is an integration of technology and whenever they need to participate, they are enjoying it." C3, FT3

"Whenever I use AI-driven technologies, I let the students navigate the laptop. (Sila yung pumupunta sa) They are the ones going in front and clicks the simulation". Whenever they are having a hard time, I ask guide questions. (Yun lang po, Sister) That's all, Sister." C3, FT3

"Easily Distracted: They sometimes get too caught up in the interactive features." C4, IT1 "Over-reliance: A few tend to rely too much on hints or prompts from AI.'CT4, IT1 "Navigation Trouble: Some students struggle with using new tools at first" CT4, IT1

There is class management involving high levels of excitement leading to noise-making and disturbance. Another issue is technical one which may occur from time to time when AI technology hangs or goes out of order, thus interrupting lessons.

"A memorable instance was when I used songs for vocabulary and reading comprehension lessons. Students got excited talking about their favorite lyrics, which led to some lively discussions about the themes and vocabulary. They didn't even realize how much they were learning because it felt more like sharing than studying. Over time, their comprehension scores improved significantly." C5, IT2

"Others find it difficult to navigate the many features, feeling overwhelmed or lost in the options available" C5, IT2

Balance Fun and Discipline: Keep the learning process engaging without compromising control in the classroom. It is necessary to start using artificial intelligence tools gradually so that students become used to them.

Digital Accessibility

"So in my case during class I use it as an activity or as a way on how to make worksheets and I also use it for recitation specially d aral-links teachnology because it has a random name generator." C1, FT1

Embracing the use of AI in modifying the class work is fundamental in enhancing learner involvement and understanding. In addition, it may not be a smooth sail embracing AI due to limitations such as technical glitches and narrow access among others.

"Like for example, Aralinks. Aralinks don't work sometimes on my laptop so I just use the traditional way or I just dictate what's in there if Aralinks doesn't work." C3, FT3

This can make classroom activities more interesting thus fostering students' involvement and inquisitiveness. A random name generator feature found in Aralinks technology can be an example which is useful because it makes recitations more dynamic and inclusive.

"So there was this one topic that we had in grade 10 which is combination of objects so here I used egg box investigation from transom.org and then I have witness students were able to illustrate the number of combination on the given situations because in that activity their where situations and then the students have to illustrate on how many combinations are there."

Additionally, through AI-based approaches pupils can be actively involved with subject matter allowing them to have better understanding. One notable case is where we were teaching combinations using egg box investigation from transum.org for grade 10 students who could visualize the number of combinations.

"Access Issues: Not all schools have enough devices or reliable internet" C4, IT1

The integration of AI in teaching improves students' engagement and learning through dynamic and interactive activities. However, it is important to address the technical reliability concerns as well as access limitations. By having alternative plans and pushing for better materials, tutors can exploit AI's potential in education for a more effective learning environment that excites learners.

Tool For Effective Learning

"So for me since I am a mathematics teacher it can help to enhance students' math skills and it also makes sure that everyone has a chance to learn. So if every student has access to Ai driven strategies or activities each student can learn at their own (case or place) while enjoying at the same time." C1, FT1

"So actually I am implementing school activities called gamification or game based learning through the use of ara-links from phoenix publishing incorporated powerpoint game templates from Mr. Borry it is actually on youtube. I found it in youtube . He is a teacher in the United States and also I am a member of the facebook page of bagtas. It is a facebook page composed also of teachers. boory and bagtas they have powerpoint templates which is most game templates powered by artificial intelligence which I am using in my teaching also I have used CAMI library compose of 3 teaching templates for example worksheets that I can also use in my teaching and also chat GPT, Grammarly that all po." C2, FT2

Artificial intelligence incorporation into education is changing how teachers teach and students learn in today's fast-paced technological environment. These range from AI-driven quizzes to gamification and interactive learning platforms that educators use to drive up student attraction, improve academic results and foster creative thinking within a classroom set-up.

"Recently during the third quarter classroom observation I have implemented the aral-links from publishing incorporated using the glaycutomus response is it powered by artificial intelligence I transform my topic into a tama o mali activity where in my students will just stand if the item is false and will sit if the item is true so after showing the correct answers the students will explain why the item is true or false so I considered it as a successful one since all my student are enjoying learning as well as during their assessment I've learned that their scores are high so they learn the topic so the factors contributed the success of my implementation are first it the students are engage with the lesson since it is based on a game the are students are participative so parang I don't find it hard to implement the topic since all of them are engaging with the topic plus they already good students. " C2, FT2

"A memorable instance was when I used songs for vocabulary and reading comprehension lessons. Students got excited talking about their favorite lyrics, which led to some lively discussions about the themes and vocabulary. They didn't even realize how much they were learning because it felt more like sharing than studying. Over time, their comprehension scores improved significantly." C3, IT2

"I will make the lesson on plate boundaries as an example. I think through that they still remember the lesson. Just last week my

students told me about plate boundaries. I think that was a big help because as what I've said they had the visualization of how plates move not just content-based like I will just tell them what is happening in that topic." C3, FT3

One good thing about AI in education is its ability to make learning a game. Lessons can become more interactive, engaging and fun by including game elements. Discussing examples of interesting gamification implementations like ARAL-links as well as PowerPoint game templates might show that this method can be an effective way of capturing the interest of students and promoting participation.

"I think AI technology is a big help in terms of teaching because it enhances the creativity inside the classroom, you are not just using the traditional way of teaching, you are making use of what's available right now which is technology since we are already in the 21st century so technology is a big thing right now and that's all, Sister." C3, FT3

"So I think (was (not sure) first factor that I considered for successful implementation of the AI driven teaching strategies is that the flatform is it must be user friendly to ensure that there is a smooth implementation of it second I make sure that there is a clear communication with the students on how the technology works and how can or how its beneficial to them as students lastly I checked if how are my students doing while they are having that technology or while they are using the tool because that is also a strategy for me to checked if the technology can be used next school year." C1,FT1

"When I started using AI quizzes to practice vocabulary, the students loved it because it felt like playing a game. Their test scores improved by about 10% in a couple of months." C4, IT1

By analyzing data via online adaptive learning platforms, content can be tailored to meet each student's individual needs and learning style. Such platforms employ machine-learning algorithms to offer individualized educational experiences that suit unique strengths, weaknesses, or pace of study for all learners.

Support System

"So there was this one time when I used the aral-links. I do not know why it is not displayed on D TV so I asked for the help of students then they told me that in one of their teachers. The teacher had to click the duplicate instead of D extended." C1, FT1

"For me whenever I have difficulties I just have to ask if there are students who can help me or I seek help from students who knowledgeable with using the technology or when using laptop of if the next class is (INUDIBLE) after 1 hour vacant I have to ask for a colleague if he or she experiences the same problem and then I will ask them on how they overcome it." C1. FT1

Utilizing students' adeptness with gadgets offers a quick and readily available solution to technical issues. Teachers may involve tech-savvy students to help solve problems by providing tips to use and ensuring the appropriate use of technology in class.

"I just ask some of my co-teachers if they are also experiencing the same and ask what are their ways of coping so that I can also apply it to me as well." C2, FT2

Joining hands with other teachers facing similar challenges might provide insights into possible solutions. By working together and sharing stories, teachers can make use of collective wisdom and think creatively about how to overcome technological hurdles.

"There are no support systems that I can rely on. I just call students who are knowledgeable in computer. Actually, whenever I use AI-driven technology and my laptop sometimes don't cooperate, I just ask help from the students and they can manipulate it." C3, FT3

Acquiring formal assistance from IT teams or online tutorials acts as a reliable source of further guidance on intricate matters. Using these resources makes it easier for teachers to handle challenges associated with technology since they are able to find their way around such things faster while also being aware about new features updates.

"I like surfing through the internet simulations, activities, that are related to my topics. Also, there are sharing, professional sharing inside the school about technologies. Some teachers share what they use inside the classroom. They recommend it to other teachers. So, I also try those. "C3, FT3

"Teacher Networks: Chatting with other teachers who face similar challenges." C4, IT1 "Tech Support: Reaching out to the tech team when tools act up." C4, IT1

"Online Tutorials: Watching online videos to better understand new features." C4, IT1

"I've found that other teachers facing similar challenges are the best resource, as they often have tried-and-true strategies. The tech support team also comes in handy whenever tools act up. Moreover, attending workshops and webinars about AI in education has provided valuable tips and fresh perspectives." C5, IT2

There should be investment in professional development opportunities that focus on integrating technologies so as to equip educators with important skills and competencies. Workshops, webinars, conferences are sources of rich ideas.

Conclusions

The subsequent areas should be explored in detail for the benefit of researchers in future. (1) Impact Assessment: Conduct a

comprehensive study to ascertain the impact of AI-driven educational techniques on students' academic achievement, involvement, and attrition. This may involve a consideration of long-term effects as well as an examination of potential divergences in results among different groups in relation with the project. (2) Technical Infrastructure: This could entail searching for ways to improve digital infrastructure and overcome technology obstacles encountered by teachers particularly those based in rural or underserved locations. Some possible solutions might range from improving internet connectivity which is necessary for enhancing access to AI tools as well as resources that are reliable. (3) Teacher Training: Investigate how effective are programs for teachers who have been invited to participate in professional development oriented toward arming them with knowledge and skills required for integrating AI into classroom teaching. These training courses impact teacher's confidence, teacher student's performance or productivity at school, and pedagogical practice. (4) Equity and Inclusion: Research on the role played by AI in advancing equal opportunities for learning within the education sector focusing on disadvantaged communities. Strategies to reduce this gap include making sure everyone can have access to artificial intelligence-based learning irrespective of economic background, race, religion or other factors affecting students unfavorably towards their studies. (5) Pedagogical Approaches: AI-Inspired Pedagogies: Explore innovative pedagogical approaches and instructional strategies that leverage AI to enhance student engagement, critical thinking, and creativity. Investigate how AI can be integrated seamlessly into existing curriculum frameworks to enrich teaching and learning experiences across diverse subject areas.

By tackling these important areas of investigation however, future researchers may contribute to the advancement of our knowledge as regards opportunities and problems related to incorporating AI in education, thus informing evidence-based policies as well as practices that boost efficient artificial intelligence-driven teaching as well as learning.

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