

Digital Immigrants: Public Senior High School Teachers Transitioning to Education 4.0

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ABSTRACT

The existence of artificial intelligence has ushered in the 4th Industrial Revolution impacting the educative process specifically teaching and learning in schools. Despite the challenges associated with AI utilization, Education 4.0 acknowledges its contribution in teaching and learning process for the many opportunities it creates that build “innovative potential” among students (Joshi, 2022, para 1). One of the challenges in AI integration in classroom teaching is teacher perspectives regarding its utilization in classrooms. To be specific, because of generational and technological gap, digital immigrant teachers are naturally reluctant in using AI in teaching. This study aims to discover senior high school teachers’ perspective on AI tools utilization in classroom teaching and learning which involves their perspective on the implication of AI tools in teaching, the challenges, and their role in this integration. By means of in-depth interviews with three (3) teachers who have utilized AI, it was revealed that they found the technology useful and convenient both in teaching and in learning. They acknowledged also that AI utilization has some constraints because these tools should only be used as guide and not as a primary source of information. However, despite the constraints and challenges, they are amenable and willing to adopt AI in classroom teaching. The study implies a collaborative effort to have a school Education 4.0 ready.

Keywords: AI utilization, AI integration in education, teachers’ perspective, teachers’ role in AI integration

Theme: New Technologies and Innovation, New Technologies and Education, Media, Information and Communication Literacy

INTRODUCTION

Artificial intelligence (AI) has marked the present generation as the 4th Industrial Revolution. Even the field of education has felt the impact of what is known as Education 4.0, a breakthrough in the world of computing ushered in by the emergence of digital technology. The term artificial intelligence is derived from the idea of computers that “can think like humans” (McGinnis, 2020, March 18). With its ability to process large volumes of data, it is believed that AI can “reshape the world around us (Sahai & Rath, 2021, abstract). Education 4.0 acknowledges not only the substantial impact of artificial intelligence on learning, but most importantly its contribution to driving “growth and innovation” in one’s economy through building “innovative potential” among students (Joshi, 2022, April 04, para 1). UNESCO recognized how this technology can impact on the future of education (“artificial intelligence in education”, n.d.), and admitted that both teachers and students must be prepared to embrace its impact. Likewise, the Department of Education through the Information and Communication Technology Service (ICTS) has shown a commitment to embracing digital technology in education through its framework, “infrastructure, software and capacity building” for both learners and teachers (“digital rise program”, 2022, May 10).

Many in the teaching professions are considered digital immigrants. They were born prior to the digital technology or computer and learned about the new technology during their adult lives (Wang et al., 2013). Contrary to digital natives, they usually struggle to learn the necessary skills to utilize the new technology, although they show great interest in using it (Ch’ng, 2019, April 28). In this digital era, teachers belonging to this group may have trouble adopting artificial intelligence applications, which are the latest in technological

innovation. In the study by Coffey (2023, October 31), it was revealed that more than 75% of faculty members in about 600 institutions (country not mentioned) do not regularly use AI, whereas half of the students who participate use AI for academic-related tasks and activities. In the Philippines, about 83% of students use generative AI; some teachers also use the technology to create content for their classes. Another consideration is that many students and teachers in the Philippines use GenAI but do not have idea of when to use or not to use it (Pascual, 2023, November 16). The main concerns in this field are ethical considerations and teacher readiness. For instance, lack of readiness in AI use may lead to cheating (Okaiyeto et al. (2023, May) and it can make learners poor in decision-making or may even make them lazy (Chan & Tsi, 2023, May 2).

AI integration or adoption in the classroom entails ethical challenges which is why many educators are hesitant to use it or do not want their students to use it. The work of Chan (2023 December) revealed that the immediate need of participants (both teachers and students) is to understand, identify and prevent academic misconduct and ethical dilemmas associated with AI adoption or utilization. If it cannot be avoided, educational institutions should develop policy and evidence-based guidelines to ensure that students can use it responsibly (Chan & Lee, 2023). The literature review by Slimi and Carballido (2023, August) also presents that AI adoption in classroom teaching influences ethics, although it is acknowledged that it brings more advantages than disadvantages; hence, the recommendation of the study is for its adoption.

For Filipino teachers in public senior high schools, the adoption of AI may take a gradual shift due to infrastructure problems and teacher skills and knowledge of teachers. As the students are more exposed to and knowledgeable about AI tools, teachers may not be well equipped to incorporate AI tools to teaching strategies and to guide learners in the utilization considering the extent to which they should allow learners to use AI tools.

REVIEW/SURVEY OF RELATED LITERATURE

Artificial intelligence

Artificial intelligence is a breakthrough technology in the field of computing. It was conceptualized in 1950 by Alan Turing who published a paper ‘Computing Machinery and Intelligence’. Schroer (2023, July 27) explained that artificial intelligence is a branch of computer science that creates machines with special functions like human intelligence. With this capability, many industries are investing in AI to help within their operations. Many of these AI-operated machines can perform “cognitive functions” such as “interpreting speech, playing games and identifying patterns”. However, not all machines generated by AI perform the same; some are classified as strong AI and weak AI. Strong AIs can “solve problems”, while weak AIs have limitations and can perform only single task (Schroer, 2023, July 27, para. 3).

Other proponents of AI came afterward such as John McCarthy, Frank Rosenblatt, and others. Its basic purpose is to create machines that can perform human intelligence in terms of problem solving and decision making (“What is artificial intelligence (AI)?”, n.d.). Artificial intelligence offers various applications such as speech recognition, customer service, computer vision, recommendation engines, and automated stock trading (“What is artificial intelligence (AI)?”, n.d.).

Artificial intelligence continues to invade the world and revolutionize how people will live from health to cybersecurity (“artificial intelligence”, n.d.). In the field of health care for instance, many machines and gadgets were created to obtain results that are difficult to detect like the German-made Merantix that can detect lymph nodes. In criminal justice, the AI-driven “strategic subject list” is used to analyze individual with potential to become perpetrators. In transportation, billions of dollars are being spent to innovate vehicles operated by AI or known as “autonomous vehicles” (West & Allen, 2018, April 24). In businesses, more and more data are becoming easily accessible and are critical for business innovations and providing a highly competitive advantage (Accenture, n.d.).

Generative Artificial Intelligence and Learning

In terms of the classification of artificial intelligence, generative AI is considered a deep-learning model that takes raw data to produce simplified data (What is artificial intelligence (AI)?, n.d.). Prabhu (2022) defined

generative artificial intelligence as “a groundbreaking branch of artificial intelligence that empowers machines to create, compose, and produce original content, often resembling human-created output” (p. 4). Generative artificial intelligence is a branch of artificial intelligence and is considered a breakthrough in the field of AI because it is designed to imitate the “creative processes of humans” (Prabhu, 2022, p. 4).

Generative artificial intelligence such as the ChatGPT is a good tool that teachers can use to help students face the reality of technology and how they can interact with it. Thus, integrating it into the classroom is seen as necessary to prepare students for their future career (Abramson, 2023, June 01). Stephens (2023, May 31) described ChatGPT as simply a “chatbot” that generates responses to queries through “human-like conversations” (para 2). It provides answers to questions as well as content if requested. This is a tool that is helpful for researchers. GPT stands for ‘generative pre-trained transformer’ and it is created to respond like how a teacher responds to the questions of students to help them better understand the concept (Coursera, 2023 July 22).

Aside from ChatGPT, another GenAI – GPT4 – is improved because it has the capability to understand, generate, and write texts. It can even solve physics questions and many others (Vargas, 2023, March 23). In addition, Gartner predicted that in 2022 around 30% of the content from any written output can be found on the internet and it is evident now that AI can even produce literary works (“In an AI world”, 2021, February 24).

Generative AI has practical uses today such as the following: (1) written content augmentation and creation, (2) question answering and discovery, (3) tone, (4) summarization, (5) simplification, (6) classification of content for specific use cases, (7) chatbot performance improvement, and (8) software coding (Gartner, n.d.).

Teachers as Digital Immigrants

The term “digital native” and “digital immigrants” coined by Marc Prensky to differentiate the two types of people living in the digital era (Ch’ng, 2019, April 28; Prensky, 2010, September 01). Digital immigrants were born prior to the advent of digital technology, specifically computer and the Internet, and therefore, they merely adopt the technology. Many are reluctant to adopt it due to its many complexities described. Digital immigrants may be involved, but their engagement is limited to “social networking” purposes only (Ch’ng, 2018, April 28, para. 8, 10).

In a study by Birch (2020, December) titled ‘Digital Immigrant Teachers and their Implementation of Technology’, digital immigrant teachers understood that inside classrooms, they must teach digital native students. They recognized their need to be competent in integrating “digital pedagogy” to help students gain essential digitalization. Based on their narratives, many teachers were hesitant, but few took the challenge to learn (p. 160).

Utilization of GenAI in the educational system

In the Philippines, many economists welcome the emergence of AI and find it significant for the growth of the economy. Different government agencies including the DTI are implementing necessary programs for the adoption of technology in the country (Ibrahim, 2022, August 16).

Vargas (2023, March 23) believed that artificial intelligence, particularly generative AI will have significant impact on the lives of Filipinos. He even mentioned that Filipino students are using ChatGPT to write essays – these students are not only in high school but also at the University of the Philippines, which he views as a potential threat to the credibility of future professions, such as future lawyers. Estrellado and Miranda (2023, May 5) remarked, “There is no turning back, as the utilization of artificial intelligence (AI) into the Philippine educational system has catapulted scholarly discourses on the line”. This is how the researchers introduced their paper believing that technology can alter many aspects of education delivery, including data privacy, the digital divide, and faculty training and development.

Looking into how prepared Filipino learners and teachers are to embrace Artificial Intelligence, the study of Labraque et al (2023) assessed the readiness of nursing students in using AI as educational tools. It revealed that participants have moderate readiness due to a lack of computer skills to navigate AI and a lack of AI knowledge. Both teachers and educational institutions are not ready to adopt AI because of insufficient skill and knowledge (Alda et al. (2020, August). AI adoption poses challenges for Filipino teachers for several reasons according to Ligot (2023, November 07); these include (1) inadequate digital infrastructure, (2) the need for educator training to effectively integrate AI into the classroom and maximize its benefits, (3) the necessity of national regulations to protect data privacy and ensure responsible AI use in educational institutions, and (4) the essential maintenance of academic integrity in AI driven education system. Infrastructure and resources, data privacy concerns, the digital divide, and faculty training were identified as the challenges in the study by Estrellado (2023, May), which recommends involving stakeholders, including educators, students, administration and policy makers in the discussion related to AI adoption and implementation.

Ethical Issues Associated with the utilization of GenAI

Artificial intelligence has posed many challenges in education, particularly in the teaching and learning process. Moreover, most schools around the globe are not prepared for it. One ethical issue with AI, according to an article, is the harm it can cause. It states, “Ethical issues arise when AI algorithms or underlying data are deployed in a manner that introduces bias, violates individual privacy, or compromises other human rights” (“Teaching AI”, n.d. para. 16). In one study by Chan and Hu (2023) titled ‘Students’ Voices on Generative AI: Perceptions, Benefits, and Challenges in Higher Education’, it was revealed that one concern students had about the use of GenAI in teaching and learning is that, despite finding many benefits of GenAI in accomplishing academic tasks, they still showed concern that this technology “could affect the value of university education” with a mean of 3.18 and SD 1.16 (para. 14).

On the other hand, the use of GenAI in educational settings can also be ethical as long as guidelines are provided for students seeking assistance from GenAI. For instance, the University College of Cook in Ireland finds the use of GenAI ethical if it can “... enhance the learning process...” (para. 1). It identifies the ethical considerations that the university practices for students when using GenAI: transparency and critical thinking/analysis tasking students with evaluating the content for accuracy and relevance (“Academic Integrity, 2023).

Teachers’ Perspective Regarding AI Tools

In the integration of technology, particularly with the use of artificial intelligence tools in teaching and learning in classrooms, teachers are hesitant about their roles in this digital era. One reason is that they think technology can replace them because these AI tools are interactive, and learners gain knowledge from using them (Dhanrajani, 2023, May 28). The same study also revealed that GenAI cannot replace teachers, especially in motivating students. Teachers are concerned about the technology reliance of learners (Chan & Lee, 2023), which can make them “lazy” (Ahmad et al, 2023 December). They also express concern over ethical use of the said technology (Chan, 2023, December).

In general, teachers acknowledge that AI technology is now the trend in classroom teaching and learning. In fact, several teachers are using it (Pascual, 2023 November 16; Coffey, 2023 October 31). However, they acknowledge that they have very limited knowledge on how and when to use it (Pascual, 2023 November 16), and they are particularly concerned about other issues that hindered them from effectively using it (Ligot, 2023 November 07; Estrellado, 2023 May). Training can indeed help develop the confidence of teachers in the utilization or adoption of AI tools in learning (Sun et al, 2022 July 30; Choi et al, 2024).

Teachers’ reluctance toward the new technology can be explained using Diffusion of Innovations theory, which explains why certain innovation are likely to be adopted. The theory presents five attributes of innovation that can drive adoption by individuals. It states that the relative advantage of an innovation, its compatibility with the values and perspectives of the adopters, the complexity or the relative difficulty individual users may

perceive it, its trialability, and observability, are the determinants of why an innovation will be adopted. Of these five attributes, the complexity of innovation is the only negative determinant (“Diffusion of Innovation, n.d.). The complexity of innovation is the factor preventing digital immigrant teachers from adopting the innovation.

Statement of the Problem

Main Problem: What are the perspectives of public senior high school teachers on utilization of AI tools in classroom teaching and learning?

1. What perspective do public senior high school teachers have regarding the implication of AI tools in classroom teaching and learning?
2. What challenges do the teachers consider with regards to the adoption of AI tools in classroom teaching?
3. How do teachers perceive their role in the integration of AI tools in classroom teaching?

Research Objectives

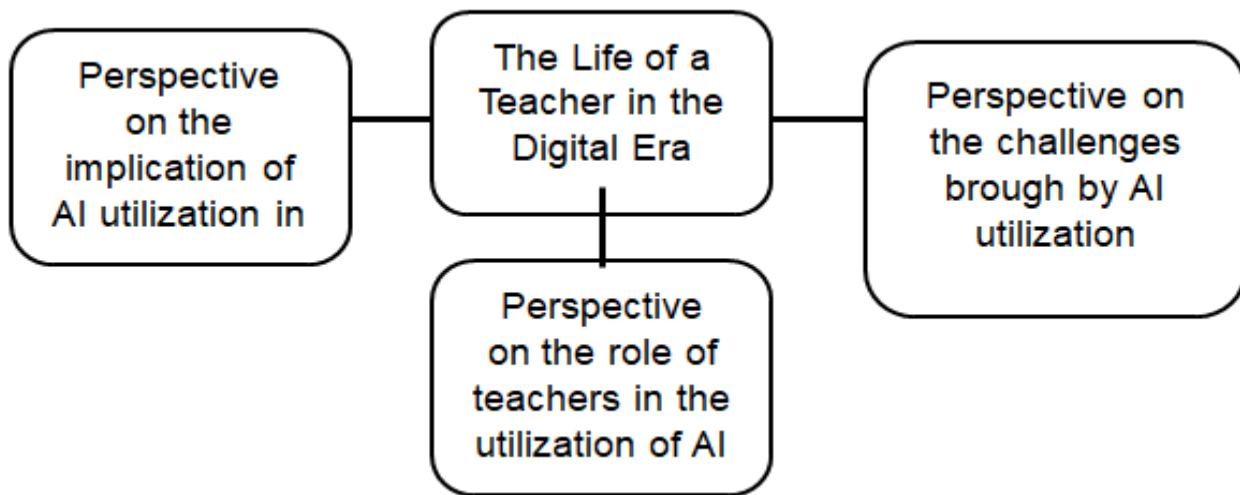
1. To determine the perspectives of public senior high school teachers regarding the adoption of AI in classroom teaching.
2. To determine the perspectives of public senior high school teachers regarding the implication of AI utilization in classroom teaching.
3. To determine the perspectives of public senior high school teachers on the integration of AI tools as part of teaching methodology.
4. To determine the perspectives of public senior high school teachers on the utilization of AI tools in classroom teaching.

Theoretical Framework

The study used Connectivism Learning Theory to explore the objectives of the study. Connectivism learning theory explains the connection between humans and the digital world and how this connection is applied in the field of learning. The theory posits that all forms of digital forms can be used to transfer learning since learners today rely heavily on technology. It is not just about taking advantage of technology; instead, it recognizes that learners today depend more on digital technology for information than on traditional books. Examples of this technology include social media, forums, videos, blogs, and others. Connectivism Learning Theory began as an acknowledgement of the technology’s contribution to the learning process and has gradually evolved to recognize that digital technology could help learners to access vast amounts of information, thereby enhancing learning. Thus, it explains that learners develop knowledge through connections with “external networks” via various forms of digital communication (“Connectivism Learning Theory, 2021 May 27, para 9). In this view, the teacher’s role is no longer merely a source of information but to guide the effective use of technology in learning and provide opportunities for learners to utilize digital tools. In this digital era learners are seen as “do-it-yourself learners (Nussbaum-Beach & Hall, 2011 cited in Kropf, 2013).

Conceptual Framework

The study focused on teachers and their perspectives regarding AI tools used in teaching and learning. It specifically addresses teachers’ view on AI utilization in the classroom, the challenges they face when using AI tools, and their roles in integrating AI tools in classroom learning.



METHODOLOGY

Research Design

The study on the perspective of teachers regarding the utilization of GenAI tools in classroom teaching and learning was explored using descriptive case study design. This research design serves to explore the “real-world situation” through the narratives of a group of individuals based on their experiences of the phenomena which includes underlying facts about the causes of the phenomena (“Writing a Case Study”, n.d.). A case study aims to investigate the “data within a specific context” (p. 1) usually with a limited number of participants. Similarly, a descriptive case study as a research design is used to “describe” real-life situations in a narrative form (Zainal, 2007 June).

Research Sampling

For this study, a purposive-convenience sampling technique was used. In particular, the inclusion criteria for selecting participants/informants include: (1) senior high school teachers must have been born before 1980 to ensure that they have experience with both traditional strategies and digital technology in teaching, (2) at least 10 years and above of teaching experience the two periods – without digital technology and with digital technology, (3) currently using AI tool(s) in teaching. In total, there are a total of three (3) participants/informants for the in-depth interviews.

Research Instrument

For the study, an interview question guide was used to gather data. Three (3) open-ended interview questions were prepared for each research question totaling nine interview questions to allow for expansive discussion by the interviewee. These interview questions served as guides in in-depth interviews; that means, the line of questioning is flexible and incorporates follow-up questions to clarify ideas that needed to be explored by the researcher.

The interview guide consists of questions that addressed the perspectives of the participants regarding the implication, challenges, and their roles as teachers in this digital era.

Data Generation

To gather data from the informants, a series of in-depth interviews were used for the three participants. The researcher set appointments with each of the participants before conducting the actual interview. A google form was prepared to identify the possible and willing teachers to participate in the study. Since the teacher-participants were colleagues of the researcher, rapport had already been established before the actual interview. A sound recording was utilized upon the permission of the interviewees as consent. After the data had been gathered, the researcher proceeded to transcribe the interview data.

Data Analysis

Thematic analysis by Braun and Clarke (2006) cited in Maguire and Delahunt (2017) was used to analyze the data generated from in-depth interviews. Thematic analysis follows a six-step approach, namely familiarization, coding, generating themes, reviewing themes, defining and naming themes, and writing up.

Familiarization is the first step in the thematic analysis process. In this phase, the researcher becomes familiar with the gathered data by constant reading to get its overview. This phase may include transcription of the recorded interview and taking initial notes based on their understanding of the text.

After getting familiar with the text, the next phase is *coding*. In this phase, the researcher begins to select any phrase(s) or sentence(s) from the text that they find significant concerning the objectives of the study. Each selected phrase or sentence will be labeled with codes to describe its meaning. It is helpful to highlight certain text (phrase or sentence) and assign each a code.

After assigning codes to relevant phrases and sentences, it is time to *generate themes*. Generating themes involves identifying patterns among the codes. It is important to identify the patterns among the codes and to group similar codes under one theme. During this phase, it is important to review the codes for their relevance or vagueness; some codes may be removed, or some codes may be used as a theme.

Reviewing themes is also necessary to determine if they accurately represent the data. Some themes may be combined with other themes, renamed, or removed. *Defining themes* is the final step of reviewing to check on the essence of each theme, whether subthemes are related to the main theme, or if the themes are consistent with the narrative of the participants. In this final refinement of the themes, researchers ensure that themes are coherently checked.

The last part of the data analysis process is writing up the report. The write-up must present the research questions. This part is written in the Result section with discussion of the themes, supported by evidence from the interviews.

RESULTS AND DISCUSSION

The participants of the study were selected based on the criterial of belonging to Generation X and Y; therefore, they are considered digital immigrants. Based on their narratives, they felt the need to get along with technology and felt the pressure knowing that their students can navigate technology better than they do.

The study of Cojean and Martin (2022) among future teachers indicated that the acceptance level of AI technology in teaching is still in the developing stage for purposes limited to content generation, writing learning, and diagnosing learning difficulties (abstract). On the other hand, acceptability level of AI technology for teaching and learning is high among primary and secondary teachers in France according to the study by Cojean et al (2023) considering that it is beneficial to them to ease their workload. The average age of the participants in the said study was 45.36, which is still beyond the required age of the present study. The present study indicates that teachers considered as digital immigrants based on age are also accepting of AI technology because they felt the need to adopt the technology for their job's sake.

RQ1: Perspectives public senior high school teachers have regarding the implication of AI tools in classroom teaching and learning

To get an idea of the implications of using AI tools in classroom learning, the participants were asked about their perspective of how they find it significant in the day-to-day delivery of their lessons. Overall, the participants found it beneficial to them.

Below shows the responses of the participants as to the implications of AI tools as they used it in classroom teaching.

Table 1. Usefulness of AI tools in Classroom Teaching and Learning

Theme	Descriptions	Significant Statements
	Specific information is readily available. It helps with understanding difficult lessons It can be used to correct academic misconduct	“Sa Quilbot tatanungin ka kung parenthetical citation ba ang gusto mo... kaya na sya, ilalagay mo lang ang website, tapos ipo-produce na nya” (Participant 1) “Syempre mas napapabilis yung mga bata sa paghahanap ng mga kailangan nilang alamin di ba, mga kaalaman” (Participant 2). “Natutulungan ako ng AI para mas maintindihan at makapag-recommend ng aligned sa kanila” (Participant 2). “Nakakadagdag din ng kaalaman... Eto malaking tulong” (Participant 2). “Tayo as teachers pag in-upload natin ang papel nila dito even sa mga dupli-checker nache-check nila kung ito ay plagiarized” (Participant 1). “Kasi kung ikaw ay may premium e di mahuhuli mo” (Participant 3).

The participants were selected because they have adequate experience in AI utilization. Given that, they know the advantages of using AI tools to help them perform their duties as teachers from lesson preparation to applying AI-based activities in classroom setting. Unlike Google search, there are various kinds of AI tools with specific functions that teachers may select according to their needs. The most common AI tool is ChatGPT that provides answers in a humanlike form to any questions or queries from its users. It is very suitable for teachers who need further explanation about any topic, suggestions regarding lesson plan designing, or even analyzing data. Other AI tools may be used to check grammar and sentence construction, as well as in detecting plagiarism. Grammarly, Copyscape, Scribbr among others, are preferred to perform such function.

The instance they stepped into the world of technology, they also realized how it helped them become better teachers. AI is helpful because many techniques and knowledge can be accessed through different AI tools.

Table 2. Convenience of using AI tools in Classroom Teaching and Learning

Theme	Descriptions	Significant Statements
Convenience of AI tool	Learning can be fun and interesting	“Ang difference nila ng gumamit ka ng AI nitong sem, talagang nandoon ang interest nila” (Participant 2). “nakita ko ma’am talaga yung gumamit ang galing” (Participant 3).
	Learning becomes easier. Teaching can be done fast and easily.	“Ma’am pinapadali ang buhay ng isang estudyante, ng isang researcher” (Participant 1). “Sa bata padadaliin lang ang buhay nila ...” (Participant 3) “napapabilis yung trabaho, alam mo yun, gumagaan” (Participant 2). “At kapag nasanay ka sa AI ma’am, di ka na pupunta kay - Google search. Makukulangan ka, tutoo!” (Participant 3).

Participants admitted that with AI tools teaching becomes lighter and easier to do. In the study by Cojean et al (2023), teachers found that with AI technologies, their workloads were reduced such as in content generation and in helping the students with class work. A study using library research conducted by Fitria (2021 December), classified AI tools according to their functions. One function of AI tools is to mentor or assist teachers by providing learning activities and recommendations for learning materials to help these teachers achieve their learning objectives. Likewise, participants who navigate these AI tools claim that they help them access rich and vast information and assess students’ learning.

Table 3. Constraints of using AI tools in teaching and learning

Theme	Descriptions	Significant Statements
Constraints of using AI tools	Learning comes after reading an AI-assisted output AI tools are only guides Responsible use of AI tools	• “Actually, ang learning ay papasok pag binasa na nila ang paper nila...” (Participant 2). • “Kasi it would need reading talaga to have it” (Participant 3). • “So, tinuturuan ko pa rin syang mag-research” (Participant 1). • “Yung talagang tayo mismo at di natin iaasa sa AI ang ating style” (Participant 2). • “So kailangang matuto ang mga bata paano babalansehin ang ethics sa paggamit ng AI sa pagsulat ng paper” (Participant 1). • “We still have to teach them the value, laging remind them, lagi naman tayong ganoon” (Participant 3).

On the other hand, participants also found that the utilization of AI tools has constraints. Students use AI tools to produce outputs as academic requirements, but learning is not maximized and usually comes later. On that note, learners must also be concerned about learning and not simply producing an output. The student-participants from the study by Zou, Su and Ping (2023 December 19) acknowledged the importance of possessing critical thinking skills in “navigating artificial intelligence-generated content tools” to maximize their learning (abstract). Additionally, Carvalho et al (2022), cited in Pusey-Reid and Ciesielski (2024), explained that AI technology is simply a tool that aids learners in having deeper understanding of various ideas or theories, in which case critical thinking is still necessary to learn.

In view of Connectivism Learning Theory, technology is part of the learning process, and learners must learn how to make sense of the information, theories, and other learning that they get from online networks including social media and other websites. Learners do not simply connect with technology but through that connection they should “form knowledge” (“connectivism”, 2021 May 27, para. 9). The theory implies the need to guide these students in proper utilization of technology for optimum learning. Teachers as they transition to Education 4.0 are also learners that must be equipped with AI tools. With effective use of technology in teaching, teachers can be able to enhance collaboration between them and students, and among students by allowing them to explore the world of knowledge, share discoveries, and apply in real life scenarios.

Selwyn (2024) expressed concern over how students misuse AI as many imitated works are produced easily. He also quoted Michelle (2019) saying, “People have been trying to get machines to reason since the beginning of the field [...] but they’re what people call ‘brittle’ – meaning you can easily make them make mistakes, and reason incorrectly” (para. 8). Moreover, McLoon (2023 August 28) reported that teachers should worry about students who use AI to cheat. This cheating may be difficult to detect because the technology used for that purpose “... isn’t always reliable” according to the local experts in their country. This is a huge responsibility on the part of teachers – they learn to guide learners. In that sense, transitioning to Education 4.0 must be seen as a concerted effort involving policy making.

RQ2: The challenges teachers consider with regards to the adoption of AI tools in classroom teaching.

The work of Chan and Lee (2023 December) shows that Gen X and Gen Y teachers are cautious about using AI tools in teaching though they acknowledge that it brings many benefits. Some of their concerns are “overreliance, ethical and pedagogical implications, emphasizing the need for proper guidelines and policies to ensure responsible use of the technology” (abstract).

The same concerns were expressed by the teacher-participants in the study, as shown in the table below.

Table 4: Teacher Factor in the adoption of AI Tools in Classroom Teaching

Theme	Descriptions	Significant Statements
Teacher Factor	Lack of full reliance on AI Tools	“Oyyy... di kaya ni AI lahat... partial lang partial” (Participant 2). “Pero di sya advantage kung sa ethics ang pag-uusapan natin kasi cheating na yan e” (Participant 3). “It is the same resistance nung unang in-introduce ang internet” (Participant 1).
	Laziness	“Ako aminado ako dyan” (Participant 2). “Sabihin nating tumamad din ako, hahah...” (Participant 3).

It shows that despite participants’ high regard for AI as a source of knowledge and ideas, they are still hesitant in using technology for several reasons. The study by Afroogh et al (2025) explains that trust is important in the “diffusion” and “adoption of AI” (para. 2). The study shows that participants showed resistance and distrust on technology. According to the participants, they consider ethical issues surrounding AI use as a factor for their distrust. Reduced levels of trust may disrupt full utilization of AI tools. In that sense, resistance or less reliance on AI is rooted in the fact that AI has limitations. As captured in the work by Selwyn (2024 January), it stated, “*AI technologies are reliant on the quality of the data they are working with... AI technologies operate through iteration and optimization, the use of approximations and correlations, the production of errors and false matches*” (para. 8). In the same article, the author recognized the importance of participation of educational communities in framing AI to be useful for education. That means establishing trust in AI is a communal responsibility.

On the one hand, laziness is another adverse influence on teachers. This laziness emanates from the potential of AI to help teachers perform their duties with convenience.

Table 5: Learner Factor in the adoption of AI Tools in Classroom Teaching

Theme	Descriptions	Significant Statements
Learner Factor	Learner’s interest	“Yung talagang mahilig mag-research at ginagamit yang mga AI na yan, mas marami silang natututunan di ba?” (Participant 2) “Yung mga batang gumamit ang ganda ng gawa” (Participant 3). “Tapos, ise-search na lang nila. Tapos, i-scan tapos babasahin, tapos di naman nila makukumpleto” (Participant 2).
	Learner’s analytical/ critical thinking skills	- Participant 2 shared, “... walang analysis, walang basehan, walang basis noong pinanggagalingan ng nakuha nilang information... bumabaw ang kanilang paraan ng pagsagot sa mga tanong”. “Ang critical thinking nila, that is the question.” (Participant 3).
	Learner’s reading comprehension	“Napansin ko lang na less yung karunungan na, kaalaman na natututunan nila compared doon sa talagang nagbabasa sila dati ng libro” (Participant 2). “Negative ako doon (reading comprehension). Kaya maraming mahihinang mga bata...” (Participant 3).
	Laziness	“Pero alam mo yung laziness. Medyo naging tamad” (Participant 2). “Tamad! Kasi imagine ma’am, we go back to ... balikan natin, noon talaga iyak tayo” (Participant 3).

The above analysis shows that students should be prepared for AI utilization. Their attitude and perception toward technology greatly affects how they make the most out of it. Students began using AI during the pandemic, and they perceived it differently from the teacher’s point of view. In that regard, they need reorientation regarding the proper use of AI. Learner’s interest, learner’s analytical skills, learner’s comprehension skills, and laziness must be refurbished to make them ready for Education 4.0.

AI utilization may pose negative effects on learners. According to Kaleido et al (2024 February 01), despite the benefits this technology offers, learners tend to be over-reliant, causing them to be neglectful and inattentive to their studies. That said, teachers' intervention and guidance are key factors in maximizing learning (abstract). In the study, the identified learner factors may indicate that (1) learners are not ready to use AI as they may become too dependent on it; (2) these factors are probably the effects of dependence on AI. In which case, teachers and school administration may investigate this and create better policies that counter the existing conditions of learners.

Table 6: Technology Factor in the adoption of AI Tools in Classroom Teaching

Theme	Descriptions	Significant Statements
Technology Factor	AI functions are limited	• “Si ChatGPT hindi sya ganoon 100% reliable. Kasi ang problem kay ChatGPT hindi cited your sources nya” (Participant 1). • “May darating pang mas magagaling pa dyang AI” (Participant 3).
	Internet connectivity	• “Syempre ang challenge sa atin pagdating sa internet connectivity” (Participant 1). • “Kasi ma’am, using AI also needs internet. Di naman tayo makakagamit ng AI kung walang internet di ba?” (Participant2)

Lastly, the technological factor pertains to the school's readiness for Education 4.0 by providing an institution that is internet-equipped. Technological factors involve costs, another consideration before a school becomes Education 4.0 ready.

RQ3. Teachers' Perspective of their role in the integration of AI tools in classroom teaching

Artificial intelligence is now unescapable. Teachers have no reason to ignore or avoid using it. It is also stated that the Department of Education is now working on policies that may usher in the utilization of AI in school, according to GMA Integrated Report (2024 January 29).

Based on the interviews, the teacher-participants also recognized their roles in this emerging educational environment, as shown in the table below.

Table 7: Exploring the World of AI

Theme	Descriptions	Significant Statements
Explore the World of AI	Discover AI	• “Mas maraming lumalabas na AI na mas makakatulong ... maging madali ang paggawa ng isang assignment” (Participant 1) • “Sa akin ma’am, malaking tulong. ... tayo yung nag-a-adjust para makasabay sa kanila hindi sila ang mag-a-adjust para sa atin” (Participant 2).
	Develop adeptness to AI tools	• “Kasi gamitin mo lang sya. Yun lang naman yun eh. Matututunan mo na ang lahat tungkol sa technology basta gamitin mo” (Participant 1). • “Mabi-behind kasi tayo ma’am e, tayo ang mabi-behind” (Participant 2)
	Understand how AI works	• “As a teacher, number one dapat kasi teacher tayo continuous learning kasi hindi pwedeng ang alam kong AI ngayon stick ako doon...” (Participant 1). • “Kailangan mas magaling tayo sa kanila sa AI na yan. Ang teacher dapat nasu-surpass nya ang galing ng AI” (Participant 2).
	Discover the responsible use of AI tools	• “Na habang ginagamit natin ito, we should be responsible also into using it wisely” (Participant 2). • “We still have to teach them the value, laging remind them, lagi naman tayong ganoon” (Participant 3).

The teacher-participants' role as they transition to Education 4.0 is exploring the world of AI. That includes the discovery of various AI tools to be utilized for teaching and learning purposes. Their willingness to adopt technology can make their classroom teaching relevant to the needs of their learners. Moreover, they recognize their need to be adept to properly utilize AI tools, and that entails training initiatives on the part of the school heads. The training initiatives must be able to help them understand how AI tools work to guide the learning process in the classroom. Lastly and equally important is the discovery of responsible use of AI tools responsibly. Teachers serve as instruments in educating learners to become responsible AI users.

Teachers' involvement with AI is not limited to helping them craft their lessons every day, but they are also a great help in combatting academic dishonesty. Zalaznick (2024 March 27) observed in his country how teachers became involved in helping learners use the technology appropriately. In the cited research from that report, it was stated that many teachers received training on "responsible use of AI and related tools", yet a small percentage of them make teachers doubt students' honesty. As teachers begin to adopt technology, there seems to be a need to support them with appropriate training to help them use the technology and guard students against its misuse.

Table 8: Adoption of AI tools in teaching

Theme	Descriptions	Significant Statements
<i>Adopt AI tools</i>	Fully utilize AI	• "Kailangan as a teacher gamitin mo ang technology to communicate to level with the students" (Participation 1). • "Sa akin ma'am bilang teacher, napakalaking bagay kasi nakakasabay tayo sa generation ngayon" (Participation 2). • "di na ako nakukuntento na lang, di tulad noong dati. At kapag nasanay ka sa AI ma'am, di ka na pupunta kay Google search. Makukulangan ka, tutoo!" (Participation 3).
	Advance one's knowledge of AI	• "The teacher should be a learner every day together with their students dapat several steps ahead ka" (Participant 1). • "kailangan mas magaling tayo sa kanila sa AI na yan. Ang teacher dapat nasu-surpass nya ang galing ng AI" (Participant 2).

Teachers recognize that part of continuous learning is adapting and adopting technology in crafting their lessons. However, their knowledge and skills in AI are insufficient, and they still need to explore, adopt, and embrace the new technology. Despite some hesitations, they show willingness to use AI tools. Yongpradit was quoted as saying, AI is "*the opportunity to rethink education and rethink why we do what we do, what we teach, [and] how we teach it*" (cited in Klein, 2024 May 22). The need to embrace AI in education is high considering that even if we do not act on it, it will transform our students and education. Teachers' responsibilities then are to discover the many uses (or benefits) of AI, develop adeptness in AI tool, discover how to use them, and the responsible use of AI, as acknowledged by the participants. In this regard, teachers must undergo a series of training on AI tools to make them equipped with AI tool and application (Rober, Potter, & Frank, 2024, cited in Banerjee, 2024). In view of this limitation, Furze (2024 June 12) remarked that teachers, regardless of age, may work hard to be adaptive to the possible impact of technology. With AI, teaching methods become "outdated", and teachers must learn what is called "AI pedagogy" (para 2).

CONCLUSION

Participants belong to Generation X and have been teaching in senior high school for an average of 5 years. Based on their narratives, they began using artificial intelligence during the pandemic. From this exposure, they discovered more AI tools which proved to be beneficial in crafting lesson plans, in developing concepts about the lessons, in assessing learners' output, and in checking plagiarism. On the other hand, AI utilization has a negative side; primarily, learners have misused technology which makes learning difficult to process for high reliance on technology in producing academic requirements.

These participants acknowledged several factors that need to be addressed in order to utilize AI tools with confidence. Particularly, the participants have trust issues with technology; learners' interest and capability to

learn using AI was also questioned. Lastly, the required infrastructure may not be able to be provided by the school, which makes it impossible to use AI in classrooms.

The study selected participants who use AI tools but did not determine how many are utilizing the new technology. One probable reason why some teachers may be hesitant to use AI tools is the lack of internet infrastructure in schools. Their utilization of AI tools is limited to lesson preparation where the Internet is available only in their homes.

Despite the challenging factors mentioned above, these participants were amendable of the new technology and are willing to adopt it to make teaching meaningful for learners. However, the study highlighted the need for full capacity to use AI in teaching and learning. Education 4.0 is inevitable; learners will work in the future in an AI-equipped environment. Teachers are ready to adopt the technology, but they have limited access and skills to fully utilize the technology.

RECOMMENDATION

Based on the conclusion of the study, the researcher would like to recommend the following:

- a. Provide teachers' training on the utilization of AI tools including other AI tools that can be used to track or detect plagiarism and address other ethical concerns.
- b. The school may promote AI utilization training during LAC sessions with an emphasis on AI pedagogy.
- c. The school may craft a policy to guide teachers in the use of AI tools. The policy must set parameters regarding the extent to which the school will allow the utilization of AI.
- d. The school may consider establishing internet infrastructure if budget permits.

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