The Adoption of Artificial Intelligence of Selected International Chinese Educators Enrolled as Graduate Students in the College of Education of St. Paul University Manila

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ABSTRACT

This study explored the past adoption process of artificial intelligence among six Chinese educators enrolled as international graduate students at the College of Education, St. Paul University Manila. It aimed to understand the stages, social facilitators, and relevant institutional structures in their adoption. The participants, educators from the North China School of Science and Technology, responded to seven questions about their AI experience. Written responses were collected on January 17, 2024, and underwent deductive thematic analysis. The findings, validated by participants, contributed insights into the educators' past AI adoption journey within the academic setting. The study revealed seven stages in AI adoption facilitated by social situations and supported by institutional factors. The adoption of artificial intelligence (AI) by international graduate student educators involves phases from initial exposure to implementation and post-reflection. Decision-making considers compatibility and institutional expectations, while challenges in implementation include managing dual roles. To ensure responsible AI adoption, recommended policies cover ethical guidelines, mandatory training, data privacy, intellectual property, transparency, and misuse prevention. Balanced AI integration, collaboration, and regular training on ethics and societal impact are crucial.

Keywords: Artificial Intelligence, Chinese international graduate students, Chinese educators, AI Adoption, St. Paul University Manila

INTRODUCTION

Investigating the adoption of artificial intelligence (AI) by graduate students who work as educators is imperative for various reasons. Firstly, there may exist a knowledge gap regarding how graduate students, especially those engaged in teaching roles, incorporate AI into their instructional methods, prompting the need for in-depth exploration in this domain. Examining the integration of AI by graduate students offers valuable insights into the potential effects on educational practices, facilitating the adaptation of teaching strategies to align with emerging technologies. Additionally, the study can unveil the professional development requirements of graduate students in terms of AI literacy and competence, pinpointing areas where educators might need training or support. Understanding the challenges and successes in AI adoption helps identify best practices, guiding institutions, policymakers, and educators in optimizing the

incorporation of AI into educational settings.

Delving into how educators utilize AI can provide insights into its impact on student learning outcomes, crucial for evaluating the effectiveness of AI tools in enhancing the overall educational experience. Exploring AI adoption by educators necessitates addressing ethical considerations related to data privacy, equity, and responsible technology use in educational environments. Moreover, graduate students often bring innovative perspectives and a willingness to explore novel teaching methods, making the study of their AI adoption a source of inventive approaches to education. As AI technologies advance, educators must be well-prepared to leverage them effectively, and understanding the current state of AI adoption among graduate students can assist institutions and educators in anticipating the evolving landscape of education. In summary, a comprehensive study on how graduate students working as educators adopt AI is indispensable for advancing comprehension of the intersection between education and emerging technologies. This research provides valuable insights that can inform policies, educational practices, and professional development initiatives, ensuring a well-informed approach to AI integration in education.

AI Awareness and Learning Processes

The acquisition of AI knowledge by educators is crucial for effective integration into education. Initiatives such as the Everyday AI (EdAI) program empower educators to lead AI education (Polack, Schiavo, & Zancanaro, 2022), while collaborative efforts in AI Educator Make-a-Thons raise awareness and enhance content knowledge (DiPaola et al., 2023; Nuemann, 2019). Social interactions and peer discussions significantly influence AI development, with conversational agents like Bard and ChatGPT fostering increased empathy (Li, Xing, & Leite, 2022; Rhoads, 2022). Observational learning in AI awareness emphasizes the progress and limitations of AI systems (Theophilou et al., 2023; Adamski & Adamska, 2023). These insights collectively contribute to a nuanced understanding of AI awareness and its implications in education and psychology.

Knowledge Acquisition and Professional Development in AI

In the dynamic AI field, varied learning strategies contribute to understanding, including supervised learning and analyzing data (Borghi & White, 2022). Global policies integrate AI into safety, health, and education (Ruvalcaba-Gomez & Garcia-Benitez, 2023). Educator-focused AI professional development, like "Innovative Learning Environments Supported by Digital Technologies" (Flogie & Krabonja, 2023) and AI Educator Make-a-Thon, emphasizes collaborative AI literacy design (Araya & Scheidel, 2023). Educators enhance pedagogical and technological competence for optimal AI-driven learning (DiPaola et al., 2023). Peer influence and collaboration are vital for AI knowledge, guiding protocols for collective intelligence and talent attraction (Langer & Jain, 2023).

Integration of AI Applications in Educational Practices

AI transforms education by offering personalized feedback (NMNH Division of Mammals, 2023) and seamlessly integrating with e-learning (Romanov et al., 2022). It aids in teaching tasks, reducing administrative burdens (Singh & Hiran, 2022). Administratively, AI automates systems, improving overall quality (Fayaz et al., 2022; Singh & Hiran, 2022). Challenges include data infrastructure issues and a lack of understanding (Tangi, van Noordt, & Müller, 2023). In clinical radiology, collaboration and infrastructure are vital (Bizzo et al., 2023). Successful integration involves simplifying concepts (Rajeswari & Purushothaman, 2023) and leveraging AI for improved teaching (Kumar et al., 2023). In healthcare, AI analytics and simulations offer personalized solutions, requiring attention to data management and privacy (Nyberg & Morris, 2023; Sharma & Sharma, 2023; Rizvi, 2023). Ethical considerations and thoughtful

integration are crucial for AI success.

Problems and Solutions in AI Adoption

Educators encounter challenges in AI adoption, risking oversimplification and behaviorism (Zhang & Deng, 2022). Algorithmic recommendations may create information cocoons, causing anxiety about AI's impact (Ritter & Koedinger, 2023; Gupta & Bhaskar, 2020). Ethical concerns, including data security and educational inequality, are raised (Bu, 2022). Misalignment with educational goals poses a risk. To address these, educators need a nuanced understanding and institutional support. Strategies involve accessible concepts through video presentations (Rajeswari & Purushothaman, 2023), inclusive education via teacher feedback (Fabretti & Schiavo, 2023), and AI education tracks for innovation (Araya & Scheidel, 2023). While AI implements evidence-based strategies, instructor expertise remains crucial for effective assessment and deployment (Molick & Molick, 2023; Holmes & Tuomi, 2022).

Types of AI Used and Guidance for Students

AI in education spans various forms, including Natural Language Processing (NLP) and Machine Learning (ML) techniques (Shrungare, 2022). Evolution encompasses humanoid robots, web-based chatbots, and collaborative instructors (Ubah, A. E. et al., 2022), extending to AI-based games and applications (Araya & Scheidel, 2023). Multiagent systems and automation enhance parallel processing and gaming (Manikandan & Chinnadurai, 2022). AI contributes to intelligent instruction, assessment, and research integration into courses (Prothero, 2023), aiming to enhance teaching and learning. Students using AI tools are advised to seek teacher guidance, preventing misapplication and plagiarism (Michaeli et al., 2023). Individualized teaching strategies, explainable AI, and ethical considerations are crucial for promoting responsible use and achieving positive outcomes (Burkhard, 2022; Afzaal et al., 2023; Stone, 2023). In media literacy education, ethical dimensions are addressed to maximize positive impacts while minimizing negatives (Huda & Hashim, 2022). Behavior analysts face ethical challenges reconciling research goals and patient needs, requiring recommendations for effective treatment (Fisher et al., 2023). Ethical dilemmas in history of contemporary education, such as representativeness and informed consent, underscore the researcher's commitment to democratic knowledge production (Velasco, 2022). An ethical matrix method is proposed for educational research to identify and balance ethical considerations (Tangen, 2014), emphasizing the responsibility of researchers to uphold credibility and improve the education system (Govil, 2013).

Anticipated Challenges for Educators in AI Usage

In the pursuit of graduate studies, educators engaging with AI encounter diverse challenges, including the risk of cheating in education, limitations of AI algorithms, and ethical concerns about data security and privacy (Ayala-Pazmiño, 2023; Cury, 2023; Bu, 2022). Noteworthy differences between AI and human scoring abilities also pose potential obstacles (Chen et al., 2022). While acknowledging these challenges, a majority argue for the irreplaceable qualities of human teachers, emphasizing critical thinking, creativity, and emotional understanding (Prothero, 2023). To navigate these complexities, educators must develop AI literacy, address practical issues like data protection, ethics, and privacy, and comprehend how AI can complement teachers and students effectively. Social, cognitive, and institutional perspectives underscore the need for educators to consider diverse dimensions in ensuring the positive integration of AI into education (Malinetskii et al., 2011; Farrell, 2018; Leal Filho et al., 2022). Strategies such as continuous learning, collaboration, and ethical prioritization are pivotal for educators to proactively navigate the challenges and integrate AI successfully into the education system (Steyvers & Kumar, 2023; Shrivastava et al., 2023; Zhang et al., 2022). Advocacy for clear policies and thoughtful resource planning further contribute to fostering a positive and effective integration of AI technologies into the learning environment (Abdulaziz et al., 2023).

Policy Recommendations for AI Use in Education

Existing policies on artificial intelligence (AI) in education have garnered global attention. UNESCO, the European Union, and the Organisation for Economic Cooperation and Development have formulated policies to enhance AI's effective use in education (Drach et al., 2023). In the United States, federal documents emphasize prioritizing public values and student involvement in AI and education intersections (Menon & Chen, 2023). The Education 2030 Agenda seeks to leverage AI for closing learning gaps and improving teaching efficiency (OECD, 2018). Ethical concerns are addressed, and workshops are proposed to bridge AI research and educational policies (Slimi & Carballido, 2023; Isotani, Bittencourt, & Walker, 2023). Educators' perspectives are pivotal for successful AI implementation, shaping design, adoption, and fostering inclusion (Gibellini, Fabretti, Schiavo, 2023). Sustainability, transparency, and co-regulation strategies are recommended for effective AI regulation (Afzaal, Zia, Nouri, & Fors, 2023; Hacker, 2023). Comprehensive lifecycle audits and ethical integration are crucial for ensuring AI quality and legal compliance (Lucaj, van der Smagt, & Benbouzid, 2023). Such practices mitigate risks and address AI's potential negative impacts on individuals, society, and the environment (Graham, 2022). The integration of bioethics recommendations further supports justice-oriented technology development in health AI and broader AI regulation, highlighting the multifaceted approach required for effective AI governance.

Study Framework

To address the General Statement of the Problem and the Research Questions, a comprehensive framework can be developed by integrating Social Cognitive Theory (SCT), Institutional Theory (IT), and the Innovation-Decision Process (IDP). This framework aims to provide a holistic understanding of the process of adopting artificial intelligence (AI) among graduate students who are also educators.

Social Cognitive Theory (SCT). SCT focuses on the social learning process and emphasizes the role of observation, imitation, and modeling in the acquisition of new behaviors. In the context of AI adoption among graduate students who are educators, SCT can be applied to understand how social interactions, peer influence, and observational learning contribute to their knowledge and attitudes towards AI.

Institutional Theory (IT). IT examines the influence of institutional pressures, norms, and structures on individual and organizational behavior. In the context of AI adoption, IT helps in understanding how institutional factors such as educational policies, organizational culture, and external pressures shape the decisions and actions of educators. This includes exploring the impact of institutional expectations on the integration of AI into educational practices.

Innovation-Decision Process (IDP). IDP is a model that describes the stages individuals go through in adopting an innovation. It includes knowledge, persuasion, decision, implementation, and confirmation stages. Applied to AI adoption, IDP helps in mapping out the sequential steps and factors influencing the decision-making process of graduate student educators, from the initial awareness of AI to its full integration into their teaching practices.

Integrated Framework. This framework encompasses distinct phases in the adoption of artificial intelligence (AI) by graduate student educators. In the Pre-Awareness Phase, Social Cognitive Theory (SCT) explores the influence of social interactions and institutional factors on educators' initial awareness of AI, while Institutional Theory (IT) investigates how institutional factors shape the environment for AI awareness. During the Awareness and Knowledge Phase, SCT delves into the impact of peer influence on educators' knowledge acquisition, while IT examines how institutional pressures shape perceptions of AI. In the Decision-Making Phase, the Innovation-Decision Process (IDP) identifies factors influencing adoption decisions, while SCT considers the role of observational learning in decision-making. The Implementation

Phase involves examining challenges in AI implementation using IDP and assessing the impact of social support on successful implementation with SCT. In the Post-Implementation Phase, SCT investigates the effects of successful AI integration, and IT explores the institutional factors contributing to sustainability. The Policy Recommendations Phase involves IT identifying institutional norms influencing AI policies, while IDP considers policies' role in further innovation. This integrated framework provides a comprehensive understanding of AI adoption dynamics among graduate student educators, considering individual, social, and institutional factors.

By applying these theoretical perspectives within the integrated framework, researchers can systematically analyze the cognitive, social, and institutional aspects of AI adoption among graduate student educators, providing a nuanced understanding of the entire process and addressing the specific facets outlined in the research questions. SCT illuminates the social learning processes, observational modeling, and peer influences that shape educators' awareness, knowledge acquisition, and decision-making regarding AI. IT examines how institutional pressures and norms influence educators' decisions, incorporating educational policies and organizational culture into the analysis. The IDP model adds a temporal dimension, mapping the sequential stages from initial awareness to post-implementation challenges and policy recommendations. By integrating these theories, the framework systematically addresses the Statement of the Problem and Research Questions, offering a holistic understanding of the multifaceted process of AI adoption among graduate student educators and contributing valuable insights to the intersection of technology, education, and institutional dynamics.

STATEMENT OF THE PROBLEM

This study investigated the process of adopting artificial intelligence among selected Chinese educators enrolled as international graduate students in the College of Education of St. Paul University Manila. Specifically, this sought to answer the following questions: (1) What are the stages of adoption of artificial intelligence among the selected participants?; (2) What social situations facilitate the adoption of artificial intelligence among them?; and (3) What institutional structures are relevant to the adoption of artificial intelligence among them?

METHODOLOGY

This qualitative study sought the participation of six Chinese educators from the North China School of Science and Technology enrolled as educators in the College of Education of St. Paul University Manila since academic year 2022-2023. They constituted the whole class. They were asked to answer seven questions revolving around their experience of artificial intelligence as educators and graduate students. They were given 30 minutes to answer on campus last January 17, 2024. Their responses, written altogether directly on the Google Docs file where the question was indicated, underwent deductive thematic guided by the study's framework. The data arising from the analysis was returned to the participants for validation.

RESULTS

Stages of AI adoption

Six stages were identified operating in the narratives of the participants, namely: (1) Pre-awareness Phase, (2) Awareness and Knowledge Phase, (3) Decision-making Phase, (4) Implementation Phase, (5) Post-implementation Phase, and (6) Policy Recommendation Phase.

Pre-awareness Phase. The responses from the participants offer valuable insights into the Pre-awareness Phase of the IDP Theory, particularly in terms of their initial exposure to AI. These direct quotations

illustrate the multifaceted nature of the Pre-awareness Phase, where geographical, academic, institutional, and interdisciplinary factors collectively shape the participants' foundational exposure to AI, providing insights into their decision-making process regarding AI adoption in teaching practices. One educator highlighted the geographical influence, stating, "I first learned about artificial intelligence after coming to the Philippines, around June 2023. I was informed by a Filipino professor," underlining the impact of academic exposure and the global context on shaping awareness. Another educator shared their college experience, noting, "When I was in college, I learned about artificial intelligence, which was cited by university teachers when introducing problems," emphasizing the role of academic institutions in incorporating AI into curricula.

The significance of interdisciplinary experiences was evident when an educator remarked, "My initial exposure to artificial intelligence in the context of art and design occurred during interdisciplinary workshops and conferences that explored the intersection of technology and creativity," showcasing diverse channels contributing to AI awareness. Institutional involvement was further emphasized by an educator who learned about AI at a conference organized by their school, stating, "As a teacher at North China University of Science and Technology, I first learned about artificial intelligence at a conference organized by my school." Lastly, the establishment of an AI Academy within a school was highlighted by an educator who stated, "I first learned about Artificial Intelligence when our school established the Artificial Intelligence Academy in 2017," underscoring institutional commitment to AI education.

Awareness and Knowledge Phase. This is illuminated by the responses of participants regarding their journey in understanding AI. The Awareness and Knowledge Phase involves a comprehensive approach encompassing practical application, self-directed learning, formal education, continuous engagement, and focused exploration, laying the groundwork for informed decisions regarding the adoption and integration of AI in educational practices. One educator emphasized the practical application of AI in their work, stating, "I use various AI applications in China to enhance my work, providing better insights for paper writing and facilitating literature translation." This highlights the tangible benefits and application of AI tools in professional tasks.

Another educator underscored self-directed learning, mentioning, "Read(ing) books and search(ing) for relevant content online," emphasizing the proactive approach the participants take in expanding their knowledge about AI through independent exploration. The role of formal education is evident in a response that details learning through lectures, stating, "After I came to the Philippines to study, the professor taught Chat GPT in the course of lectures, and explained in detail how to use this artificial intelligence software for the first time," demonstrating the structured understanding gained through academic instruction. Continuous learning and engagement are stressed by an educator who noted, "Learning about AI typically involves formal education, online courses, workshops, and hands-on experience," emphasizing the dynamic nature of staying updated through various methods.

Additionally, the exploration phase is depicted by an educator who shared, "After contact, I searched the Internet for what is artificial intelligence and the specific application of artificial intelligence," showcasing the initial inquiry and exploration in the awareness stage. The focused understanding within regional contexts was articulated by the first educator, stating, "Although China currently does not allow the use of ChatGPT, many software applications in China are developed based on ChatGPT," illustrating an awareness of regional regulations and specific applications of AI models.

Decision-making Phase. This is elucidated through insights gathered from participants concerning their choices regarding the adoption and utilization of AI. This involves the participants strategically deciding on AI incorporation based on factors such as accessibility, task relevance, and perceived benefits, reflecting a nuanced approach to integration in specific work contexts. One educator, constrained by accessibility limitations, stated, "Since ChatGPT is not accessible in China, I use other Chinese AI applications sparingly

in my work," showcasing a decision driven by practical constraints. The educator strategically employs AI suggestions, particularly for event planning, emphasizing the significant reduction in work time and enhanced efficiency.

Another educator outlined a decision to integrate AI platforms into teaching and work management, aiming to improve teaching effectiveness and provide personalized support for students. Exploring AI applications in art and design, an educator contemplated the potential use of Midjourney for image generation, reflecting a thoughtful decision-making process. In contrast, an educator engaged in graduate student management chose to limit the use of AI software in their work, emphasizing context-specific decision-making. Conversely, one educator highlighted the extensive integration of AI across academia, including research, data analysis, and educational technologies, showcasing a comprehensive decision to leverage AI's versatile applications. The final educator underscored diverse applications of AI in document processing, translation, data analysis, and facial recognition, revealing a multifaceted decision-making process.

Implementation Phase. Here, common themes emerged, reflecting a nuanced and balanced approach. These direct quotations underscore the convergence of responses around key themes during this phase, revealing a consistent and thoughtful approach among the participants as they integrate AI into their educational practices. The participants often employ AI in specific contexts, such as paper writing and teaching platforms, with one educator emphasizing, "I primarily use AI in my paper writing, leveraging its capabilities to better understand concepts and central ideas in literature," illustrating a practical application of AI as a supplementary tool in academic tasks.

Another educator noted, "Utilizing Chaoxing Learning Platform, Rain Classroom and other teaching network platforms," highlighting the integration of AI for administrative and communication purposes in teaching platforms. A recurring theme emphasized the importance of critical thinking alongside AI use, with one educator advising, "I advise students to view AI as a valuable supplementary tool but stress that it cannot replace critical thinking," reflecting the participants' commitment to maintaining a balanced perspective. The adaptability of AI applications to diverse fields is emphasized, with an educator noting, "Students may use machine learning algorithms, natural language processing tools, or other AI technologies depending on their field of study," indicating a tailored approach to AI adoption based on students' academic pursuits.

Addressing challenges, the participants underscored the importance of practical learning and responsible use, cautioning students to "deepen their understanding of the use of artificial intelligence through practice and avoid over-dependence." Ethical considerations, privacy concerns, and data security were emphasized collectively, with an educator stating, "In the process of application, the privacy and security of information are a little worried, so appropriate data encryption and access control measures should be carried out," revealing a shared commitment to responsible AI use within ethical and secure frameworks.

Post-implementation Phase. This involved participants navigating an array of challenges related to technical understanding, timely application, adapting to new technologies, addressing ethical considerations, and recognizing the learning process associated with AI application. Here the participants grappled with a multitude of challenges in adopting AI, as elucidated by their responses. A crucial concern revolves around the participants comprehending the working principles of AI and effectively integrating it into teaching.

One underscored this challenge: "Educators may face challenges understanding the working principles of AI and incorporating it effectively into teaching. Training is essential for educators to maximize the benefits of this technology." The challenges extend to the timely application of AI functions during course design, where some functions may lag behind. Incorporating AI into the curriculum presents difficulties due to varying levels of technical proficiency among students, necessitating inclusive strategies and ethical considerations in AI-generated art. Another captured this sentiment: "Educators might face challenges

related to incorporating AI tools into the curriculum due to varying levels of technical proficiency among students. Ensuring inclusivity and providing accessible training resources can address these issues. Ethical considerations in AI-generated art and discussions around originality are important aspects to navigate."

Furthermore, the participants stressed the need to adapt to new technologies, especially those demanding a high level of technical competence, with professional training deemed essential. One educator succinctly expressed this viewpoint: "Educators may need to adapt to new technologies and tools, and some of these types of AI may require a high level of technical competence. Educators need professional training first to be able to take full advantage of AI." While some challenges, like AI limitations in addressing inquiries, lack specific quotations, the learning process involved in AI application is highlighted with the insight: "A lot of artificial intelligence will only be relatively shallow application. If you want to do deeper research, (you) must first study the software, so the application process of artificial intelligence is also a process of learning and application while exploring."

Policy Recommendation Phase. Participants provided nuanced insights into the regulatory landscape necessary for the ethical and effective use of AI in education. Their recommendations span a spectrum of considerations, beginning with a call for the establishment of ethical guidelines. As one participant suggested, "I suggest establishing ethical guidelines for AI use to guide students and teachers in their behavior. Implementing textual constraints on AI algorithms can ensure that technological use aligns with societal values." This recommendation aligns with the broader theme of emphasizing ethical considerations, ensuring that the use of AI adheres to societal norms and values.

Data privacy and security policies emerge as pivotal concerns, with the participants proposing specific policies to safeguard personal information. A respondent noted, "Data Privacy and Security Policy – Develop clear policies to ensure that personal data of students and teachers (are) fully protected when using artificial intelligence tools." This underscores the critical need for policies that adhere to privacy regulations and standards, reflecting a collective understanding of the importance of safeguarding sensitive information.

Intellectual property and liability considerations are addressed through policy suggestions such as, "Intellectual Property and Liability Policy – Clarify the intellectual property rights and legal responsibilities of students and teachers when using artificial intelligence tools." This highlights a comprehensive approach to legal responsibilities, ensuring fair practices and protecting the innovative contributions of students.

The recommendations extend beyond general ethics to specialized domains, such as AI-generated art. An educator advocated for guidelines that "emphasize ethical practices in AI-generated art, including proper attribution and respect for intellectual property." This tailored approach recognizes the unique ethical considerations within artistic contexts, emphasizing the need for specific guidelines in this domain.

Furthermore, an overarching emphasis on fairness and transparency is evident in several recommendations. Policies should, according to one participant, "Ensure fairness and strengthen ethics… Require AI systems to provide transparency." This dual focus on fairness and transparency reflects an awareness of the societal impact of AI and the necessity for clear communication about AI systems' decision-making processes. Overall, these policy recommendations collectively underscore the participants' understanding of the multifaceted dimensions of AI governance in education. The integration of ethical guidelines, privacy protections, intellectual property considerations, and a commitment to transparency reflects a comprehensive and responsible approach to shaping the regulatory framework for AI integration in educational practices.

Social situations facilitating AI adoption

The responses highlight instances where the participants learned about AI through direct interaction with

knowledgeable individuals, emphasizing the social aspect of learning. For example, one participant mentioned learning about AI after arriving in the Philippines and being informed by a Filipino professor, showcasing how exposure to AI is facilitated through direct interaction with a model. Similarly, attending a conference organized by the school becomes a platform for social learning, exposing the participants to AI through interaction with peers and experts. SCT principles, emphasizing the importance of social interactions and collaborative learning, are evident in these instances. Direct influence from a professor serves as a clear example of social learning. Moreover, the participants adopting AI tools after observing peers or colleagues reflects the observational learning. The decision to leverage AI for specific tasks, such as proposal generation, is influenced by the efficiency demonstrated by others. The integration of AI into teaching and student management practices is likely influenced by observing successful implementations of AI platforms in education. The participants model a balanced use of AI, serving as examples of integrating AI as a supplementary tool without replacing critical thinking. AI-driven strategies showcased by the participants on teaching platforms create an environment for students to observe and adopt similar practices.

Institutional structures relevant to AI adoption

In all phases of AI adoption among the participants, institutional structures play a crucial role. During the Pre-awareness Phase, educational institutions facilitate exposure to AI through events like interdisciplinary workshops and conferences. Specialized programs, such as the establishment of an Artificial Intelligence Academy, actively shape the participants' initial encounters with AI. In the Awareness and Knowledge Phase, institutions contribute to the participants' understanding through lectures, training programs, and adherence to regional regulations. Moving into the Decision-Making Phase, institutional norms influence choices, with the participants aligning decisions based on regional restrictions and broader institutional expectations. Participants' decisions align with or deviate from institutional expectations, showcasing the influence of organizational norms and ethical considerations. The Post-Implementation Phase underscores the need for continuous institutional support in ensuring responsible AI use. In the Policy Recommendations Phase, the participants' suggestions, such as ethical guidelines and data privacy policies, demonstrate an awareness of the institutional dimensions of AI governance. Throughout this journey, educational institutions consistently shape experiences and decisions, emphasizing the importance of both social and institutional factors in the multifaceted process of AI adoption in education.

DISCUSSION

The adoption of artificial intelligence (AI) among the participants encompasses various phases, each marked by unique challenges and considerations specific to this particular group. The participants' journey into AI adoption often begins with their initial exposure to the technology. This could occur during academic exchanges, interdisciplinary workshops, or conferences related to their field of study. In this phase, the unique context of being both graduate students and educators influences how they become aware of AI's potential applications. Observational learning within academic environments and exposure to AI through conferences and workshops shape their initial awareness.

As these individuals progress, their awareness evolves into a deeper understanding of AI's capabilities. They may gain knowledge through formal education, online courses, and hands-on experiences. The dual role of being graduate students and educators may prompt them to explore AI applications that enhance both their research and teaching practices. The influence of peer discussions and collaborative learning is heightened, given their engagement in academic communities.

In the decision-making phase, the participants face unique considerations. Their decisions to adopt AI are influenced by the compatibility of AI with their teaching methods and research goals. Observational learning plays a crucial role as they may look to colleagues or mentors who have successfully integrated AI

into their academic activities. The decisions made during this phase are not only informed by personal preferences but also by the institutional expectations placed upon them as educators.

The implementation phase sees the participants applying AI in their teaching and research practices. They may encounter challenges specific to their dual role, such as managing both their studies and teaching responsibilities. The successful integration of AI is often facilitated by collaboration with peers and the support of academic institutions. The implementation phase is marked by a dynamic interplay between their roles as learners and educators, influencing how they navigate challenges and leverage AI tools.

Following successful AI integration, the participants may experience a positive impact on their self-efficacy. Their ability to model AI use for their students is heightened, contributing to a culture of innovation within the educational environment. The post-implementation phase is characterized by a reflection on the transformative effects of AI adoption on their roles as both students and educators.

Hence, the adoption of AI among the participants is a multifaceted process, characterized by the interplay of their roles as learners and teachers. The unique challenges and considerations at each phase underscore the need for tailored strategies that recognize the dual nature of their academic journey. The integration of AI becomes not just a technological advancement but a dynamic aspect of their evolving roles within the educational landscape.

To ensure responsible and ethical adoption of AI among educators enrolled as international graduate students and their students, a comprehensive set of policies is recommended. Firstly, the establishment of ethical guidelines for AI use in educational settings is crucial, accompanied by mandatory training programs to deepen understanding and promote responsible practices. Clear protocols for data privacy and security are essential, emphasizing compliance with relevant regulations to safeguard the personal data of both educators and students.

Policies outlining intellectual property rights should be implemented to protect innovations and creations developed using AI. Moreover, transparency in AI systems' decision-making processes is paramount, necessitating support for the development of models that can explain their outputs. The policies should address fairness and non-discrimination, ensuring the design and use of AI systems avoid biases and discriminatory practices. Misuse prevention measures include training educators in academic ethics and establishing a supervision system to monitor and intervene in cases of irregular AI tool usage.

Encouraging the comprehensive integration of AI into daily study, while emphasizing its role as a supplement rather than a replacement for critical thinking, is crucial for a balanced approach. Collaboration between academic departments, particularly in art and technology, should be fostered to ensure interdisciplinary AI education. Regular training sessions on AI ethics and societal impact are recommended, integrating AI education into the curriculum to equip students with essential skills for the AI-driven era. Additionally, implementing security measures to prevent AI-related breaches and disclosure of information is imperative, emphasizing responsible AI use in educational contexts.

These policies collectively aim to create a conducive environment for the ethical and responsible integration of AI in education, balancing innovation with the protection of individuals and promoting critical perspectives. Regular reviews and updates to these policies will be essential to keep pace with the evolving landscape of AI technology and its implications in educational settings.

The literature review serves as a comprehensive backdrop to interpret the findings concerning AI adoption among the participants. Initiatives such as Everyday AI (EdAI) and AI Educator Make-a-Thons underscore the pivotal role of educators in AI education (Pollack et al., 2022; DiPaola et al., 2023). Social interactions, exemplified by the Bard and ChatGPT models, contribute to heightened empathy and AI development (Li et

al., 2022; Rhoads, 2022). The literature accentuates the nuanced understanding essential for AI awareness, aligning with the diverse phases identified in the findings.

In the knowledge acquisition phase, the literature emphasizes diverse learning strategies (Borghi, 2022) and educator-focused professional development (Flogie & Krabonja, 2023). The findings align, demonstrating that the participants acquire AI knowledge through formal education and hands-on experiences, influenced by peer discussions and collaborative learning.

The integration of AI applications in educational practices, as supported by the literature (Romanov et al., 2022; Singh & Hiran, 2022), resonates in the implementation phase. Challenges, such as data infrastructure issues (Tangi et al., 2023), echo the findings, underscoring the necessity for comprehensive AI integration strategies.

The literature on problems and solutions in AI adoption, encompassing ethical concerns and institutional support (Bu, 2022), corresponds with the challenges faced by the participants. The need for nuanced understanding and policies, as suggested in the literature (Fabretti & Schiavo, 2023), echoes in the policy recommendations stemming from the findings.

The types of AI used and guidance for students discussed in the literature (Shrungare, 2022; Michaeli et al., 2023) align with the diverse AI applications identified in the findings. The emphasis on ethical considerations (Burkhard, 2022) resonates with the recommendations for ethical guidelines and comprehensive AI integration policies.

Anticipated challenges for educators in AI usage (Ayala-Pazmiño, 2023; Zhang & Deng, 2022) correspond to the challenges identified in the findings. The literature supports the need for continuous learning, collaboration, and ethical prioritization, mirroring the strategies suggested for navigating AI complexities in education.

REFERENCES

1. Abdulaziz, A., Al-Khalifa, K. N., & Hamouda, A. M.ʔ2023). Re-Thinking Data Strategy and Integration for Artificial Intelligence: Concepts, Opportunities, and Challenges. *Applied Sciences*, 13(12), 7082. DOI: https://doi.org/10.3390/app13127082
2. Adamski, A., & Adamska, J. (2023). Artificial Awareness, as an innovative learning method and its application in science and Technology. *Annals of Biomedical Science and Engineering*, *7*(1), 012–019. https://doi.org/10.29328/journal.abse.1001020
3. Afzaal, M., Zia, A., Nouri, J., & Fors, U. (2023). Informative feedback and explainable AI-based recommendations to support students' self-regulation. *Technology, Knowledge and Learning*. DOI: https://doi.org/10.1007/s10758-023-09650-0
4. Araya, R. & Scheidel, W. (2023). *AI in Education*. Crossroads. doi: 10.1145/3589657
5. Ayala-Pazmiño. M. F. (2023*). Artificial Intelligence in Education: Exploring the Potential Benefits and Risks*. 593 Digital Publisher CEIT. DOI: 10.33386/593dp.2023.3.1827
6. Bizzo, B. C. et al. (2023). Addressing the Challenges of Implementing Artificial Intelligence Tools in Clinical Practice: Principles from Experience. *Journal of the American College of Radiology. JACR*, *20*(3), 352–360. https://doi.org/10.1016/j.jacr.2023.01.002
7. Borghi, G. & White B. (2022). *Data extractivism and public access to algorithms: Mapping the battleground of international digital trade*. Routledge
8. Bu, Q. (2022). Ethical Risks in Integrating Artificial Intelligence into Education and Potential Countermeasures. *Science insights, 41*(1). DOI: 10.15354/si.22.re067
9. Burkhard, M. (2022). Student perceptions of ai-powered writing tools: towards individualized teaching strategies. *CELDA*, 2022, 225–240

10. Chen, J., Lai, P., Chan, A., Man, V., & Chan, C-H. (2022). AI-Assisted Enhancement of Student Presentation Skills: Challenges and Opportunities. *Sustainability*, *15*(1), 196. DOI: 10.3390/su15010196

11. Cury, C. (2023, June 22). The Risks of Biased AI – And How To Avoid It. Retrieved from https://rockcontent.com/blog/risks-of-biased-ai/#:~:text=These%20biases%20can%20arise%20from,and%20correlations%20within%20that%20data

12. DiPaola, D. et al. (2023). Make-a-Thon for Middle School AI Educators. In Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 1 (SIGCSE 2023). Association for Computing Machinery, New York, NY, USA, 305–311. https://doi.org/10.1145/3545945.3569743

13. Drach, I. et al. (2023). *The Use of Artificial Intelligence in Higher Education*. Unìversiteti ì lìderstvo, doi: 10.31874/2520-6702-2023-15-66-82

14. Fabretti, V. & Schiavo, G. (2023). AI Education from the Educator's Perspective: Best Practices for an Inclusive AI Curriculum for Middle School. *CHI EA '23: Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems*, 27, 1–6. DOI: 10.1145/3544549.3585747

15. Farrell, H. (2018). The Shared Challenges of Institutional Theories: Rational Choice, Historical Institutionalism, and Sociological Institutionalism. In Glückler, J., Suddaby, R., Lenz, R. (Eds.). *Knowledge and Institutions*, 13, 23-44. Springer, Cham. DOI: https://doi.org/10.1007/978-3-319-75328-7_2

16. Fayaz, S. et al. (2022). Academic and Administrative Role of Artificial Intelligence in Education. Sustainability. *Sustainability 2022*, *14*(3), 1101. DOI: 10.3390/su14031101

17. Fisher, W. W., Fuhrman, A. M., Greer, B. D., Ibañez, V. F., Peterson, K. M.. Piazza, C. C. (2023). Chapter 7 – Ethical considerations with balancing clinical effectiveness with research design. In D. J. Cox, N. Y. Syed, M. T. Brodhead & S. P. Quigley (Eds.), *Research Ethics in Behavior Analysis* (149-168). Academic Press

18. Flogie, A. & Krabonja, M. V. (2023). Artificial Intelligence in Education: Developing Competencies and Supporting Teachers in Implementing AI in School Learning Environments. In *12th Mediterranean Conference on Embedded Computing, MECO 2023, Budva, Montenegro, June 6-10, 2023*. pages 1-6, IEEE, 2023. DOI: https://doi.org/10.1109/MECO58584.2023.10155054

19. Gibellini, G., Fabretti, V., & Schiavo, G. (2023). AI Education from the Educator's Perspective: Best Practices for an Inclusive AI Curriculum for Middle School. Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems

20. Govil, P. (2013). Ethical Considerations in Educational Research, 1(2), 17-22

21. Graham, S. S. (2022). Regulating health ai. *The Doctor and the Algorithm*, 159–184. DOI: https://doi.org/10.1093/oso/9780197644461.003.0008

22. Gupta, K. P. & Bhaskar, P. (2020). Inhibiting and Motivating Factors Influencing Teachers' Adoption of AI-Based Teaching and Learning Solutions: Prioritization Using Analytic Hierarchy Process. *Journal of Information Technology Education: Research*, 19, 693-723. DOI: https://doi.org/10.28945/4640

23. Holmes, W. & Tuomi, I. (2022). State of the art and practice in AI in education. European Journal of Education,57(4), 542-570. DOI: 10.1111/ejed.12533

24. Huda, M., & Hashim, A. (2022). Towards professional and ethical balance: insights into application strategy on media literacy education. *Kybernetes, 51*(3), 1280-1300

25. Isotani, S. Bittencourt, I., & Walker, E. (2023). Artificial Intelligence and Educational Policy: Bridging Research and Practice. In Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium and Blue Sky. DOI: 10.1007/978-3-031-36336-8_9

26. Jeenisha, S. (2022). AI in Education. *XRDS: Crossroads, The ACM Magazine for Students, 29*(3), 63–65. DOI: https://doi.org/10.1145/3589657

27. Kumar, P., S, N., A, S., & K B, K. (2023). Implementation of Artificial Intelligence in Education. *International Research Journal of Computer Science*, *10*(05), 104–108.

https://doi.org/10.26562/irjcs.2023.v1005.01

28. Langer, N. & Jain, T. (2023). *Peer Influence and IT Career Choice*. Information Systems Research. DOI: 10.1287/isre.2019.0416

29. Leal Filho, W. et al. (2022). Barriers to institutional social sustainability. *Sustain Sci*, 17, 2615–2630. DOI: https://doi.org/10.1007/s11625-022-01204-0

30. Li, C., Xing, W., & Leite, W. I. (2022). Toward Building a Fair Peer Recommender to Support Help-Seeking in Online Learning. *Distance Education, 43*(1), 30-55

31. Lucaj, L., van der Smagt, P., & Benbouzid, D. (2023). AI regulation is (not) all you need. *2023 ACM Conference on Fairness, Accountability, and Transparency*. DOI: https://doi.org/10.1145/3593013.3594079

32. Malinetskii, G. G., Manenkov, S. K., Mitin, N. A., & Shishov, V. V. (2011). A cognitive challenge and information technologies. *Herald of the Russian Academy of Sciences, 81*(4), 397-405

33. Manikandan, S. & Chinnadurai, M. (2022). *Empowering Artificial Intelligence Through Machine Learning* (1st ed.). Imprint Apple Academic Press

34. Michaeli, T., Seegerer, S., & Romeike, R. (2023). What Students Can Learn About Artificial Intelligence – Recommendations for K-12 Computing Education. arXiv.org, https://arxiv.org/ftp/arxiv/papers/2305/2305.06450.pdf

35. Mollick, E. & Mollick, L. (2023). Using AI to Implement Effective Teaching Strategies in Classrooms: Five Strategies, Including Prompts. *The Wharton School Research Paper*. DOI: 10.2139/ssrn.4391243

36. Neumann, M. (2019, March 10). Interview with Thomas Dietterich. Retrieved from https://sigai.acm.org/aimatters/blog/author/mneumann/

37. NMNH Division of Mammals. (2023). Managing Educational Systems and Sector in the Context of Artificial Intelligence: An Overview. DOI: 10.46679/978819573220311

38. Nyberg, C. C., & Morris, E. (2023). Letter to the editor: "Revolutionizing clinical education: Opportunities and challenges of AI integration." *European Journal of Physiotherapy*, 25(3), 127–128. DOI: https://doi.org/10.1080/21679169.2023.219857

39. OECD. (2018). Future of Education and Skills 2030: Conceptual Learning Framework. Retrieved from https://www.oecd.org/education/2030/Education-and-AI-preparing-for-the-future-AI-Attitudes-and-Values.pdf

40. Polack, S., Schiavo, G., Zancanaro. (2022). Teachers' Perspective on Artificial Intelligence Education: an Initial Investigation. In CHI EA '22: Extended Abstracts of the 2022 CHI Conference on Human Factors in Computing Systems. Article No.: 431 (pp.1–7). https://doi.org/10.1145/3491101.3519866

41. Prothero, A. (2023, April 28). Will Artificial Intelligence Help Teachers—or Replace Them? Retrieved from https://www.edweek.org/technology/will-artificial-intelligence-help-teachers-or-replace-them/2023/04

42. Rajeswari, P., & Purushothaman, S. (2023). Artificial Intelligence in education. *Thiagarajar College of Preceptors Edu Spectra*, 5(S1), 47–50. https://doi.org/10.34293/eduspectra.v5is1-may23.008

43. Rhoads, M. (2022). Observational learning. *Observational Learning*. Routledge. https://doi.org/10.4324/9780367198459-reprw29-1

44. Ritter, S. & Koedinger, K.R. (2023). Large-scale commercialization of AI in school-based environments. doi: 10.4337/9781800375413.00035

45. Rizvi, M. (2023). Exploring the landscape of Artificial Intelligence in education: Challenges and opportunities. *2023 5th International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA)*. https://doi.org/10.1109/hora58378.2023.10156773

46. Romanov, A. et al., (2022). Applying AI in Education Creating a Grading Prediction System and Digitalizing Student Profiles. *2022 International Conference on Frontiers of Communications, Information System and Data Science (CISDS)*, Guangzhou, China, 2022, pp. 84-93. DOI: 10.1109/cisds57597.2022.00021

47. Ruvalcaba-Gomez, E. A. & Garcia-Benitez, V. H. (2023). Analysis of Artificial Intelligence Strategies: Comparative Study in National Governments. DOI: 10.4018/978-1-6684-5624-8.ch003

48. Sharma, S., & Sharma, D. (2023). Integrating Artificial Intelligence into education. *International Journal of Advanced Academic Studies*, *5*(6), 35–39. https://doi.org/10.33545/27068919.2023.v5.i6a.1004

49. Shrivastava, R., Jain, M., Vishwakarma, S.K., Bhagyalakshmi, L., Tiwari, R. (2023). Cross-Cultural Translation Studies in the Context of Artificial Intelligence: Challenges and Strategies. In: Kumar, A., Mozar, S., Haase, J. (Eds.). Advances in Cognitive Science and Communications. ICCCE 2023. Cognitive Science and Technology. Springer, Singapore. DOI: https://doi.org/10.1007/978-981-19-8086-2_9

50. Singh, S. V. & Hiran, K. K. (2022). The Impact of AI on Teaching and Learning in Higher Education Technology. *Journal of Higher Education, Theory, and Practice*, 22(13). DOI: 10.33423/jhetp.v22i13.5514

51. Slimi, Z. & Carballido, B. V. (2023). Navigating the Ethical Challenges of Artificial Intelligence in Higher Education: An Analysis of Seven Global AI Ethics Policies. *TEM Journal, 12*(2), 590-602. DOI: 10.18421/TEM122-02

52. Steyvers, M., & Kumar, A. (2023). Three Challenges for AI-Assisted Decision-Making. *Perspectives on Psychological Science*, *0*(0). DOI: https://doi.org/10.1177/17456916231181102

53. Tangen, R. (2014). Balancing Ethics and Quality in Educational Research—the Ethical Matrix Method. Scandinavian Journal of Educational Research, 58(6), 678-694

54. Tangi, T., van Noordt, C., & Müller, A. P. R. (2023). The challenges of AI implementation in the public sector. An in-depth case studies analysis. In Proceedings of the 24th Annual International Conference on Digital Government Research (DGO '23). Association for Computing Machinery, New York, NY, USA, (pp. 414–422). DOI: https://doi.org/10.1145/3598469.3598516

55. Theophilou, E., et al. (2023). Learning to Prompt in the Classroom to Understand AI Limits: A Pilot Study. Springer Nature Switzerland

56. Ubah, A. E. *et al*. (2022), "A Review of Artificial Intelligence in Education," *2022 International Conference on Artificial Intelligence of Things and Crowdsensing (AIoTCs)*, Nicosia, Cyprus, 2022, pp. 38-45, DOI: 10.1109/AIoTCs58181.2022.00104

57. Velasco, M. S. (2022). Ethical considerations of oral history from the educational approach *New Trends in Qualitative Research*, *12*. DOI: e638. https://doi.org/10.36367/ntqr.12.2022.e638

58. Zhang, K., & Deng, P. (2022). Exploring the technology and problems of Artificial Intelligence Education applications. *2022 4th International Conference on Computer Science and Technologies in Education (CSTE)*. https://doi.org/10.1109/cste55932.2022.00056

59. Zhang, Y., Ren, G., & Wang, D. (2022). Ethical challenges and strategies of Artificial Intelligence Applications. *2022 Eleventh International Conference of Educational Innovation through Technology (EITT),* New York, NY, USA, 2022, pp. 110-113, doi: 10.1109/EITT57407.2022.00025

Response to comments of reviewer:

Dr. Brian Bantugan <bbantugan@spumanila.edu.ph>   9:15 PM (5 minutes ago)   ☆ ↩ ⋮
to Editor ▾

Dear editor:

They are not language teachers as indicated in the suggested title revision. They are Chinese educators from different disciplines who are enrolled as international students in the College of Education of St. Paul University Manila. Therefore, I cannot comply with the suggested title, it is not a quantitative study so tables and graphs are not needed. Attached is the article with the recommended additional sentences in the abstract, highlighted in yellow.

Brian Bantugan