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ORIGINAL

Artificial Intelligence as the Call of the Times: Attitudes of Higher Education Teachers across Gender, Generational Cohorts, and Length of Service in the Context of Education 5.0

La Inteligencia Artificial como el Llamado de los Tiempos: Actitudes de los Docentes de Educación Superior según el Género, las Cohortes Generacionales y la Antigüedad en el Servicio en el Contexto de la Educación 5.0

Alexandhrea Hiedie Dumagay[1], Arayana F. Kunting[1,6], Ericson O. Alieto[1], Kharylle Schyaneid T. Kenoh[1], Rochard T. Tarroza[1], Richard M. Rillo[2], Eduard M. Riparip[3], Lesly Ann C. Jacinto[1], Lovelle Diocess S. Lauzon[4], Edison B. Estigoy[5], Christopher Iris Francisco[1], Dolores O. San Juan[7]

[1]Western Mindanao State University. Zamboanga City, 7000 Philippines.
[2]De La Salle University. Manila, 1004 Philippines.
[3]University of Makati. 1644 Philippines.
[4]Mindanao State University-Sulu. 7400 Philippines.
[5]Xi'an University of Technology.
[6]University of the Philippines. Diliman, 1101 Philippines.
[7]Zamboanga Peninsula Polytechnic State University. 7000 Philippines.

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Corresponding Author: Alexandhrea Hiedie Dumagay

ABSTRACT

Artificial Intelligence had reshaped education worldwide and redefined how teachers taught and how students learned. Yet in the Philippine higher education sector, particularly in Southwestern Mindanao, progress remained uneven because of gaps in infrastructure and training. The study aimed to determine the attitudes of 648 in-service educators from state universities and colleges toward AI in education, with attention to gender, generational cohort, and length of service as influencing factors. The study used a quantitative cross-sectional design and analyzed the data through descriptive statistics, independent samples t-tests, and one-way ANOVA. Results showed that teachers held generally positive attitudes toward AI (mean = 4,19, SD = 0,94), while negative attitudes were relatively low (mean = 2,27, SD = 0,82). Significant differences appeared across gender ($t(646) = 7,03$, $p < 0,001$), generation ($F(3,644) = 2391,43$, $p < 0,001$), and length of service ($F = 8,45$, $p < 0,001$). Female and younger educators, particularly those from Generation Z and Millennials, showed stronger positive attitudes, whereas teachers with longer service were more cautious. The findings revealed that openness to AI was shaped by demographic and professional factors. These findings suggest that AI adoption in higher education is shaped not only by technology itself but also by teachers' demographic backgrounds and professional contexts. The study recommends targeted professional development and inclusive policies to strengthen AI literacy, address concerns, and align AI integration with the human-centered vision of Education 5.0.

Keywords: Attitude; Gender; Generational Cohorts; Length of Service; Higher Education; In-service Teachers.

RESUMEN

La Inteligencia Artificial había transformado la educación a nivel mundial y redefinido la manera en que los docentes enseñaban y los estudiantes aprendían. Sin embargo, en el sector de la educación superior filipina, particularmente en el suroeste de Mindanao, el progreso seguía siendo desigual debido a las brechas en infraestructura y formación. El estudio tuvo como objetivo determinar las actitudes de 648 docentes en servicio de universidades y colegios estatales hacia la IA en la educación, considerando el género, la cohorte generacional y los años de servicio como factores de influencia. Se empleó un diseño cuantitativo de tipo transversal y los datos se analizaron mediante estadísticas descriptivas, pruebas t para muestras independientes y ANOVA de un factor. Los resultados mostraron que los docentes mantenían actitudes generalmente positivas hacia la IA (media = 4,19; DE = 0,94), mientras que las actitudes negativas fueron relativamente bajas (media = 2,27; DE = 0,82). Se observaron diferencias significativas según el género ($t(646) = 7,03$; $p < 0,001$), la generación ($F(3,644) = 2391,43$; $p < 0,001$) y los años de servicio ($F = 8,45$; $p < 0,001$). Las docentes y los educadores más jóvenes, especialmente los pertenecientes a la Generación Z y a los Millennials, mostraron actitudes más positivas, mientras que los de mayor antigüedad se mostraron más cautelosos. Los hallazgos revelaron que la apertura hacia la IA estaba determinada por factores demográficos y profesionales. El estudio recomienda programas de desarrollo profesional específicos y políticas inclusivas que fortalezcan la alfabetización en IA, aborden las preocupaciones existentes y alineen la integración de la IA con la visión humanista de la Educación 5.0.

Palabras clave: Actitud; Género; Cohortes Generacionales; Antigüedad en el Servicio; Educación Superior; Docentes en Servicio.

INTRODUCTION

Artificial Intelligence (AI) evolved from speculative ideas about machine intelligence into one of the most influential technologies that shaped contemporary life. Initially introduced during the mid-20th century,[1] AI expanded to include advanced machine learning, deep learning, and natural language processing, which allowed systems to analyze, predict, and adapt to complex environments.[2,3] Its applications spanned critical areas such as healthcare, national defense, business, and education, demonstrating its ability to enhance precision, efficiency, and innovation.[4,5,6,7]

Education maintained a close relationship with technological change. From early uses of radio and television to the rise of computers and the internet, digital technologies continuously reshaped classrooms and learning processes.[8,9,10,11,12] The widespread use of digital platforms during the Fourth Industrial Revolution established the foundation for the transition toward AI-powered learning. This shift represented not only another wave of technology adoption but also a redefinition of how knowledge was delivered, assessed, and experienced in education.[13,14,15,16,17]

The emergence of Artificial Intelligence in Education (AIED) introduced a new phase of digital transformation. Tools such as adaptive learning platforms, intelligent tutoring systems, automated grading, and chatbots assisted institutions in personalizing instruction, monitoring student progress, and reducing the workload of educators.[18,19,20,21,22,23] Within this framework, Education 5,0 served as a paradigm that promoted human-centered, ethical, and innovation-driven learning. It viewed AI not as a substitute for teachers but as a collaborator that enabled them to cultivate creativity, empathy, and critical thinking.[24,25,26]

Realizing this vision required more than the availability of technology. It depended on deliberate strategies that ensured proper infrastructure, relevant professional development, and policy safeguards that guaranteed ethical and responsible use.[27,28] Kuleto et al.[29] emphasized that universities must consistently update curriculum content and assessment practices to remain responsive to the evolution of AI and to sustain dependable, forward-looking learning environments.

The Philippine higher education system began its gradual movement toward this transformation. Universities and colleges initiated pilot AI applications for teaching, student support, and administration. However, progress remained uneven because of persistent challenges such as limited digital infrastructure, unstable internet connectivity, and low levels of AI literacy among educators.[29,30,31,32,33,34] These barriers appeared most evident in Southwestern Mindanao, where resource limitations and socio-economic inequalities restricted adoption. Despite these conditions, Filipino teachers and students exhibited adaptability and openness to AI, while ethical concerns, privacy issues, and fears of depersonalization persisted.[35,36,37,38]

Teachers' attitudes remained central to the successful integration of AI in education. Attitude, commonly defined as an individual's favorable or unfavorable evaluation of an object or idea,[39] determined whether teachers resisted or embraced new technologies. In educational settings, attitude manifested through beliefs

about AI's usefulness, emotional responses such as excitement or anxiety, and the willingness to employ AI tools in classroom practice.[4,40] Studies revealed that positive attitudes aligned with openness to innovation, pedagogical integration, and readiness to test new tools.[41,42] Conversely, negative attitudes often resulted from low confidence, fear of replacement, or inadequate training, which hindered adoption.[43]

Evidence from recent studies revealed the complexity of these attitudes. A study in Cyprus that adapted localized versions of the General Attitudes Toward AI Scale and the AI Literacy Scale found that many teachers expressed neutral views toward AI despite moderate digital competence. The responses indicated caution rather than outright resistance, showing a pragmatic perspective that accepted AI's relevance but remained aware of its implications. The same study demonstrated that higher digital skills correlated with increased literacy, constructive attitudes, and greater readiness to incorporate AI into teaching.[44]

Despite extensive global research on AI in education, studies in the Philippine higher education context remained scarce. Most local investigations concentrated on pre-service teachers or on single dimensions such as readiness, anxiety, perception, and knowledge.[45,46,47,48] This left in-service teachers underrepresented in current research, even though they implemented curriculum and pedagogical innovations directly.

Demographic factors also required closer examination. Gender, for instance, could influence attitudes toward AI. Philippine studies identified differences between male and female educators, with males often expressing more favorable attitudes.[37] International studies also confirmed gender-based variations in familiarity and comfort with AI tools.[49] Since teaching remained a predominantly female profession in the Philippines,[50,51,52,53] disregarding gender differences could reinforce disparities in digital confidence and literacy among educators.

Generational membership likewise influenced AI adoption. Scholars noted that educators from various cohorts such as Generation Z, Millennials, Generation X, and Baby Boomers displayed distinct perspectives toward technological change. Younger teachers, often described as digital natives, demonstrated greater openness to innovation, whereas older educators expressed caution due to limited exposure or reliance on established teaching routines.[54,55] In the Philippine context, limited empirical evidence examined how generational differences influenced readiness or hesitation to use AI in education.

Length of service represented another important factor in AI adoption. Teachers at different stages in their careers responded differently to innovation because of variations in experience, adaptability, and exposure to emerging tools. Early-career educators with one to seven years of teaching often exhibited stronger enthusiasm for AI, while those with longer service contributed critical insights yet displayed greater hesitation due to established practices.[56,57] However, little evidence existed on how teaching tenure influenced AI attitudes among higher education teachers in the Philippines.

Thus, this study sought to fill these gaps by examining the attitudes of in-service teachers in higher education institutions in Southwestern Mindanao toward Artificial Intelligence, with attention to gender, generational cohort, and length of service. By situating the inquiry within the vision of Education 5.0, the study provided localized insights into how teachers perceived both the opportunities and the challenges associated with AI integration. The findings provided guidance for institutional leaders and policymakers in developing inclusive strategies, professional development initiatives, and policies that ensured AI adoption supported the human-centered mission of Philippine higher education.

Literature Review

Global and Philippine Perspectives on Education 5.0

The concept of Education 5.0 has emerged as the next stage in educational reform, marking a shift from the primarily technology-driven goals of Education 4.0 to a model that deliberately integrates human values, ethics, and sustainability. Whereas Education 4.0 responded to the demands of Industry 4.0 by emphasizing innovation and digital transformation, its reliance on technology often sidelined the interpersonal and affective dimensions of teaching and learning. Education 5,0 builds on these foundations but places learners, teachers, and society at the center, stressing adaptability, collaboration, and the responsible use of advanced technologies such as artificial intelligence (AI), robotics, and data analytics.[24, 58,59,60]

The transition from Education 4.0 to Education 5.0 was shaped by the rapid digitalization of the pandemic years, when online classes and distance education underscored the ability of technology to expand access. However, as Chinchorkar et al.[61] point out, this period also revealed the limits of a purely technology-centered model, with human connection often diminished in the process. Education 5.0 emerged as a corrective response—one that integrates social and emotional dimensions into technologically enhanced learning to ensure that education remains both innovative and humane. This transformation envisions sustainable systems that are not only technologically advanced but also teacher–learner-centered and socially responsible.

AI plays a particularly significant role in advancing this vision. Intelligent tutoring systems, predictive analytics, and adaptive learning platforms enable the personalization of instruction and reduce repetitive tasks, allowing teachers to focus more on mentorship, creativity, and higher-order thinking. Scholars emphasize that AI should serve as a partner rather than a replacement for teachers, enhancing the human aspects of learning when designed and implemented responsibly.[23,25,62]

Recent studies further connect Education 5.0 with the broader principles of Industry 5.0. Mohamed Hasim et al.[63] proposed a tetra-dimensional model for integrating Industry 5.0 into higher education—covering theoretical, technical, application, and practice dimensions. They highlight the importance of research and development, business innovation, and human-centricity in reimagining higher education, emphasizing that the sector must not only improve operational efficiency but also contribute to societal and environmental sustainability.

Readiness for Education 5.0, however, varies across nations. Alharbi[64] observed that developed countries such as Saudi Arabia and Malaysia are leading efforts by embedding AI, robotics, and immersive technologies into education, while developing nations like Zimbabwe and Sri Lanka struggle with infrastructure and policy limitations. Balili Jr. et al.[65] likewise found that educators worldwide are expected to continuously reskill and integrate advanced tools such as AI, virtual reality (VR), and augmented reality (AR). They caution, however, that this transformation requires long-term investment in faculty development and institutional support. Shahidi Hamedani et al.[60] also situate Education 5.0 within the framework of Society 5,0, highlighting the dual need for technical competence and ethical sensibility so graduates can contribute meaningfully to sustainable development goals.

In the Philippines, the implementation of Education 5.0 remains in its early stages. Persistent issues such as unstable internet connectivity, inadequate infrastructure, and digital literacy disparities continue to slow progress,[30,32] especially in underserved areas like Southwestern Mindanao. Yet despite these limitations, universities have begun to recognize the importance of aligning their programs, policies, and teacher development initiatives with the demands of Education 5.0.[33,37,66]

Research on Filipino educators presents both progress and challenge. Gamad et al.[67], in their study of Global Filipino Teachers (GFTs), found moderate technological competence overall. Participants showed strong proficiency in tools such as video conferencing and social media but demonstrated weaker skills in AI-driven applications. Adaptability was closely linked to technological skills, and factors such as age, gender, and academic background influenced readiness. Their study underscores the need for targeted professional development, infrastructure support, and continuous policy reinforcement to fully engage educators with the expectations of Education 5.0.

In essence, Education 5.0 signifies more than a technological upgrade—it represents a reorientation of education toward ethics, sustainability, and human development. Globally, the literature shows both advancement and inequality in its implementation, while the Philippine experience highlights the importance of empowering teachers as key agents of change. The success of Education 5.0 ultimately rests not only on digital integration but also on how well educators are prepared, supported, and positioned to humanize learning in a digital era.

Artificial Intelligence in Education

Artificial intelligence (AI) has become an integral part of education, presenting both opportunities and challenges across learning contexts. Ouyang et al.[68] identified three paradigms in the evolution of AI in education (AIEd): AI-directed learning, where learners passively receive information; AI-supported learning, where learners collaborate with AI; and AI-empowered learning, where students lead their learning through active engagement. This shift mirrors the broader trend toward learner-centered and personalized education, positioning AI not just as a tool for efficiency but as a catalyst for empowerment. Yet despite its growing presence, Schiff[69] observed that AIEd remains underrepresented in global AI policy strategies, where emphasis is placed more on workforce readiness than on pedagogical innovation. This imbalance reflects a persistent gap between educational practice and national policy frameworks.

Research has identified both the potential and the pitfalls of AI integration in classrooms. Seo et al.[70] noted that AI systems can enhance learner–instructor interaction, scale personalized feedback, and foster a stronger sense of connection in online settings. However, they also cautioned that these same systems could raise issues of surveillance, agency, and accountability, areas that require thoughtful cultural and pedagogical consideration. Wang et al.[23], in a large-scale bibliometric review, confirmed that AIEd research has evolved from technical design to focus more on adoption, impact, and challenges. Similarly, Agarwal et al.[71] stressed that Education 5.0 calls for policies and institutional capacity-building to sustain AI integration, particularly in higher education.

Ofosu-Ampong[72] added a more contemporary perspective by examining lecturers' attitudes toward AI tools such as ChatGPT. His study revealed that 84 % of lecturers expressed willingness to accept AI for academic use, with significant predictors including teaching experience, institutional support, and personal attitudes. Factors like usability, policy structure, and cultural context also influenced their openness. These findings emphasize that beyond technology itself, successful AI adoption relies on supportive environment. In this sense, AI in education is both a technological and socio-political transformation that demands alignment among innovation, governance, and teacher readiness.

Attitude towards Artificial Intelligence

The way teachers and learners perceive AI often determines its success or failure in integration. Studies consistently reveal a mix of enthusiasm, neutrality, and anxiety. Santos et al.[38] reported that teachers were generally interested in AI, especially in rural areas where it was seen as a tool to overcome limited resources, yet overall, their stance toward integration remained neutral. Negative attitudes were largely shaped by social fears of AI dominance, though many respondents expressed confidence in interacting with AI tools. Similarly, Stein[55] showed that attitudes can be linked to psychological traits: younger individuals and those high in agreeableness tended to hold more positive views, while those with conspiracy-oriented beliefs expressed resistance.

How teachers and learners perceive AI often determines whether integration succeeds or fails. Studies across contexts reveal a spectrum of emotions, ranging from enthusiasm to caution and even anxiety. Santos et al.[38] reported that teachers, particularly in rural areas, viewed AI as a means to overcome limited resources but maintained a generally neutral stance toward its integration. Negative attitudes were mostly driven by fears of AI dominance, although many respondents still felt confident using AI tools. Similarly, Stein[55] found that attitudes correlate with psychological traits: younger individuals and those high in agreeableness showed more positive dispositions, while people with conspiratorial or skeptical tendencies were more resistant.

Teacher competence also shapes perceptions. Galindo-Domínguez et al.[41] discovered that educators with strong digital competence tended to express more positive attitudes toward AI, regardless of age, gender, or experience. This suggests that enhancing teachers' skills in information management, content creation, and problem-solving can promote acceptance. Hopcan et al.[73] presented a complementary perspective, noting that teacher candidates were open to AI but anxious about its impact on employment and social structures. Brauner et al.[74] similarly argued that public attitudes toward AI are fragmented and influenced by ethical and political discourse rather than purely technical considerations. Together, these findings highlight that attitudes toward AI are deeply tied to questions of trust, ethics, and governance.

In the Philippine setting, Alieto et al.[75] found that teacher aspirants acknowledged AI's transformative potential but raised concerns about ethics, classroom dynamics, and readiness for adoption. Serdenia et al.[76] also identified hesitations rooted in preparedness and access inequities. Collectively, these studies show that attitudes toward AI are shaped not only by technology itself but also by local realities—cultural, pedagogical, and infrastructural. Building on this, Ofosu-Ampong[72] confirmed that attitudes directly predict AI acceptance among lecturers, suggesting that supportive policies and continuous training are essential to foster positive dispositions and reduce apprehension.

Attitude toward AI and Gender

Scholars have long debated whether gender influences how teachers and students perceive AI. Evidence, however, remains mixed. Balasa et al.[37] reported that male prospective teachers showed significantly higher positive attitudes toward AI than females, suggesting that gender may play a role in shaping openness to technological adoption. They argued that gender-responsive approaches could help bridge this gap in teacher training. In contrast, Hajam et al.[77] found no significant difference between male and female students' attitudes toward AI, though disciplinary background (science versus arts or commerce) appeared to influence their views.

Other studies also suggest that gender may interact with additional variables. Galindo-Domínguez et al.[41] concluded that digital competence, rather than gender itself, predicts AI attitudes, while Santos et al.[38] found that although gender was not statistically significant, female teachers tended to show slightly more frequent interest in AI than their male colleagues. Serdenia et al.[76] further emphasized that while gender differences in perception are not always straightforward, subtle disparities in confidence and engagement highlight the need for inclusive training opportunities. These multifaceted findings indicate that while gender gaps may exist in certain contexts, they are not universal and may be mediated by other factors such as competence, discipline, or geographical location.

Overall, gender appears to influence attitudes toward AI in context-specific ways. Some studies show men as more optimistic adopters, while others find neutrality or highlight other mediating variables. For educators and policymakers, addressing gender differences means going beyond perception to confront the systemic and institutional barriers that shape them.

Attitude toward AI and Generational Cohorts

Generational identity also plays a key role in understanding how educators perceive and adopt AI in education. Studies show that younger cohorts—particularly Generation Z—tend to be more receptive to experimenting with AI, while older cohorts such as Generation X and Baby Boomers are often more cautious.[54,55] This divide reflects broader differences in digital socialization: Gen Z grew up surrounded by technology, whereas older educators honed their teaching practices in less digitized environments.

Empirical research supports this contrast. Chan et al.[78] found that Gen Z students expressed optimism about

the benefits of generative AI tools such as ChatGPT, highlighting gains in productivity, personalization, and efficiency. In contrast, Gen X and Millennial teachers voiced concerns about ethical implications, overreliance, and pedagogical risks. Similarly, Babu et al.[79] demonstrated that generational identity significantly predicted ChatGPT adoption, with Gen Z's openness exerting the strongest influence on usage behavior. Together, these findings reveal that generational perspective shapes not only perception but also actual engagement with AI.

Recognizing these differences is crucial for higher education institutions. Faculty development programs must address both the digital optimism of younger educators and the measured prudence of older generations. Building inclusive AI policies that foster dialogue and collaboration can help bridge generational divides and encourage balanced, responsible adoption.

Attitude toward AI and Length of Service

Parallel to generational influences, the length of teaching service has been identified as a potential factor shaping educators' responses to AI integration. Studies suggest that early-career teachers (1–7 years) often demonstrate higher willingness to experiment with innovative tools, viewing them as opportunities for professional growth and classroom engagement.[57] Mid-career teachers (8–21 years) may adopt a more balanced stance, weighing the benefits of AI against practical classroom challenges, while late-career educators (22 years and above) sometimes show resistance due to entrenched pedagogical routines or skepticism about AI's relevance.[56]

At the same time, length of service can also be an asset. Experienced educators bring deep pedagogical expertise that can inform critical evaluation of AI tools, ensuring that adoption aligns with sound teaching practices and ethical considerations. However, without targeted training or institutional support, longer-serving teachers may be disadvantaged in terms of digital competencies, potentially reinforcing inequalities in AI adoption.[18,75] In the Philippine context, there is little empirical evidence that directly links teaching tenure to AI attitudes. This gap highlights the importance of examining length of service not simply as a demographic variable but as a meaningful factor influencing the trajectory of AI adoption in higher education.

METHOD

This study utilized a quantitative, non-experimental cross-sectional survey design to investigate the attitudes of in-service teachers in higher education toward the integration of artificial intelligence. Data were collected at a single point in time to generate a descriptive snapshot of teachers' dispositions, following the approach outlined by Stockemer[80] and Stockemer et al.[81]. Survey responses were coded into numerical data and subjected to descriptive and inferential statistical analyses, a procedure consistent with methodological standards in educational research. [82,83,84]

Respondents of the Study

The respondents of this study were drawn from different state universities and colleges in Southwestern Mindanao, with a total of 648 participants. Using a purposive sampling approach, only in-service faculty members actively engaged in teaching were included to ensure that participants had sufficient familiarity with instructional technologies and AI-related practices. The survey was conducted online, and out of approximately 700 distributed questionnaires, 648 valid responses were retrieved, yielding a response rate of 92,6 %. The final sample size exceeded the minimum requirement based on Cochran's formula for large populations, ensuring representativeness and statistical adequacy.

In terms of gender, the sample was composed of 381 females (58,8 %) and 267 males (41,2 %), reflecting the female-dominated nature of the teaching profession in the Philippines. By generation, the largest groups were Generation Z with 285 respondents (44,0 %) and Millennials with 235 respondents (36,3 %), representing younger and mid-career educators. Smaller numbers came from Generation X with 79 respondents (12,2 %) and Baby Boomers with 49 respondents (7,6 %), who brought longer experience and perspectives shaped by earlier technological transitions.

When categorized by length of service, the distribution was almost even. Teachers with 1–7 years of experience accounted for 131 respondents (20,2 %), nearly equal to those with 8–14 years (130; 20,1 %), 15–21 years (130; 20,1 %), and 22–28 years (130; 20,1 %). A slightly smaller group of 127 respondents (19,6 %) had served 29 years or more, offering insights from the most experienced educators.

Research Tool

This study utilized the General Attitudes toward Artificial Intelligence Scale (GAAIS), a standardized instrument created by Schepman et al.[85] to assess overall perceptions of AI. The scale contains 20 statements, each answered using a five-point Likert format ranging from 1 = strongly disagree to 5 = strongly agree. To ensure balance, the questionnaire incorporates both favorable and unfavorable statements: twelve items reflect positive dispositions toward AI, while eight items capture more critical or negative perspectives. This

combination enables the instrument to generate a well-rounded view of respondents' attitudes, minimizing bias toward extreme. For the purposes of this research, the questionnaire was modified to include a demographic section that identified respondents' gender, generational cohort, and length of service which served as the independent variable in the analysis.

Data collection procedure

The data collected from the survey questionnaires were tallied, organized, and subjected to appropriate statistical treatments using SPSS. To describe the respondents' demographic characteristics (gender, generational cohort, and length of service) and their overall responses on the constructs, frequency counts, percentages, means, and standard deviations were computed. These descriptive statistics provided a general profile of the respondents and summarized their attitudes toward artificial intelligence (AI).

To determine whether significant differences existed across demographic variables, inferential statistics were employed. Specifically, an independent samples t-test was used to examine mean differences in attitude levels between male and female respondents. Meanwhile, one-way analysis of variance (ANOVA) was carried out to test for differences across generational cohorts (Gen Z, Millennials, Gen X, and Baby Boomers) and length of service categories (1–7 years, 8–14 years, 15–21 years, 22–28 years, and 29 years and above).

Ethical considerations

The study followed standard ethical protocols in educational research. Participation was voluntary, and informed consent was obtained from all respondents. No personally identifiable information was collected; responses were coded and reported in aggregate to ensure confidentiality and anonymity. The adapted General Attitudes toward Artificial Intelligence Scale[85] was properly acknowledged.

Data Analysis Procedure and Statistical Treatment

The data collected from the survey questionnaires were tallied, organized, and subjected to appropriate statistical treatments using SPSS. To describe the respondents' demographic characteristics (gender, generational cohort, and length of service) and their overall responses on the constructs, frequency counts, percentages, means, and standard deviations were computed. These descriptive statistics provided a general profile of the respondents and summarized their attitudes toward artificial intelligence (AI).

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RESULTS AND DISCUSSION

The Attitudes of In-service Teachers Toward AI Use in Education

Table 1 presents the descriptive statistics on the attitudes of in-service teachers toward artificial intelligence (AI) in education. Overall, the findings reveal that in-service teachers generally hold a positive attitude toward the integration of AI, as indicated by the computed overall mean score of 4,19 (SD = 0,94), which falls under the "Positive" descriptive category. This suggests that teachers in the sample are receptive to technological change, aligning with global research showing that educators often recognize AI as a tool that enhances efficiency and supports professional practice.[4,41]

For positive attitudes, several items received very high ratings, indicating strong acceptance and enthusiasm toward AI. Specifically, teachers expressed very positive perceptions about AI's role in performing routine tasks, where they preferred interacting with AI systems rather than humans (M = 4,34, SD = 1,068). They also strongly agreed that AI can significantly improve people's well-being (M = 4,37, SD = 1,016), replace employees in many routine jobs (M = 4,43, SD = 1,054), and even perform better than humans (M = 4,38, SD = 1,011). Furthermore, they showed eagerness to adopt AI tools, with high interest in using AI in their own jobs (M = 4,42, SD = 1,065). These findings are consistent with Kaya et al.[54] and Schiavo et al.[86], who observed that higher AI literacy and exposure often translate into favorable attitudes and willingness to adopt AI tools. Similarly, Dumagay et al.[31] reported that prospective teachers in the Philippines demonstrated moderate to high acceptance of AI, highlighting a growing readiness to integrate AI into professional practice.

However, when it comes to negative attitudes, the overall mean score of 2,27 (SD = 0,82) indicates that in-service teachers generally disagree with negative statements about AI. They do not perceive AI as inherently dangerous (M = 1,65, SD = 1,025) or sinister (M = 1,69, SD = 1,139). Similarly, concerns about AI taking control of people (M = 2,28, SD = 0,830) or causing personal suffering (M = 2,86, SD = 1,146) received low to neutral responses. This mirrors the findings of Stein et al.[55] and Berghdal[87], who noted that while ethical and existential fears about AI exist in public discourse, educators tend to downplay dystopian narratives, focusing instead on AI's utility in practice.

Table 1. In-Service Teachers' Attitudes Toward Artificial Intelligence in Education

Attitude	Weighted Mean	SD	Des
For routine transactions, I would rather interact with an artificially intelligent system than with a human.	4,34	1,068	Very Positive
Artificial Intelligence can provide new economic opportunities for this country.	4,16	0,971	Positive
Artificially intelligent systems can help people feel happier.	4,00	1,002	Positive
I am impressed by what Artificial Intelligence can do.	4,02	1,181	Positive
I am interested in using artificially intelligent systems in my daily life.	3,90	0,987	Positive
Artificial Intelligence can have positive impacts on people's wellbeing.	4,37	1,016	Very Positive
Artificial Intelligence is exciting.	4,25	1,069	Very Positive
An artificially intelligent agent would be better than an employee in many routine jobs.	4,43	1,054	Very Positive
There are many beneficial applications of Artificial Intelligence.	3,71	0,648	Positive
Artificially intelligent systems can perform better than humans.	4,38	1,011	Very Positive
Much of society will benefit from a future full of Artificial Intelligence.	4,29	1,177	Very Positive
I would like to use Artificial Intelligence in my own job.	4,42	1,065	Very Positive
Positive Attitude	4,19	0,94	Positive
Organizations use Artificial Intelligence unethically.	2,69	0,945	Neutral
I think artificially intelligent systems make many errors.	2,40	0,702	Negative
I find Artificial Intelligence sinister.	1,69	1,139	Very Negative
Artificial Intelligence might take control of people.	2,28	0,830	Negative
I think Artificial Intelligence is dangerous.	1,65	1,025	Very Negative
I shiver with discomfort when I think about future uses of Artificial Intelligence.	2,01	1,111	Negative
People like me will suffer if Artificial Intelligence is used more and more.	2,86	1,146	Neutral
Artificial Intelligence is used to spy on people.	2,61	0,955	Neutral
Negative Attitude	2,27	082	Negative

Interestingly, a few neutral views were observed, particularly regarding AI's ethical implications and privacy issues. For example, respondents were undecided on whether organizations use AI unethically (M = 2,69, SD = 0,945) and whether AI is being used to spy on people (M = 2,61, SD = 0,955). Such neutrality suggests cautious optimism, as teachers may acknowledge AI's potential risks but do not yet perceive them as immediate threats in their professional contexts. This is corroborated by Funa et al.[33], who highlighted ethical and privacy concerns as key barriers in AI adoption in Philippine education, and by international studies emphasizing the importance of governance and ethical guidelines to build user trust.[60,88]

When situated within the Philippine context, the findings align with recent local studies on educators' attitudes toward AI. Alieto et al.[75] and Serdenia et al.[76] noted that pre-service teachers often adopt a cautiously optimistic view, recognizing AI's benefits for learning while expressing reservations about ethical and pedagogical risks. Similarly, Balasa et al.[37] found that while Filipino educators acknowledge AI's potential to support teaching, their confidence in using it is still shaped by access to training and institutional support. Dumagay et al.[31] further confirmed that openness to AI is already present among teacher aspirants, though infrastructural and digital literacy gaps limit deeper integration. These parallel results suggest that while in-service teachers in Southwestern Mindanao share the global trend of positivity toward AI, their attitudes are tempered by contextual realities, reinforcing the call for localized training programs and ethical frameworks to sustain momentum.

Difference in Attitude and Gender

Table 2. Independent Samples T-Test in the level of attitudes toward AI in education among in-service teachers when grouped according to gender

	Gender	N	Mean	SD	t	df	p-value	d	Interpretation
Positive	Female	381	4,40	0,73	7,031	646	0,000	0,90	Significant;
	Male	267	3,89	1,10	6,572	429,169			Large effect
Negative	Female	381	1,86	0,52	-19,185	646	0,000	0,66	Significant;
	Male	267	2,87	0,82	-17,814	416,271			Moderate effect

Table 2 presents the independent samples t-test results comparing in-service teachers' attitudes toward artificial intelligence (AI) in education when grouped by gender. The analysis reveals statistically significant differences in both positive and negative attitudes between male and female teachers ($p < 0,001$).

For positive attitudes, female teachers ($M = 4,40$, $SD = 0,73$) reported significantly higher scores than their male counterparts ($M = 3,89$, $SD = 1,10$), $t(646) = 7,03$, $p < 0,001$, with a large effect size ($d = 0,90$). This indicates that, within this sample of in-service teachers, women showed stronger optimism and acceptance of AI integration, viewing it as a valuable tool to improve teaching efficiency and classroom practice. Interestingly, this finding diverges from the results of Balasa et al.[37], where male teacher aspirants were found to be more receptive to AI than females, highlighting that attitudes toward AI may shift depending on professional experience and exposure. Serdenia et al.[77], meanwhile, reported no significant gender differences, suggesting that gender effects may be context-specific rather than universal.

For negative attitudes, male teachers ($M = 2,87$, $SD = 0,82$) scored significantly higher than females ($M = 1,86$, $SD = 0,52$), $t(646) = -19,19$, $p < 0,001$, with a moderate effect size ($d = 0,66$). This suggests that men in this study expressed more apprehension or skepticism toward AI, particularly in relation to ethical issues, data privacy, and potential disruptions to teaching roles. These results are consistent with broader international research, which shows that men often voice stronger concerns about the risks of automation and technological change.[54,55]

Taken together, the findings confirm that gender plays a significant role in shaping in-service teachers' attitudes toward AI in education. Female teachers in this study demonstrated greater positivity, while male teachers expressed stronger reservations. When contrasted with prior Philippine studies on teacher aspirants, which reported men as more receptive,[37] the results suggest that gendered attitudes may evolve with career stage and professional responsibilities. This underscores the importance of tailoring professional development programs not only by gender but also by career phase, ensuring that both groups are supported in developing confidence, skills, and critical perspectives on AI integration.

Difference in Attitude and Generational Cohorts

Table 3. One-way ANOVA test in the level of attitudes toward AI in education among in-service teachers when grouped according to generation

	Generation	N	Mean	SD	SS	df	MS	F	p-value	eta	Interpretation
Positive	Gen Z	285	4,73	0,14	519,622	3	173,207	2391,43	0,000	0,918	Significant
	Millennials	235	4,47	0,22	46,644	644	0,072				Large effect
	Gen X	79	2,89	0,42	566,266	647					
	Baby Boomer	49	1,78	0,58							
	Total	648	4,19	0,94							
Negative	Gen Z	285	1,85	0,28	270,656	3	90,219	343,71	0,000	0,616	Significant
	Millennials	235	2,10	0,59	169,042	644	0,262				Moderate effect
	Gen X	79	3,36	0,82	439,699	647					
	Baby Boomer	49	3,83	0,50							
	Total	648	2,27	0,82							

Table 3 presents the one-way ANOVA results comparing in-service teachers' attitudes toward AI in education across generational cohorts. Significant differences were found for both positive attitudes, $F(3, 644) = 2391,43$, $p < 0,001$, $\eta^2 = 0,918$, and negative attitudes, $F(3, 644) = 343,71$, $p < 0,001$, $\eta^2 = 0,616$. Post hoc tests show

that younger teachers, particularly Generation Z (M = 4,73, SD = 0,14) and Millennials (M = 4,47, SD = 0,22), expressed the highest positive attitudes toward AI, while Generation X (M = 2,89, SD = 0,42) and Baby Boomers (M = 1,78, SD = 0,58) reported much lower positivity. For negative attitudes, Generation Z recorded the lowest scores (M = 1,85, SD = 0,28), followed by Millennials (M = 2,10, SD = 0,59), whereas Generation X (M = 3,36, SD = 0,82) and Baby Boomers (M = 3,83, SD = 0,50) exhibited higher skepticism.

These results highlight a generational divide in teachers' perceptions of AI. Younger cohorts appear more open and adaptive, consistent with prior studies showing Gen Z's strong adoption tendencies and favorable views of generative AI tools like ChatGPT.[78,79] Older generations, by contrast, display greater apprehension, a finding that aligns with research linking age to digital anxiety, lower AI literacy, and heightened concerns over ethics and autonomy.

Taken together, the evidence suggests that generational cohort is a meaningful predictor of attitudes toward AI in education. While younger teachers are ready to integrate AI tools into their professional practice, older cohorts may require targeted interventions such as mentorship, continuous training, and intergenerational collaboration to overcome barriers and foster more inclusive adoption of AI technologies in higher education.

Difference in Attitude and Length of Service

Table 4. One-way ANOVA test in the level of attitudes toward AI in education among in-service teachers when grouped according to length of service

	Length of Service	N	Mean	SD	SS	df	Mean Square	F	p-value	eta	Interpretation
Positive	1-7 years	131	4,52	0,72	28,274	4	7,068	8,448	0,000	0,050	Significant
	8-14 years	130	4,25	0,85	537,993	643	0,837				Small effect
	15-21 years	130	4,21	0,92	566,266	647					
	22-28 years	130	4,05	1,04							
	29-above	127	3,90	1,01							
	Total	648	4,19	0,94							
Negative	1-7 years	131	1,86	0,48	130,769	4	32,692	68,045	0,000	0,297	Significant
	8-14 years	130	1,89	0,57	308,930	643	0,480				Large effect
	15-21 years	130	1,99	0,76	439,699	647					
	22-28 years	130	2,75	0,70							
	29-above	127	2,89	0,89							
	Total	648	2,27	0,82							

Table 4 presents the results of the one-way ANOVA test examining whether there are significant differences in the levels of attitudes toward artificial intelligence (AI) in education among in-service teachers when grouped according to their length of service. The findings indicate that there is a statistically significant difference in positive attitudes toward AI across the five groups of teachers ($F = 8,448$, $p < 0,001$, $\eta^2 = 0,050$). Although the effect size is considered small, the results suggest that teachers' length of service influences their positive perceptions of AI. Post hoc analysis reveals that teachers with 1–7 years of service reported the highest positive attitude toward AI (M = 4,52, SD = 0,72), followed by those with 8–14 years (M = 4,25, SD = 0,85) and 15–21 years (M = 4,21, SD = 0,92). In contrast, those with 22–28 years (M = 4,05, SD = 1,04) and 29 years and above (M = 3,90, SD = 1,01) demonstrated comparatively lower positive attitudes. These results indicate that younger or early-career teachers tend to embrace AI in education more favorably than their more experienced counterparts.

Similarly, a significant difference was also observed in negative attitudes toward AI among the groups ($F = 68,045$, $p < 0,001$, $\eta^2 = 0,297$), with a large effect size, indicating a stronger association between teachers' length of service and their negative perceptions of AI. Teachers with 1–7 years of service reported the lowest negative attitudes (M = 1,86, SD = 0,48), closely followed by those with 8–14 years (M = 1,89, SD = 0,57) and 15–21 years (M = 1,99, SD = 0,76). However, teachers with 22–28 years (M = 2,75, SD = 0,70) and 29 years and above (M = 2,89, SD = 0,89) exhibited substantially higher negative attitudes toward AI integration in education.

These findings align with prior studies indicating that early-career educators, often digital natives, are generally more receptive to adopting new technologies, including AI, due to greater exposure and adaptability.[18,78] In contrast, veteran teachers frequently express reservations tied to established pedagogical routines, technological anxiety, or concerns about AI's ethical and professional implications.[56] The trend observed in this study resonates with global evidence showing that length of service and age can moderate openness to innovation, with younger educators perceiving AI as an enabler of efficiency and personalization, while more

experienced teachers often emphasize risks such as job displacement and loss of pedagogical control.[55,57]

Overall, the results suggest that teachers' length of service plays a crucial role in shaping their attitudes toward AI in education. In-service teachers with fewer years of experience tend to demonstrate more openness and positivity toward adopting AI technologies, while those with longer teaching experience express greater skepticism and resistance. These patterns highlight the potential need for targeted training and professional development programs that address the specific concerns of veteran teachers while sustaining the enthusiasm of younger cohorts. Doing so can help foster a more balanced and inclusive approach to AI adoption in Philippine higher education.

CONCLUSIONS

This study set out to examine the attitudes of in-service teachers in Southwestern Mindanao toward the integration of artificial intelligence (AI) in higher education, with particular attention to gender, generational cohorts, and length of service. The findings show that teachers generally hold positive attitudes toward AI, recognizing its potential to enhance instructional efficiency, creativity, and well-being. However, the results also highlight that such attitudes vary across demographic factors. Female teachers demonstrated stronger receptivity, younger cohorts such as Generation Z and Millennials expressed greater optimism, and early-career educators showed more openness compared with their longer-serving counterparts. These variations reveal that acceptance of AI is shaped not only by the technology itself but also by the social and professional contexts in which teachers work. The study also responds to a research gap in the Philippine higher education landscape. While global studies on AI in education have expanded rapidly, local research has often focused on pre-service teachers or on single constructs such as readiness, anxiety, or perception. The perspectives of in-service teachers, who carry the responsibility of implementing curriculum reforms and adopting new pedagogical tools, remain underexplored. By addressing this gap, the present study contributes localized evidence that AI adoption in Philippine higher education is both promising and complex. It underscores the importance of framing AI within the vision of Education 5.0, where technology is viewed as a collaborator that supports human-centered learning.

RECOMMENDATIONS

On the basis of these findings, several recommendations are advanced. Higher education institutions should develop professional development programs that are inclusive and sensitive to the differences among teachers. Training initiatives should be designed to address the needs of veteran educators who may be more hesitant, while also empowering early-career and younger teachers who are more receptive to technological innovation. Intergenerational mentoring can be promoted as a way to combine the digital fluency of younger educators with the pedagogical wisdom of more experienced colleagues.

Institutional leaders and policymakers should also prioritize investments in digital infrastructure, AI literacy, and ethical safeguards to ensure that adoption is equitable, sustainable, and aligned with professional values. Research on in-service teachers must be expanded to better understand how demographic and contextual factors influence openness or resistance to AI integration.

Finally, any initiative involving AI in education should be grounded in the framework of Education 5,0. AI should be treated not as a replacement for teachers but as a partner that enriches teaching and learning by strengthening creativity, empathy, and critical thinking. By following this direction, Philippine higher education institutions can ensure that AI adoption advances inclusivity, equity, and innovation while upholding the human-centered mission of education.

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AUTHORSHIP CONTRIBUTION

Conceptualization: Alexandhrea Hiedie Dumagay, Arayana F. Kunting, Ercison O. Alieto, Kharylle Schyaneid T. Kenoh, Rochard T. Tarroza, Richard M. Rillo, Eduard M. Riparip, Lesly Ann C. Jacinto, Lovelle Diocess S. Lauzon, Edison B. Estigoy, Christopher Iris Francisco, Dolores O. San Juan.

Data curation: Alexandhrea Hiedie Dumagay, Arayana F. Kunting, Ercison O. Alieto, Kharylle Schyaneid T. Kenoh, Rochard T. Tarroza, Richard M. Rillo, Eduard M. Riparip, Lesly Ann C. Jacinto, Lovelle Diocess S. Lauzon, Edison B. Estigoy, Christopher Iris Francisco, Dolores O. San Juan.

Formal analysis: Alexandhrea Hiedie Dumagay, Arayana F. Kunting, Ercison O. Alieto, Kharylle Schyaneid T. Kenoh, Rochard T. Tarroza, Richard M. Rillo, Eduard M. Riparip, Lesly Ann C. Jacinto, Lovelle Diocess S. Lauzon, Edison B. Estigoy, Christopher Iris Francisco, Dolores O. San Juan.

Drafting - original draft: Alexandhrea Hiedie Dumagay, Arayana F. Kunting, Ercison O. Alieto, Kharylle Schyaneid T. Kenoh, Rochard T. Tarroza, Richard M. Rillo, Eduard M. Riparip, Lesly Ann C. Jacinto, Lovelle Diocess S. Lauzon, Edison B. Estigoy, Christopher Iris Francisco, Dolores O. San Juan.

Writing - proofreading and editing: Alexandhrea Hiedie Dumagay, Arayana F. Kunting, Ercison O. Alieto, Kharylle Schyaneid T. Kenoh, Rochard T. Tarroza, Richard M. Rillo, Eduard M. Riparip, Lesly Ann C. Jacinto, Lovelle Diocess S. Lauzon, Edison B. Estigoy, Christopher Iris Francisco, Dolores O. San Juan.