Artificial Intelligence In Teaching: Applications And Challenges

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Abstract:

Background: Artificial Intelligence (AI) is revolutionizing education by tailoring learning to the needs of each student and offering personalized educational experiences. However, its integration raises concerns such as over-reliance on technology and the risk of personal data breaches. Addressing these challenges requires teacher training and the establishment of strict data protection regulations. The development of tools that enhance creativity and critical thinking is also crucial. In this way, AI can empower the educational process without replacing the human element.

Materials and Methods: The study is classified as exploratory research, aiming to capture the current state of knowledge and attitudes among educators in Primary and Secondary Education regarding Artificial Intelligence (AI). Data collection was conducted using an anonymous self-administered questionnaire, distributed via email to all schools nationwide through the Primary and Secondary Education Directorates in December 2023. Responses were gathered through the Google Forms platform, and statistical analysis was performed using IBM SPSS v29. The research sample consisted of N=1736 educators who participated voluntarily. A distinctive feature of the study was the screening question following the collection of demographic information. Participants were instructed not to proceed with the questionnaire if they responded "Not at all" to question A1: "How well do you know what Artificial Intelligence is?" Preliminary data revealed that 51% of educators indicated no knowledge of AI, while 49% reported having at least some familiarity, ranging from minimal to extensive knowledge. After excluding incomplete questionnaires, the final sample comprised N=862 educators, and all subsequent data analysis was based on this refined dataset.

Results: This study aimed to explore educators' perceptions regarding the applications of Artificial Intelligence (AI) in teaching, the challenges and concerns associated with its adoption, and strategies to address these challenges effectively. The theoretical framework underscores the pivotal role of AI in modern society, emphasizing the need for a deeper understanding of how it can be responsibly integrated into education. AI's capabilities extend beyond instructional support, fostering innovative learning models that align with the demands of the 21st century. By offering personalized learning experiences, immediate feedback, and opportunities to enhance data analysis skills, AI is revolutionizing education. However, its introduction raises concerns such as the potential diminishment of educators' roles, the erosion of the human aspect of teaching, and the exacerbation of social inequalities. To mitigate these issues, it is crucial to train educators in AI use, adapt its applications to individual student needs, and enhance critical digital literacy to ensure equitable and ethical use. Developing technical, ethical, and pedagogical skills through training programs and establishing robust regulatory frameworks can prepare educators to harness AI's potential responsibly and effectively. Moreover, laying the groundwork for a fair and inclusive educational framework will maximize the benefits of AI without compromising fundamental educational values. The findings of this study align with this perspective, indicating that educators recognize the positive impacts of AI, particularly in personalization, increased efficiency, and enhanced teaching support. Nevertheless, they also highlight significant concerns regarding rational use, social equity, and pedagogical balance. Regulatory interventions are deemed essential pillars in preventing negative outcomes. A comprehensive integration strategy grounded in education and regulatory compliance is necessary for the successful application of AI in education.

Conclusion: Artificial Intelligence (AI) is transforming education by enabling personalized learning, providing immediate feedback, and enhancing data analysis skills. However, its integration raises concerns about diminishing the role of educators, losing the human element in teaching, and exacerbating social inequalities. Addressing these challenges requires training educators in AI use, tailoring applications to individual student needs, and fostering critical digital literacy to ensure equitable and ethical implementation. By doing so, AI can serve as a tool for empowerment rather than a replacement for human interaction in learning.

Key Word: Artificial Intelligence, Teaching, Educators, Challenges.

I. Introduction

Artificial Intelligence (AI) refers to the ability of a computational system to perform tasks traditionally requiring human intelligence, such as decision-making, learning, and problem-solving. Certain aspects of AI include machine learning, natural language processing, and decision-making systems that leverage big data for the analysis and synthesis of information[42]. In the context of education, AI has the potential to transform the learning process by offering personalized learning experiences and flexibility in teaching. Specifically, it provides tools that enable the customization of content according to the needs of each student, facilitating the retention and comprehension of knowledge[16]. AI combines interdisciplinary fields such as education, psychology, neuroscience, and linguistics to create flexible and effective learning environments. These environments enhance collaboration between students and educators through tools such as intelligent tutors, learning platforms, and automated teaching assistants[27]. Moreover, AI can offer critical solutions to challenges in the educational sector, such as teacher shortages and the need for adaptive learning. Through the integration of data analytics and adaptive technology tools, AI has been shown to improve the quality of teaching and student experiences[50]. The importance of AI in the modern era makes it essential to understand how it can be responsibly integrated into education. It is clear that its potential extends beyond instructional support, creating new learning models that meet the needs of the 21st century[34].

The integration of Artificial Intelligence (AI) into teaching has the potential to redefine how students learn and educators teach. AI offers adaptive learning environments tailored to the needs of each student, making learning more flexible and effective. For example, technologies such as intelligent tutors and autonomous learning devices provide personalized learning experiences, facilitating skill development and better comprehension of lessons[45]. AI enhances teaching by reducing the workload of educators through automated assessment systems, data analysis, and feedback mechanisms. In this way, educators can dedicate more time to guiding and supporting their students, while students benefit from more personalized guidance[75]. Another significant advantage is the potential for creating educational tools that foster creativity and innovation. For instance, through systems based on deep learning technologies, it is possible to monitor student progress and provide interactive feedback that boosts their active participation in the learning process[13]. AI also promotes access to educational material, overcoming barriers such as geographical restrictions or resource shortages. Technologies like Massive Open Online Courses (MOOCs) enable access to quality education for a larger number of students, thus contributing to reducing educational inequalities[66]. However, the adoption of AI in teaching also requires enhancing teacher training for the proper use of these tools. It is crucial for educators to understand the capabilities of AI to effectively integrate it into their educational practices[55].

Artificial Intelligence (AI) has shaped new trends in the educational process, paving the way for more personalized, flexible, and efficient learning practices. According to recent literature, AI is applied in various fields, such as the creation of intelligent teaching systems, data analysis to predict student performance, and the development of evaluation systems based on deep machine learning[77]. A significant trend is the integration of personalized learning through adaptive systems. These systems leverage data to tailor content and methodology to each student's needs. This approach contributes to improving student engagement and increasing teaching efficiency[79]. Additionally, technologies such as sentiment analysis and recommendation systems are being developed. These tools are used to understand students' emotions and adjust teaching approaches, offering a more human-centered dimension to education[51]. Another development is the use of AI to predict course dropout rates and enhance student persistence through proactive interventions. These applications rely on algorithms to identify students at risk of dropping out, enabling educators to take appropriate measures[58]. The integration of AI has also enabled the use of virtual learning environments and gamification to create more interactive and engaging learning experiences. These technologies not only improve student engagement but also enhance creative thinking and problem-solving[16].

Knowledge representation and adaptive learning methods lie at the core of modern educational technologies, offering a personalized learning experience tailored to the needs of each student. Knowledge representation involves the organization and management of knowledge in a format usable by learning systems, while adaptive learning methods adjust content and teaching to align with the needs and skills of the learner. Knowledge representation includes creating knowledge networks that connect concepts and information. For example, models based on Fuzzy Cognitive Maps enable teaching systems to detect a student's knowledge levels and adjust the material accordingly[17]. Additionally, the use of Knowledge Graphs helps connect information and predict learning needs, supporting effective teaching[80].

Adaptive learning methods utilize data to create personalized curricula. Through the use of algorithms and data analysis, adaptive systems can assess a student's progress in real time and adjust instruction. For

instance, systems leveraging Knowledge Graph technologies allow for dynamic reorganization of learning materials to enhance comprehension[72.] These systems focus not only on the material but also on the student's learning pace. Incorporating personalized learning helps sustain student engagement while promoting conceptual understanding through examples and repetitive practice[32,52,53,54].

Automated assessment, immediate feedback, and personalized teaching are key technological innovations reshaping the educational process. Through automated assessment systems, students receive targeted feedback instantly, fostering learning and self-regulation. The use of automated assessment allows for swift and objective evaluation of student performance. These systems incorporate algorithmic questions and open-ended responses, offering real-time detailed evaluations. Research has shown that such platforms can enhance student skills, particularly in STEM fields, effectively preparing them for exams[8]. Immediate feedback, especially in digital learning environments, has been proven to improve the learning experience. For example, research involving biotechnology students found that those who received immediate and interactive feedback achieved better exam results than those using traditional teaching methods[40]. Teaching systems integrating automated feedback allow students to correct and resubmit their work, improving skills through interactive processes. Moreover, these systems enable educators to focus more on guidance and teaching rather than grading[46]. Automated assessment and feedback not only save educators time but also create a learner-centered environment. This technology promotes student autonomy and continuous improvement in the learning process by offering personalized approaches that address diverse learning needs.

Personalized learning, supported by technology, is one of the most innovative approaches in modern education, focusing on meeting each student's unique needs, skills, and interests. Technologies facilitating learning environments incorporate personalized adaptations that promote active student engagement. Personalized learning environments integrate modern technologies such as machine learning and artificial intelligence to create unique learning profiles. By analyzing data, these systems can adapt content and teaching strategies to meet each student's needs[47]. These systems also offer capabilities for continuous monitoring of progress and engagement. Learning material recommendation systems use collaborative and content-based filtering techniques to provide appropriate content based on students' preferences, needs, and performance[10]. This approach enhances engagement and cognitive development by adapting the learning experience in real time. Personalized learning enables self-regulation, encouraging students to manage their learning. Furthermore, through technologies incorporating principles like Universal Design for Learning, educational activities become more inclusive, ensuring the needs of a broad range of students are met [9].

Artificial Intelligence (AI) offers significant opportunities to enhance the education of students with special needs and gifted students, focusing on creating inclusive learning environments. Through targeted applications, AI can tailor teaching to the unique requirements and abilities of these groups. Students with special needs often face challenges in the educational process, such as difficulties in accessing materials or understanding lessons. AI applications, such as speech recognition systems and virtual tutors, are designed to enhance the learning experience for these students. For example, data-driven diagnostic tools, such as categorization for autism, contribute to improving the understanding and support of these children[48]. Intelligent tutoring systems are also used to create personalized learning pathways tailored to students' needs. These tools provide continuous feedback and guidance, boosting the confidence of students with special needs and fostering their autonomy[21].

AI can also help gifted students fully realize their potential through specialized programs. AI-based systems offer personalized challenges, advanced content, and enhanced guidance, such as virtual tutors for developing critical thinking and problem-solving skills[62]. These applications also assist educators in identifying high-performing students and designing personalized educational plans. For example, systems like ChatGPT are used to provide immediate feedback and complex challenges, fostering the creativity and independence of gifted students. Integrating AI further promotes the inclusion of students in traditional educational settings. Schools in disadvantaged areas use AI-based educational programs to enhance access to quality education, regardless of cultural or socioeconomic challenges[25].

The integration of Artificial Intelligence (AI) into education promotes the development of critical skills such as critical thinking, creativity, and innovation, while ensuring the responsible use of technology. These skills are fundamental for success in a world profoundly influenced by AI technologies. AI facilitates the development of critical thinking by promoting analytical approaches. Tools like ChatGPT and other natural language applications enhance data management and the analysis of complex information, allowing students to practice skills such as evaluation and analytical comparison of information[68]. Its use in education fosters creativity by providing opportunities for personalized and innovative learning. Applications such as content generation systems and generative AI technologies help students explore new ideas and develop their own, creating projects that combine technology with personal expression[57]. AI serves as a catalyst for innovation in education, helping students adapt to a rapidly changing world. Through the development of technological tools, such as learning system platforms, AI encourages the discovery and application of new learning and teaching

methods[61]. Education on the safe use of AI is essential for understanding the ethical dimensions of technology. Specialized training programs familiarize students with issues such as privacy, data management, and the implications of technological decisions[69].

Artificial Intelligence (AI) plays a significant role in improving students' critical thinking and autonomy, contributing to the enhancement of 21st-century skills. However, concerns arise regarding the proper use of technology and avoiding dependency on it. Critical thinking is enhanced through the integration of AI tools that promote analytical approaches and data evaluation. For instance, applications like ChatGPT are used for information analysis and developing the ability to distinguish between reliable and unreliable sources. These tools have shown that students can achieve a deeper understanding and improve their problem-solving skills[60]. Students' autonomy is supported by AI systems that provide tools for self-directed learning. In research on postgraduate student supervision, the use of ChatGPT enhanced their independence, guiding them from learner roles to researcher roles through self-directed inquiry and adaptation to new methodologies[19]. Despite the benefits, excessive reliance on AI may negatively impact the development of critical thinking. Studies show that while AI tools enhance analysis, they can also reduce students' initiative and self-analysis if assessment and questioning skills are not reinforced[67].

The introduction of Artificial Intelligence (AI) in education raises challenges related to creating flawed communication patterns and reinforcing social inequalities. Although AI promises to improve the educational process, it may replicate or even exacerbate existing inequalities due to design, implementation, and access deficiencies. Its use in education can affect the quality of communication between students and educators. Algorithms often rely on data that may contain biases, leading to unintended inequalities and stereotypes. Studies show that automation in communication may reduce the interactive nature of teaching, limiting opportunities to develop essential communication skills[11]. When not carefully applied, AI can exacerbate social inequalities. Unequal access to cutting-edge technologies and educational resources may deepen disparities between social groups and countries. Research indicates that students from disadvantaged backgrounds are more likely to be negatively affected due to lack of access to digital infrastructure and specialized guidance[41]. The digital divide created by AI correlates with educational inequalities. Students without access to advanced technologies are at a disadvantage compared to their peers, increasing differences in educational opportunities and learning outcomes. Poor implementation of AI in developing regions undermines efforts toward educational equity[12].

The rapid progress of Artificial Intelligence (AI) has raised concerns about the potential replacement of educators. While AI offers significant benefits to the educational process, the consequences of its possible substitution could impact teaching quality and lead to unemployment. AI has the potential to take over some functions of educators, such as personalized teaching and performance data analysis. Tools like virtual instructors can provide personalized support to students, enhancing learning. However, human qualities such as empathy, communication, and the ability to nurture critical thinking skills are difficult to replicate through AI[14]. The growing use of AI in education may increase the risk of unemployment for educators, especially in low-resource countries or those with developing technologies. Research has shown a real fear of job losses as AI increasingly takes on teaching tasks[20]. Nonetheless, experts argue that AI will work best as a tool that enhances teaching rather than replacing educators. Instead of replacing teachers, AI can complement their efforts, allowing them to focus on creative and interactive aspects of teaching. Studies suggest that collaboration between AI and educators can improve the learning experience by leveraging the strengths of both sides[59].

The use of Artificial Intelligence (AI) in education has raised concerns about potentially limiting creativity and focusing on STEM (Science, Technology, Engineering, Mathematics) subjects at the expense of the humanities. While the integration of AI may enhance innovation and efficiency, it could negatively affect the development of critical human skills. AI technologies often prioritize processes based on logic and algorithmic thinking, which may limit opportunities for creative expression. Research has shown that while generative AI is effective in content creation, it struggles to produce works reflecting authentic human creativity[18]. Additionally, excessive reliance on these systems may reduce the development of imagination and innovation in students. The global educational trend emphasizes STEM fields due to their connection with economic growth and technological innovation. However, excessive emphasis on STEM at the expense of the humanities may result in the loss of valuable skills such as critical thinking and ethical analysis[3]. Integrating creativity and humanistic approaches through STEAM (STEM + Arts) is proposed as a solution to maintaining a balance between scientific and humanistic skills. To address these issues, educational programs that integrate art and human creativity into the sciences, such as STEAM, have proven effective. This approach promotes collaboration between different cognitive fields, enabling students to develop both cognitive and creative potential[28].

Artificial Intelligence (AI) has the potential to advance critical thinking, which is crucial for the responsible and effective use of technologies in education and society. However, the success of AI integration in education depends on the development of appropriate educational approaches and the creation of a culture of

responsible use. AI can support the development of critical thinking with tools that help students analyze information, assess data reliability, and develop logical arguments. In a recent study, using tools like ChatGPT enhanced skills in information analysis and evaluation, enabling students to identify misinformation and apply critical thinking in real time[60]. Enhancing critical thinking requires educational strategies that incorporate responsible AI use. Research has shown that teaching skills such as data evaluation and pattern recognition of misinformation can strengthen students' critical thinking while preparing them for the ethical challenges posed by AI use[70]. Although AI enhances the educational process, human guidance remains essential for developing a holistic educational experience. Studies suggest that critical thinking enhancement is more effective when AI use is combined with active educator participation, offering moral and emotional context[36].

The safe use of Artificial Intelligence (AI) by students is one of the central challenges of modern education. Lack of understanding of the implications of these technologies may lead to ethical and practical problems. Strengthening education on the use of AI promotes responsible behavior and enhances students' critical thinking. Education on the safe use of AI includes teaching fundamental principles of privacy protection and data security. Research shows that students trained on topics such as misinformation recognition and data management are better equipped to use AI responsibly[76]. Teaching students to use AI is linked to promoting digital literacy. Through targeted programs, students can learn to evaluate AI results, understand its limitations, and avoid over-reliance on it. These skills are critical for fostering autonomy and critical thinking[2]. Teaching the ethical dimension of AI helps students understand the consequences of their decisions when using it. Education on topics such as transparency, impartiality, and accountability is fundamental to shaping ethically aware citizens. In this context, educational systems encourage discussion and student participation in real-life scenarios[74].

The use of Artificial Intelligence (AI) in education requires appropriate teacher training to effectively and responsibly leverage this technology's potential. Training in AI use includes teaching technical skills, understanding the capabilities and limitations of technology, and establishing ethical principles for its use. Teacher training should focus on both technical skills and pedagogical approaches that utilize AI. Programs like those based on the ADDIE model have shown that participating teachers gain a better understanding of tools like machine learning and natural language processing to support teaching[30]. Using AI in education raises ethical issues such as privacy protection and avoiding algorithmic biases. Training for teachers should include lessons on impartiality, transparency, and accountability to ensure the safe use of technology in schools[40]. AI offers tools for developing personalized learning experiences and improving teaching. Teachers who use AI can save time on repetitive tasks like automated grading and focus on more creative aspects of teaching[26].

AI in education requires the creation of a clear and binding framework regulating its use to protect fundamental human rights, ensure transparency, and maintain educational ethics. The need for international cooperation in developing AI regulations has been emphasized by organizations like UNESCO, which has issued recommendations for the ethical use of AI in education. In its Report on the Ethics of AI, key principles such as safety, transparency, and inclusion are highlighted as globally applicable standards[63]. At the national level, many countries have developed strategies for AI use in education. For instance, the European Union promotes AI regulations that include strict measures to ensure privacy and prevent discrimination in educational systems[29]. China has adopted policies focusing on education as a pillar of its national AI strategy while prioritizing public interest safeguards[39]. Despite these initiatives, concerns remain regarding safeguarding the rights of students and educators. Research has shown that the lack of clear regulatory frameworks may lead to data misuse and the reinforcement of social inequalities[11].

The rapid development of AI in education has raised concerns related to technology misuse, ethical use, and reinforcing social inequalities. Assessing the need for possible bans or restrictions on AI use is based on studies examining the benefits, risks, and social impacts. AI can offer significant advantages to the educational process, such as personalized learning, administrative task automation, and enhancement of educational tools. These applications allow educators to focus on the quality of teaching and developing interpersonal relationships with students[49]. Key concerns regarding AI use include issues of privacy, ethical use, and transparency. Algorithm misuse can reinforce biases and undermine trust in the educational system. The lack of adequate regulations increases the risk of personal data breaches and abuse of power by institutional entities[59]. Some educational institutions and governments have implemented AI bans, such as prohibiting generative AI tools, to protect academic integrity and ensure equity. However, studies show that such bans are often insufficient and may limit access to innovative learning practices[73]. Experts argue that delineating AI use through regulations rather than bans is more effective. Developing ethical and transparency guidelines, such as those proposed by UNESCO, can ensure responsible AI use and maximize its benefits[80].

Based on this theoretical framework, a key question addressed in this study concerns teachers' attitudes toward the application of Artificial Intelligence (AI) in teaching (Section C, domain 1), as well as their knowledge of AI and its applications they have used in lessons (Section C, domain 2). Furthermore, it explores the perceptions of the sampled teachers regarding the Fear of the consequences of AI applications in teaching

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(Section E) and the ways to address potential negative consequences of AI during its implementation in teaching (Subsection E1-1). Specifically, this study will describe the research findings: a) regarding Section C (domain 1): 'In which of the following areas do you believe AI applications can be positive for teaching?'; b) for Subsection C (domain 2): 'Are you familiar with or already using any AI application in teaching?'; c) for Section E: 'Fears of negative consequences from the introduction of AI in teaching'; and d) for Subsection E1-1: 'In your opinion, can the negative characteristics of AI in education be addressed?

The research objectives are thus formulated as follows:

-What are teachers' perceptions regarding the applications of AI in teaching?

-What are teachers' perceptions of the fear associated with the introduction of AI in teaching?

-What measures do teachers consider important for addressing the negative consequences of introducing AI in teaching?

-Is there a connection between the applications of AI in teaching, the fear of negative consequences from the introduction of AI in teaching, and addressing these negative consequences?

-Is there a correlation between the factors (Applications of AI in teaching, Fear of the consequences of introducing AI in teaching, Addressing the negative consequences of AI in teaching) and demographic characteristics (Gender, Level of education, Years of service, Educational level—Primary and Secondary education, and Job position—Teachers and Education executives)?

II. Material And Methods

The study falls under exploratory research and aimed to capture the current state of affairs among educators in Primary and Secondary Education regarding Artificial Intelligence (AI). It was conducted using data collection through an anonymous self-reported questionnaire. The questionnaire was distributed via email to all schools in the country through the Primary and Secondary Education Directorates in December 2023. Data were collected using the Google Forms platform, and statistical analysis was performed using IBM SPSS v29.

Sable: The research sample consisted of the voluntary participation of N=1736 educators. A unique feature of this study was that, following the collection of demographic data, participants were instructed not to complete the questionnaire if they answered "Not at all" to Question A1: How well do you know what Artificial Intelligence is? Consequently, the first key finding revealed that 51% of the educators in the study had no knowledge of AI, while 49% reported knowing "A little," "A lot," or "Very much." After excluding incomplete questionnaires, the final sample was adjusted to N=862, and this subset was used for data analysis.

The Questionnaire: The questions included in the research questionnaire are part of a broader study[35,81]. They consist of nineteen (19) closed-ended questions from Section C (domain 1), which concern teachers' perceptions regarding the applications of AI in teaching, and domain (2) with two questions (1 closed-ended question and 1 open-ended question) related to the knowledge and use of AI applications. Additionally, Section E is included, with 8 closed-ended questions regarding the fear of the consequences of introducing AI into teaching, and a subsection of Section E with five closed-ended questions, which refer to ways of addressing potential negative consequences of AI in teaching.

Statistical analysis

The data analysis was conducted using descriptive and inferential statistics with the IBM SPSS v.29 software. Percentages and frequencies were calculated, and the results were presented through tables. The normality of the variables related to skills was tested using the Kolmogorov-Smirnov test as well as skewness and kurtosis indicators. The results showed that the variables followed a normal distribution (p-value>0.05). To explore correlations, parametric tests such as Pearson's correlation, t-Test, and ANOVA were employed.

III. Result

Table 1 *Percentage Distribution of Artificial Intelligence Applications.* According to the perceptions of the 862 participants regarding the contribution of Artificial Intelligence (AI) in teaching, significant prospects for enhancing the educational process are highlighted. The areas with the highest acceptance include the use of intelligent educational systems (75.6%) and the effective instructional approach to gifted students (74.7%), which underscores the potential of AI in tailoring teaching to individualized needs. Equally important is its contribution to knowledge representation and the support of educators, with 71.9% recognizing AI as a valuable tool for reducing workload and enhancing teaching quality. Automated assessment and feedback (67.3%), the creation of supportive learning environments (69.1%), and the development of skills for the safe use of AI (67.7%) also emerge as key areas where AI can strengthen the educational process. Furthermore, machine learning (64.7%) and adapting the learning process to the needs of each student (61.3%) emphasize the potential for personalization, while addressing the special needs of students (64.5%) promotes equitable and inclusive

education. Conversely, areas such as the development of critical thinking (44.3%) and the improvement of collaborative and communication skills (47.3%) seem to encounter limited acceptance. This differentiation may stem from perceptions about AI's ability to enhance complex cognitive and social skills, highlighting the need for further research and increased user trust in these areas. Overall, the table confirms a positive attitude toward the capabilities of AI in teaching, with a focus on personalization, improving efficiency, and supporting educators, while emphasizing the need to enhance understanding and trust in the more abstract and complex skills it can support.

Table 1: Percentage Distribution of Artificial Intelligence Applications

Question G1: In which of the following areas do you believe that applications of Artificial Intelligence can have a positive impact on Teaching?	**N=862**	
Statements	**Not at all-A little (%)**	**Very much (%)**
1. Knowledge representation	28.1	71.9
2. Automatic teaching programming	41.1	58.9
3. Machine learning	35.3	64.7
4. Reinforcement learning	34.6	65.4
5. Intelligent educational systems	24.4	75.6
6. Automated assessment and feedback	32.7	67.3
7. Promotion of instructional inclusion for students	37.8	62,2
8. Creation of a supportive learning environment for each student	30.9	69.1
9. More effective instructional approaches for addressing the special needs of students	35.5	64.5
10. Effective instructional approaches for gifted students	25.3	74.7
11. Assistance for educators and reduction of their workload	28.1	71.9
12. More efficient and effective teaching methods	33.2	66.8
13. Development of students' literacy	42.9	57.1
14. Development of students' critical thinking	55,7	44.3
15. Development of students' problem-solving skills	42,7	57.3
16. Promotion of students' creativity and innovation	41,8	58.2
17. Improvement of students' collaboration and communication skills	52.7	47.3
18. Adaptation of the learning process to the specific needs of each student	38.7	61.3
19. Development of students' skills for the safe use of Artificial Intelligence	32.3	67.7

Table 2 *Percentage Distribution of Knowledge and Applications of Artificial Intelligence in Teaching.* The results indicate that only 32% of participants are familiar with and/or already use AI applications, while 68% responded negatively, suggesting that the majority of educators are either not yet familiar with or have not integrated such applications into their teaching practices. This question highlights the potential of AI in education, emphasizing creativity, personalized teaching, and the enhancement of the learning experience. At the same time, the high percentage of those not using AI demonstrates the need for further awareness and training for educators on the use of such tools. Those who answered positively mentioned a variety of tools and applications used in different academic fields. Examples include ChatGPT for creating lesson plans, exercises, and scenarios; Kahoot for interactive exercises; Magic School AI for questionnaires and lesson plans; and tools like Bard AI and Bing Image Creator for creative activities. Additionally, tools such as Google Classroom, Immersive Reader, and applications for speech-to-text or translation demonstrate the wide range of available solutions.

Specifically, more than 20 different AI applications and tools are reported to be used across various teaching contexts. Key applications include:
-ChatGPT: Widely used for creating lesson plans, exercises, and teaching scenarios in subjects such as language, mathematics, history, natural sciences, and computer science.
-Bard AI and Bing Image Creator: Tools for creating multimedia content and ideas.
-Kahoot and Magic School AI: Interactive platforms for student assessment and questionnaire design.
-Google Classroom and Immersive Reader: Tools that support lesson organization and the inclusion of students with special needs.
The use of applications such as ChatGPT for differentiated teaching and Magic School AI for questionnaires highlights the emphasis on personalizing the learning process. Educators report that these applications allow them to better adapt teaching to the needs of each student.
These applications are used across multiple academic subjects, such as:
-Language and Literature: A holistic approach via ChatGPT.
-Mathematics and Natural Sciences: Utilization of tools like Wolfram|Alpha and Stable Diffusion.

-Arts and Creativity: Tools such as Canva Magic Write and Nightcafe AI for creating visuals.
Tools like Google Classroom assist in lesson organization and communication with students, reducing educators' workload. This highlights the significant role of AI in supporting both instructional and administrative tasks in education.

Table 2: Percentage Distribution of Knowledge and Applications of Artificial Intelligence in Teaching

N=862 Question G2: (Please select one of the two options for each question).	Yes (%)	No (%)
Do you know and/or already use any Artificial Intelligence applications in teaching?	32.0	68.0
If yes, specify the application and the subject: ChatGPT for everything, ChatGPTD, Kahoot in computer science, Bard AI for ideas and suggestions in various subjects, Magic School AI for questionnaires and lesson plans, ChatGPT for English lessons, OpenAI for designing lesson plans for the first time, Google Classroom & text-to-speech, Google Translation, Magic School tools, ChatGPT for educational scenarios in kindergarten, ChatGPT for a holistic approach to language, Twee for creating English teaching material, ChatGPT, Bing Image Creator for history, Bard & Bing Image Creator, ChatGPT, Stable Diffusion and Google Colab for machine learning and technical applications (specific to computer science in vocational schools), Immersive Reader, Grammarly, ChatGPT in computer science, GPT Voki, Padlet, Kahoot, H5P, ChatGPT 4 & Imagine AI, ChatGPT, ICT, ChatGPT for modern Greek language, experimentally tried with my students using ChatGPT and Bard in modern Greek language and literature lessons, Bard, language, Bing, Diffit, Briskit, Bard, Scispace, Magic School AI, language, mathematics, geography, computer science using ChatGPT, ChatGPT for lesson organization, Bing, Magic School, ChatGPT, Image Generator, ChatGPT in natural sciences, AI offers various applications in education, providing new opportunities to improve teaching and learning. As I teach in kindergarten, I have not yet implemented AI in the classroom, but I am in the process of learning about its applications and potential, voice typing, ChatGPT, NightCafe AI for image creation, Querium for mathematics, ChatGPT in physics, preschool education using Google's Teachable Machine, ChatGPT, MidJourney, etc., ChatGPT in mathematics, ChatGPT in biology, ChatGPT, Kahoot, ChatGPT in history, ChatGPT, robotics applications, search engines (e.g., Google Search) in computer science lessons, programming with BeeBot, ChatGPT, English, ChatGPT, I have created English exercises with this application, which I either assign to students for practice or include in tests, ChatGPT for creating differentiated lesson plans in mathematics, ChatGPT, eTwinning educator for utilizing AI, Bing Image Creator in visual arts, ChatGPT for creating questionnaires across all subjects, ChatGPT in German, ChatGPT and Wolfram|Alpha in mathematics, ChatGPT in computer science lessons, ChatGPT in physics, ChatGPT, BingAI, electrical installations of ships, naval mechanical design, ChatGPT, Bard, Canva Magic Write, Quizlet, Animated Drawings (English), Quizlet, Magic School, in geography and physics for grades 7-9, ChatGPT (LLMs) in skill workshops, ChatGPT in biology.		

Table 3 *Percentage Distribution of Fear of Consequences from the Introduction of Artificial Intelligence in Education.* According to the results, 66.1% of respondents are deeply concerned that the use of AI may negatively affect students' critical thinking. This highlights the fear that excessive reliance on AI tools might diminish the process of active thought. Additionally, 87.7% express a high degree of concern that AI and applications such as ChatGPT could be misused by students. The overwhelming majority underscores the need for guidance in the use of AI. Furthermore, 80.5% fear that AI could promote incorrect communication models, emphasizing the sensitivity to issues of linguistic and social education. Meanwhile, 54.5% believe it is likely that an overemphasis on the sciences at the expense of the humanities could emerge, revealing concerns about the balanced development of students. The percentage of respondents is divided (50.1% "very much," 49.9% "not at all") on the potential for AI to replace educators and increase unemployment, reflecting confusion on this issue. Meanwhile, 61.7% are worried about a reduction in student autonomy, highlighting fears that AI might limit students' ability to develop independent thought and action. With 69.1% identifying creativity and innovative thinking as critical areas they believe are threatened by AI, concerns about its potential impact on these essential skills are evident. Additionally, 53.4% express fears that the use of AI might create inequalities, underscoring the need for equitable access to and use of technology in education. In conclusion, while AI brings opportunities, it simultaneously raises significant concerns across multiple levels. Fears regarding its rational use, social equity, and educational balance underscore the need for careful planning and guidance in integrating AI into the educational process.

Table 3: Percentage Distribution of Fear of Consequences from the Introduction of Artificial Intelligence in Education

N=862 Section E Questions	Not at all-A little (%)	Very much (%)
E1. Is there a fear of negative consequences on students' critical thinking?	33,9	66,1
E2. Is there a fear that Artificial Intelligence and its applications (e.g., ChatGPT) will be used by students not as a supportive tool?	12,3	87,7
E3. Is there a fear of confusion and the projection of incorrect communication models to students by Artificial Intelligence?	19,5	80,5
E4. Is there a fear of an imbalanced development of students, with a focus on the sciences and the sidelining of the humanities?	45,5	54,5
E5. Is there a fear of the replacement of classroom teachers and an increase in unemployment in the teaching sector?	49,9	50,1

E6. Is there a fear of a reduction in students' autonomy?	38,3	61,7
E7. Is there a fear of negative consequences on students' creativity and innovative thinking?	30,9	69,1
E8. Is there a fear of creating social and educational inequalities through the use of Artificial Intelligence in Education?	46,6	53,4

Table 4 *Percentage Distribution of Addressing the Negative Consequences of Artificial Intelligence in Education.* The results reveal a high level of optimism regarding the effective management of the challenges arising from the integration of Artificial Intelligence (AI) while simultaneously emphasizing the importance of specific strategies. More specifically, the majority of participants (94.0%) believe that developing critical thinking skills in students can serve as a crucial tool for the safe and constructive use of AI. This highlights the need to incorporate critical thinking as a fundamental element of the educational process, enabling students to evaluate and utilize technology responsibly. Additionally, 93.0% of respondents support teaching students the safe and appropriate use of AI, indicating the importance of pedagogical guidance in employing new technologies. This strategy can reduce the likelihood of misuse or misunderstanding of AI. The training of educators in AI usage is also deemed essential by 91.2% of participants, underscoring the need for continuous professional development for teachers so they can effectively integrate AI into their classrooms. At the same time, 81.9% advocate for the necessity of international and governmental regulations to control the integration of AI in education. This perspective highlights the importance of establishing regulatory frameworks to ensure that technology is used ethically and fairly. Finally, only 15.5% of respondents consider banning AI a viable solution. This suggests that the overwhelming majority favors strategies of integration and management rather than a complete avoidance of the technology. The findings indicate that the educational community recognizes the necessity of AI in education but identifies critical thinking, proper training, and regulatory interventions as key pillars for mitigating its negative effects. A comprehensive integration strategy, grounded in education and regulatory compliance, is deemed essential for the successful utilization of AI in the educational system.

Table 4: Percentage Distribution of Addressing the Negative Consequences of Artificial Intelligence in Education

N=862		
Question E9: In your opinion, can the negative aspects of Artificial Intelligence in education be addressed:		
(Please choose one of the two options for each question).	Yes (%)	No (%)
E9.1 - Through developing students' critical thinking regarding the use and applications of Artificial Intelligence?	94.0	6.0
E9.2 - Through teaching students safe and appropriate use of Artificial Intelligence?	93.0	7.0
E9.3 - Through training educators in the use of Artificial Intelligence?	91.2	9.8
E9.4 - Through international and government agreements to regulate the integration of Artificial Intelligence in Education?	81.9	18.1
E9.5 - Through banning Artificial Intelligence in Education?	15.5	84.5

Correlation Analysis of AI Applications, Fear of Consequences, and Addressing Consequences in Teaching

Table 5 *Correlations.* Initially, the correlation between AI Applications in Teaching and Fear of AI Consequences in Teaching shows a negative Pearson coefficient of -0.255, which is statistically significant at the p<0.01 level. This small negative correlation suggests that the more participants express a positive attitude toward AI applications in teaching, the less they fear the consequences of its integration. Additionally, the correlation between AI Applications in Teaching and Addressing the Negative Consequences of AI in Teaching presents a positive Pearson coefficient of 0.176, also statistically significant at the p<0.01 level. This weak positive correlation indicates that educators who express a positive attitude toward AI applications in their teaching practices are more likely to recognize potential negative consequences and take measures to mitigate them. This relationship supports the idea that active use of AI is accompanied by increased awareness of the challenges it may bring. In contrast, the correlation between Fear of AI Consequences in Teaching and Addressing the Negative Consequences of AI in Teaching is very low (Pearson coefficient 0.065) and not statistically significant (p=0.058). This suggests that fears about the consequences of AI are not directly linked to the intention or actions taken to address them. The weakness of this relationship may indicate the need for support and guidance for educators to transform their concerns into proactive measures. In summary, the results show that AI Applications in Teaching play a significant role in reducing fears and enhancing the proactive management of AI-related consequences. The strength of the correlations ranges from weak negative to weak positive, reinforcing the view that integrating AI is positively associated with educators' adaptation to the challenges related to its use. However, fears alone do not appear to drive action, highlighting the need for educational guidance and support.

Table 5: Correlations

		Applications of AI in Teaching	Fear of AI Consequences in Teaching	Addressing the Negative Consequences of AI in Teaching
Applications of AI in Teaching	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	862		
Fear of AI Consequences in Teaching	Pearson Correlation	-.255**	1	
	Sig. (2-tailed)	<.001		
	N	862	862	
Addressing the Negative Consequences of AI in Teaching	Pearson Correlation	.176**	.065	1
	Sig. (2-tailed)	<.001	.058	
	N	862	862	862
**. Correlation is significant at the 0.01 level (2-tailed).				

Correlations with Demographic Characteristics

A correlation analysis was conducted between the factors (Applications of AI in teaching, Fear of the consequences of AI integration in teaching, Addressing the negative consequences of AI in teaching) and demographic characteristics (Gender, Level of education, Years of service, Educational level—Primary and Secondary education, and Job position—Teachers and Education executives). The results showed that Educational level (Primary and Secondary), Job position in the school (Teachers and Education executives), and the Level of education of the participants did not have a statistically significant effect on their perceptions regarding the factors (Applications of AI in teaching, Fear of the consequences of AI integration in teaching, Addressing the negative consequences of AI in teaching). In contrast, Gender had a statistically significant effect on participants' perceptions of addressing the negative consequences of AI in teaching. Furthermore, Years of service had a statistically significant effect on perceptions of AI applications in teaching.

Table 6 *Descriptive measures of addressing the negative consequences of AI in teaching by Gender.* Regarding Gender, the t-Test analysis indicates a difference in mean scores between men (Mean=1.73) and women (Mean=1.76).

Table 6: Descriptive measures of addressing the negative consequences of AI in teaching by Gender

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Addressing the negative consequences of AI in teaching	Male	278	1.73	.161	.010
	Female	584	1.76	.134	.006

Table 7 *Independent Samples Test.* The t-Test results, based on Levene's Test (p<0.05), show that the second row of the table t=-3.008, p=0.003<0.05) indicates a statistically significant difference in mean scores between men and women. This confirms a statistically significant correlation between perceptions of addressing the negative consequences of AI integration in teaching and Gender. Specifically, women are more likely (Mean=1.76) than men (Mean=1.73) to consider measures for addressing the negative consequences of AI integration in teaching as necessary.

Table 7: Independent Samples Test

		Levene's Test for Equality of Variances				Significance	
		F	Sig.	t	df	One-Sided p	Two-Sided p
Addressing the negative consequences of AI in teaching	Equal variances assumed	27.060	<.001	-3.208	860	<.001	.001
	Equal variances not assumed			-3.008	466.256	.001	.003

Table 8 *ANOVA.* One-Way Analysis of Variance (ANOVA) was used to examine differences in mean scores based on years of service. The findings for variance based on years of service do not indicate equality of means, thus revealing a statistically significant difference (p<0.05) regarding the applications of AI in teaching (F(7)=2.272, p=0.027<0.05).

Table 8: ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
AI Applications in Teaching	Between Groups	1.621	7	.232	2.272	.027
	Within Groups	87.069	854	.102		
	Total	88.690	861			

Table 9 *Multiple Comparisons.* The results of multiple comparisons between different years of service categories regarding AI applications in teaching indicate a statistically significant difference (p=0.048) between the categories "1-5 years" and "31-40 years," with a mean difference of 0.129. This suggests that individuals with more years of service (31-40 years) score higher in terms of AI applications in teaching. Additionally, a significant difference is observed between the categories "26-30 years" and "31-40 years" (p=0.010), with a mean difference of 0.163. The most notable differences are found between categories with fewer and more years of service, particularly between "31-40 years" and smaller categories. This implies that educators with greater experience may exhibit a more positive attitude towards AI applications in teaching.

Table 9: Multiple Comparisons

Tukey HSD							
Dependent Variable	(I)) Years of Service	(J) Years of Service	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
AI Applications in Teaching	31-40	1-5	.129*	.042	.048	.00	.26
		6-10	.124	.057	.364	-.05	.30
		11-15	.152	.053	.078	-.01	.31
		16-20	.099	.043	.287	-.03	.23
		21-25	.114	.042	.123	-.01	.24
		26-30	.163*	.046	.010	.02	.30
		41-43 and above	.237	.135	.651	-.17	.65

IV. Discussion

This study aimed to investigate educators' perceptions of Artificial Intelligence (AI) applications in teaching, the challenges and concerns associated with its adoption, and strategies for effective implementation. The theoretical framework highlights AI's transformative role in modern society and the need for its responsible integration into education. AI transcends traditional teaching support by introducing innovative learning models aligned with 21st-century demands. It facilitates personalized learning experiences, provides immediate feedback, and enhances data analysis skills, fundamentally reshaping education. However, its adoption raises concerns such as diminishing educators' roles, weakening the human aspect of teaching, and exacerbating social inequalities. Addressing these challenges requires equipping educators with AI training, tailoring its applications to individual student needs, and fostering critical digital literacy for ethical and equitable use. Developing technical, ethical, and pedagogical competencies through professional development programs and establishing robust regulatory frameworks are vital to ensuring the responsible use of AI in education. Moreover, creating an inclusive and fair educational framework can maximize AI's benefits while safeguarding core educational values. The study's findings confirm that educators recognize AI's potential for personalized learning, increased efficiency, and enhanced teaching support. Nevertheless, they stress concerns about rational use, social equity, and maintaining pedagogical balance. Regulatory measures are essential to mitigate risks and promote sustainable integration. A comprehensive strategy combining education, regulation, and ethical practices is critical for the successful application of AI in education.

Regarding the perceptions of the sample's educators about the applications of Artificial Intelligence (AI) in teaching, 71.9% of participants believe that AI can significantly contribute to both knowledge representation and supporting educators by relieving them of a substantial workload, highlighting strong acceptance of its potential to enhance teaching practices. Simultaneously, with 75.6% expressing a positive stance towards smart educational systems and 74.7% acknowledging the effective teaching strategies for gifted students, the potential of AI to shape personalized teaching approaches becomes evident. Automated assessment and feedback are highly valued by 67.3% of respondents, while 64.7% consider machine learning a useful tool for enhancing evaluation processes and improving teaching practices. However, areas related to the development of critical thinking (44.3%) and collaborative skills (47.3%) receive relatively lower acceptance rates, possibly due to challenges in understanding AI's contribution to more complex cognitive skills. Additionally, 69.1% value AI's contribution to creating supportive learning environments, while 61.3% recognize its role in adapting teaching to the needs of individual students, confirming the strong acceptance of personalization through AI. Finally, 67.7% of participants believe that AI can contribute to developing safe usage skills, emphasizing the need for education on digital safety issues. Overall, the findings highlight a positive disposition towards AI applications in teaching, with emphasis on areas such as smart systems, assessment, and personalization, while lower acceptance rates in more complex skills suggest the need for further exploration and enhancement of these capabilities. Similar findings are reported by researchers and

scholars regarding AI applications in teaching. AI supports educators through automated assessment systems and tailored teaching frameworks. Its integration into processes such as automated evaluation and intelligent teaching systems facilitates educators, reduces their workload, and enhances teaching precision[4]. The use of intelligent teaching systems can adapt instruction to the needs of each student, improving the learning experience, teaching effectiveness, and student performance[61]. It also contributes to developing problem-solving skills and creativity through opportunities for personalized learning, which promote critical thinking and innovation[45]. Despite its prospects, challenges remain, such as the need to improve human-machine interaction and concerns about ethical issues and privacy[78]. In conclusion, AI in teaching has the potential to transform education by providing personalized and effective learning tools, improving the teaching experience, and freeing educators from time-consuming tasks. However, its full integration into teaching requires strategies to address technical and ethical challenges, as highlighted in many recent studies[4,43].

Regarding the degree of knowledge and use of AI applications in teaching, the analysis of the results reveals that only 32% of participating educators report being familiar with and/or already using Artificial Intelligence (AI) applications in teaching, while 68% responded negatively. This indicates that the majority of educators are either not yet familiar with these technologies or have not integrated them into their teaching practices. This finding highlights both the potential and the need for intensive awareness and training to achieve broader adoption of AI in the educational process. Educators who reported familiarity with AI mentioned using a wide range of tools and applications that serve different educational purposes and disciplines. Specifically, more than 20 different applications are referenced as being used across various teaching contexts. Key examples include ChatGPT for creating lesson plans, exercises, and teaching scenarios; Kahoot for interactive activities; and Magic School AI for questionnaires and lesson planning. Additionally, applications such as Bard AI and Bing Image Creator are utilized for creative activities, while tools like Google Classroom and Immersive Reader facilitate lesson organization and the inclusion of students with special needs. The widespread adoption of applications like ChatGPT for personalized teaching and Magic School AI for questionnaires underscores the emphasis on adapting the learning process to the needs of each student. The findings indicate that AI has been dynamically introduced into education, primarily for the creation of educational materials, the personalization of teaching, and the enhancement of the assessment process. However, the high percentage of educators who have not yet utilized AI underscores the need for intensive training and the building of trust in these technologies. Furthermore, it is essential to develop strategies that will promote creativity and establish AI as a vital tool for enhancing the educational experience. Similar research studies emphasize that the adoption of AI can enhance personalized teaching through adaptive learning systems that analyze students' individual needs, providing targeted feedback and guidance[6]. Tools such as ChatGPT, Google Classroom, and Magic School AI support the creation of educational materials, administrative assistance, and student assessment, improving the quality and effectiveness of teaching[4]. Despite its advantages, the adoption of AI faces challenges, such as limited familiarity and concerns regarding ethics and data protection, which require addressing through skill development strategies and the creation of clear guidelines[23]. Educators play a pivotal role in the adoption of AI. A lack of knowledge and support is often cited as a barrier, indicating the need for targeted training and guidance[31]. AI is considered a transformative technology capable of shaping a sustainable and inclusive educational system, where both students and educators are empowered through technologies such as virtual tutors and intelligent assessment systems[65]. Despite the benefits of AI, its successful integration into education requires a balanced approach, emphasizing teacher training, ethical considerations, and strategic development.

Regarding the fear and concern that the introduction of AI into teaching may evoke among respondents, the majority, at 66.1%, expressed significant worry about its impact on students' critical thinking. This highlights the fear that the easy access to ready-made answers and solutions provided by AI tools could limit the development of analytical and synthetic thinking. Instead of actively participating in the thought process, students risk adopting a passive stance toward knowledge. Moreover, concerns escalate when considering the use of AI by students not as a supportive tool but in ways potentially harmful to the learning process. A notable 87.7% of participants believe that students are likely to rely on AI applications, such as ChatGPT, without pedagogical guidance, turning their use into a form of dependency or poor practice. This fear is closely related to AI's ability to create confusion and present incorrect communication models to students, as indicated by 80.5% of respondents. AI applications may offer answers or content that do not meet educational needs or that promote inappropriate or erroneous examples. Furthermore, there is concern that the introduction of AI might disrupt the balance in students' development by overemphasizing the sciences at the expense of the humanities. Approximately 54.5% of participants consider there to be a risk of sidelining the humanities, which could lead to an imbalance in the development of essential skills and values critical for cultivating ethics, aesthetics, and social awareness. Another significant issue concerns the role of educators in the future. While 50.1% worry about the potential replacement of teachers by AI and the subsequent increase in unemployment in the sector, the remaining 49.9% appear to believe this fear is less justified. This division underscores the complexity of the issue and the need for detailed analysis of the relationship between human labor and technology in education.

Concerns about reduced student autonomy are also noteworthy, with 61.7% fearing that AI might limit students' ability to take initiatives and develop their own learning strategies. This trend is closely tied to the perception that students' creativity and innovation could be hindered by excessive reliance on AI, as expressed by 69.1% of participants. Finally, 53.4% of respondents voiced concerns that AI might exacerbate social and educational inequalities. Unequal access to advanced AI tools and differing abilities to use them across social strata or schools could deepen polarization within the educational system. Overall, the data highlight a series of concerns regarding the integration of AI into education. These findings emphasize the need for careful planning and strategic management to ensure AI functions as a tool for supporting and enhancing the educational process without threatening its quality or creating new inequalities. Similar observations and conclusions are echoed in academic studies. The introduction of artificial intelligence (AI) into education is a multidimensional phenomenon affecting fundamental aspects of learning processes, teaching, and educational policy. Scientific analysis reveals both the benefits and concerns associated with the widespread application of AI in education. AI has the potential to tailor teaching to students' needs, personalizing the learning experience. Tools such as intelligent educational systems enable the analysis of student progress, improving teaching and evaluation[16]. However, autonomy and critical thinking decline when students rely excessively on these tools to solve problems and make decisions[67]. Moreover, AI can enhance educational equity, but there is also the risk of creating new inequalities due to unequal access to technologies. Schools with fewer resources may struggle to integrate AI into teaching, widening the gap between well-funded and underprivileged educational institutions[50]. While AI facilitates innovation, ethical questions arise about its use. Although it streamlines processes like assessment, over-reliance on such technologies might undermine educators' engagement in the learning process[64]. Finally, concerns about its impact on critical thinking and creativity are valid. Excessive dependence on AI may restrict students' initiative and imagination, turning them into passive consumers of information rather than active producers[60]. In conclusion, artificial intelligence has the potential to transform education, but careful planning and ethical approaches are required to maximize its benefits while mitigating risks. Fair integration of technology is crucial for promoting a more inclusive and effective educational system.

Regarding the methods for addressing the negative consequences that the introduction of Artificial Intelligence (AI) in teaching might entail, the findings of this study highlight significant optimism about the potential for effectively managing the challenges accompanying the integration of AI into education. At the same time, they underscore the necessity of developing targeted strategies to ensure that the benefits of this technology are maximized while its negative impacts are minimized. Specifically, 94.0% of participants support the cultivation of critical thinking in students as one of the most essential tools for the safe and effective use of AI. This emphasizes the need to integrate critical thinking as an integral part of the educational process, enabling students to evaluate and responsibly use technology. In the modern educational landscape, where technology plays a dominant role, developing such skills is crucial to avoid a passive relationship with AI tools. Additionally, 93.0% of respondents consider it essential to teach students the proper and safe use of AI. This strategy reflects the need for pedagogical guidance in using technology, ensuring that students acquire the knowledge and skills necessary to avoid misuse or misunderstanding of AI capabilities. Teacher training emerges as another significant priority, with 91.2% of participants emphasizing the need for continuous professional development for educators. Training teachers in AI usage is not only necessary for the successful integration of technology in classrooms but also for enhancing their confidence in managing these tools, enriching their teaching methods, and improving the learning process. Moreover, 81.9% of respondents stress the importance of international and state regulatory frameworks to control the introduction of AI into education. This perspective reflects the need for ethical and equitable guidelines for using technology, ensuring that its benefits are distributed fairly and without discrimination. Conversely, only 15.5% of respondents believe that the complete prohibition of AI is a viable solution. The overwhelming majority favor developing strategies focused on the proper management and integration of AI into the educational process, rejecting the avoidance of technology as an unrealistic and ineffective approach. In conclusion, the findings indicate that the educational community acknowledges the significant value of AI in education while also understanding the potential risks posed by its unregulated use. Therefore, critical thinking, proper education, and regulatory interventions are highlighted as the three foundational pillars for the sustainable and effective integration of AI into educational systems. A comprehensive strategy combining technological and pedagogical innovation with ethical and institutional guarantees is vital for creating a future where AI serves as an ally of education rather than a threat to it. Similarly, scientific studies emphasize key aspects of AI implementation, including the development of critical thinking, teacher training, and the establishment of regulatory frameworks. The cultivation of critical thinking in students is crucial for the safe and constructive use of AI. The adaptive nature of AI systems enables personalized teaching, enhancing students' active engagement with learning content. This contributes to the formation of independent and critical thinking, essential for using AI effectively[15]. Teacher training is another critical pillar for the successful integration of AI. Professional development for educators through specialized programs and technological applications is essential for facilitating AI use in classrooms. Teachers need to

acquire skills to utilize AI as a tool to enhance teaching and interaction with students[7]. At the same time, establishing regulatory frameworks is vital. The lack of regulatory guidelines for AI creates gaps that can negatively impact the fair and safe use of this technology. Governments and educational institutions must collaborate to develop policies ensuring data protection, ethical use of technology, and the prevention of inequalities[63]. The development of skills such as collaboration, creativity, and communication, which can be enhanced through AI, helps students understand how to work with AI, making it a complementary force for learning rather than a restrictive factor[39]. Overall, the effective integration of AI into education requires a combined strategy based on developing human skills, teacher training, and careful regulatory compliance. These approaches will ensure that AI enhances the educational process while addressing challenges related to ethical use and equity.

Regarding the correlation between AI applications, fear of consequences, and addressing the negative impacts of AI in teaching, the correlation analysis reveals significant relationships between the applications of artificial intelligence (AI) in teaching and educators' related perceptions. Specifically, a negative correlation (Pearson -0.255, $p<0.01$) is observed between a positive attitude toward AI applications and fears about the consequences of their integration. This suggests that increased acceptance of AI reduces educators' fears, possibly due to increased familiarity with the technology. Additionally, the positive correlation (Pearson 0.176, $p<0.01$) between the use of AI and addressing negative consequences indicates that educators who integrate AI into their practices are more likely to recognize and proactively manage the challenges it entails. In contrast, the correlation between fear of AI consequences and addressing them is very low (Pearson 0.065) and not statistically significant ($p=0.058$), suggesting that educators' concerns do not automatically translate into action. This highlights the need for educational guidance and support to turn fears into active measures. Overall, the findings demonstrate that AI applications in teaching play a central role in reducing fears and enhancing educators' ability to manage the consequences of technology, with the strength of correlations ranging from weak negative to weak positive. AI integration is positively associated with educators' adaptation to challenges, while emphasizing the need for systematic support to boost confidence and effectiveness in its use. The integration of artificial intelligence (AI) in teaching presents significant potential and challenges, with literature highlighting the complexity of factors influencing educators' attitudes and the management of negative consequences. AI has a positive impact on improving personalized teaching and collaborative learning, emphasizing the need for adopting the technology alongside measures to prevent misuse[33]. However, while AI is widely used to facilitate teaching, there remains a lack of trust among educators due to its risks and challenges, which often leads to fears about the consequences of the technology[78]. Nevertheless, other research has shown that professional experience plays a crucial role in recognizing and managing the negative consequences of AI, as more experienced educators tend to be more aware of and adaptable to technological challenges[24]. Conversely, other studies have found that younger educators are more receptive to educational innovations, such as AI, due to their greater familiarity with new technologies and lower resistance to change[71]. The use of AI tools in educational design supports personalized teaching and reduces barriers, enhancing educators' and students' engagement in the learning process[44]. In summary, research studies demonstrate that AI applications in teaching can reduce fears and strengthen the management of negative consequences, provided that appropriate support is offered to educators. At the same time, differences in perceptions seem to be influenced more by personal characteristics, such as age, experience, and familiarity with technology, rather than by institutional or professional factors.

A correlation analysis was conducted to explore the relationships between specific factors (Applications of AI in teaching, Fear of the consequences of AI integration in teaching, Addressing the negative consequences of AI in teaching) and demographic characteristics (Gender, Level of education, Years of service, Educational level—Primary and Secondary education, and Job position—Teachers and Education executives). The findings revealed that Educational level (Primary and Secondary education), Job position (Teachers and Education executives), and Level of education did not have a statistically significant impact on participants' perceptions of the factors. However, Gender showed a statistically significant influence on perceptions of addressing the negative consequences of AI in teaching. Specifically, women were more likely (Mean=1.76) than men (Mean=1.73) to consider measures for addressing these negative consequences as necessary. Additionally, Years of service had a statistically significant effect on perceptions of AI applications in teaching. Multiple comparisons revealed significant differences between years of service categories. Notably, a statistically significant difference ($p=0.048$) was observed between the "1-5 years" and "31-40 years" categories, with a mean difference of 0.129. This suggests that individuals with more years of service (31-40 years) tend to score higher regarding AI applications in teaching. Similarly, a significant difference ($p=0.010$) was found between the "26-30 years" and "31-40 years" categories, with a mean difference of 0.163. The most pronounced differences were identified between groups with fewer and more years of service, particularly between "31-40 years" and smaller categories. This indicates that educators with greater experience are more likely to exhibit a positive attitude toward AI applications in teaching. These results underscore the importance of considering

demographic characteristics such as Gender and Years of service when examining perceptions of AI integration in education. The results are consistent with the findings of a research study indicating that female educators tend to show greater empathy and take more measures to address the negative consequences of technology in teaching compared to male educators. Factors such as educational level and job position were not statistically significant in shaping perceptions regarding the consequences of technological changes[56]. Another study recorded that educational level does not directly affect perceptions of innovations, such as artificial intelligence in teaching[1]. Similar findings suggest that demographic characteristics such as gender and age, rather than job position or educational level, influence educators and their practices regarding the acceptance of artificial intelligence in teaching[22]. Moreover, study[24] showed that professional experience significantly affects educators' perceptions of new methodologies, such as the integration of AI. It was found that less experienced educators scored higher in teaching skills but that more experienced educators tended to be more positive toward innovations like AI. However, the findings of another study differ, suggesting that demographic characteristics, such as educational level and experience, significantly influence perceptions of teaching innovations. Younger and less experienced educators are more receptive to adopting new technologies in teaching[71]. In conclusion, the findings from the literature support that educational level and job position do not have a statistically significant impact on perceptions of the applications and consequences of artificial intelligence in teaching. Differences in perceptions appear to be more related to personal characteristics, such as gender and experience.

V. Conclusion

The findings of this study reveal a generally positive attitude among the participating educators toward the integration of Artificial Intelligence (AI) in teaching. They emphasize its potential in areas such as intelligent systems, assessment, and personalization. However, lower acceptance rates for more complex skills underscore the need for further exploration and development of these capabilities. A significant portion of educators have not yet utilized AI in their teaching, highlighting the critical need for comprehensive training programs and initiatives to build trust in these technologies. In addition, the findings stress the importance of developing strategies to promote creativity and establish AI as a vital tool for enhancing the educational experience. Concerns surrounding AI integration in education were also identified, pointing to the necessity of careful planning and strategic management to ensure that AI functions as a supportive and empowering resource without compromising educational quality or exacerbating inequalities. Overall, educators recognize the transformative potential of AI in teaching, while also acknowledging the risks associated with its unregulated use. As a result, critical thinking, targeted training, and regulatory interventions are identified as the three foundational pillars for the sustainable and effective integration of AI into educational systems. A comprehensive strategy that merges technological and pedagogical innovation with ethical and institutional safeguards is essential for shaping a future where AI acts as an ally to education rather than a threat.

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