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Al-Powered Educational Tools and Pedagogical Performance of Teachers in Selected Secondary Schools: Basis in Crafting Al-based Pedagogical Innovation

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ABSTRACT

The use of AI tools has brought a huge change in the education landscape. Its proliferation has been beneficial to different sectors bringing different innovations. However due to its fast paced development, the education field had a challenging role to keep up. This study's purpose is to gauge the current status of the educator's knowledge on the use of the most known AI system to identify their readiness in using this technology. The findings of this research includes a survey questionnaire that aimed to identify the most common use AI tool, as well as know the experiences of the various educators that already had used the system. The result of this study can greatly benefit teachers who are currently looking for a reference in gauging whether the AI system is something beneficial to their daily task as an educator. This paperwork can also benefit future researchers since this study includes teachers' perspectives on the effectiveness of the AI tools based on their experience as they navigate the system in the teaching and learning process.

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CHAPTER ONE
INTRODUCTION

Artificial intelligence was once just a part of the world of science films and television series yet now emerges into our world bringing about numerous transformations in ways we never thought possible. The meteoric rise of AI has been powered by humanity's incessant desire for knowledge which has redefined our understanding of intelligence and its inherent influence on our recent generation.

However, as AI presents itself as a cutting edge innovation, the future it holds comes with both opportunities and challenges. And while the coming times may be clouded with apprehension due to its rapid progress, it is crucial that we embrace this technological growth and adapt ourselves to its cathartic strength. Every one must belt up and should not stand idly by as AI penetrating the academic institution is now on its full show. The only question yet to answer is if the preparation we had is enough to gear us towards proper harnessing of its full potential in order to lead our learners down to its core.

AI is no more a recounting science fiction pursuit but a reality to be dealt with multifunction. So although the advantages of AI are undoubtedly noteworthy, several critical issues remain to be addressed such as data privacy, cost management, and user's competency. These concerns will definitely require a comprehensive assessment to identify our educator's readiness and examine the current framework of our AI-powered educational tools. Ultimately, the goal of this study is to provide a benchmark of the educators preparedness for the AI integration and also provide insights about the latest trends in AI-based pedagogy, achieving the dual objectives to acquire the requisite knowledge and ultimately make informed decisions for the benefit of the learners, educators, and the whole community.

A. Background of the Study:

The current era has witnessed the rapid advancement of artificial intelligence (AI), which has permeated various industries and services, including the academic field. The rise of AI has transformed modern pedagogical methods in education, paving the way for diverse teaching styles that enhance student learning. The implications of these AI tools on teaching performance, individual study techniques, and learning assessments in the current educational landscape have been a subject of discussion in the academic field through the years since its launch (Kohnke et al., 2023).

Artificial intelligence is a term coined by John McCarthy in 1995. It is the ability of the computer or machine to mimic human intelligence such as problem-solving, decision-making, sound reasoning, and deep learning. In this regard, AI was defined as the "science and engineering of making intelligent machines". Although AI has been around for decades, its prevalence in today's era is due to the advances in computer hardware and software which creates new algorithms and techniques. (Russel, 2010)

On the other hand, pedagogy as defined by Britannica dictionary pertains to the study of teaching methods, including the aims of education and the ways in which such goals may be achieved. The field relies heavily on educational psychology, which encompasses scientific theories of learning, and to some extent on the philosophy of education, which considers the aims and value of education from a philosophical perspective. It can therefore be concluded thatpedagogy is the summation of instructions and methods involved in teaching and learning process including the system and tool that it will use as a medium of instruction. This is closely related to the teaching performance which dealt with the skills of an educator to facilitate the learning in a variety of methods, including the ability to utilize the educational tools prescribed by the academic institution: AI-Powered educational tools as a concrete example in today's era.

The rapid proliferation of artificial intelligence (AI) in the academic field has yielded innovative solutions and support tools, including generative AI tools based on language models like ChatGPT and Google-Bard. Generative AI tools represent a significant leap forward from previous AI tools. They harness deep learning models to generate human-like content, spanning audio, code, images, text, simulations, 3D objects, and videos. These tools can produce novel and unexpected outputs in response to varied and complex prompts, such as languages, instructions, and questions (Lim et al., 2023). Educational AI tools like That.quiz and Gauthmath provide mathematical activity practices and solutions in just a few clicks, while teaching aid AIs like eduaide.com, teachermade.com, and Magic tool offers a platform that has various teaching support functionalities such as lesson plan generation, class-activity formulation, and assessment creation.

The AI tools also possess the ability to empower school administrators to alleviate the workloads of every teacher and school head through administrative task automation such as grading student’s outputs, tracking each learner’s progress, and organizing staff and students schedules. This provides them ample time to cater a more personalized learning system for each student, shaping the current curriculum to accommodate the growing technology. These premises are aligned with the educational goals outlined in the Department of Education's (DepEd) Basic Education Development Program (BEDP) 2030. The ability of the AI educational tools to provide more insights and recommendations will be made possible by leveraging data-driven-decision making. This step can also enable school heads and stakeholders to make informed decisions regarding resource allocation, curriculum department, and student support programs.

While artificial intelligence (AI) has brought about solutions to enhance teaching and learning practices it has also raised concerns, among educators. These concerns stem from theneed to keep up with AIs advancements in order to fully leverage its benefits and provide students with the educational experiences and outcomes. The challenges involved in implementing AI in education include its limitations, teachers misconceptions and their general lack of expertise (Akgun & Greenhow 2021; Sijing & Lan, 2018). Afe (2000) as cited by Agharuwhe (2013) emphasized the role of teachers in facilitating and managing materials and tools within their classrooms as student performance may vary depending on the teachers expertise and experience. Therefore it is crucial for teachers who aim to nurture their students' growth to be adequately equipped in order to achieve desired results.

Furthermore, according to a report, by the World Economic Forum (WEF) in 2020 the Philippines ranked 56th out of 100 countries in terms of preparedness for skills. The report emphasized that despite having a population of digitally connected individuals there is an urgentneed to improve digital literacy and skills to fully embrace the potential of the digital economy. Additionally with AI emerging as an alternative approach to teaching methods it suggests that our current approaches may no longer be sufficient (Taeihagh, A., 2021). Hence, with these findings and data regarding the current status of our AI competency, it is now imperative that weformulate solutions to address the recent shortcomings. The success of any future strategies will depend on properly assessing our educators digital skills and competencies along with a comprehensive plan to train our educators to match the existing demand of this modern pedagogy. Once this foundation is established, updating our curriculum to align with the evolving AI system can be a fathomable feat.

B. Statement of the Problem

This study aims to determine the impact of Al-powered educational tools to the pedagogical performance of teachers which will be the basis of crafting an Al-based innovation.

➢ *Specifically, it sought to answer the following questions:*

- *What are the Al-powered educational tools commonly used by the teachers?*

- *To what extent do Al-educational tools impact the pedagogical performance of teachers in terms of:*

✓ Providing Personalized Learning Experience
✓ Grading and feedback
✓ Adapting lessons to individual student needs
✓ Identifying at-risks students
✓ Creating engaging and interactive content

- *Based on the Research Findings, what Al-based Innovation can be Proposed to Enhance the Pedagogical Performance of Teachers?*

C. Theoretical Framework

Fig 1 Elements of an Intelligent Learning Platform

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The figure shows the Elements of an Intelligent Learning platform which contains severalfeatures and functions that make up a comprehensive system of teaching and learning process in an ideal setting. The visual includes the "Learning Management System (LMS) which pertains to be the core of the platform, represented b0y a server icon. It manages and delivers course content, tracks student progress, and facilitates communication. The Intelligent Tutoring System (ITS) is also included in the diagram and it is depicted as the brain. the ITS personalized learning experiences by adapting to individual student needs and learning styles. Itwill recommend resources, provide targeted feedback, and adjust the difficulty level of content.

The Assessment on the hand is represented by a checkmark is a component that handles quizzes, exams, and other forms of evaluation. It might use AI to analyze student performance and provide insights for improvement. Furthermore, the Learning Content Management System (LCMS), as shown as a bookshelf, manages learning materials like videos, documents, and simulations. It might also handle version control and access permissions. Additionally, an E-learning Content refers to the actual learning materials deliveredthrough the platform, represented by various icons like documents, videos, and puzzles. The Mobile Technology such as smartphone symbol suggests the platform can be accessed and used on mobile devices, offering flexibility and convenience for learners. The data Monitoring and analysis is depicted as a graph in the diagram. This component collects and analyzes data on student activity and performance. This data can be used to inform platform improvements and personalize learning experiences further. The quality assurance system is represented by a shield, this component ensures the platform meets certain quality standards, such as data security, accessibility, and reliability.

Overall, the framework suggests an intelligent learning platform that adapts to individual needs of each learner through the ITS and personalized learning tools. The system also provides a variety of learning content which is accessible through the LCMS and e-learning content. This type of learning content offers flexibility and convenience through mobile access and various content formats. Also, a comprehensive AI tool should be able to analyze data for improvement so it will be easier to personalize the learning modalities and components of the tool and inform platform development. Finally, an AI system must maintain its quality and security. This is possible through dedicated quality assurance measures that are already included in the implementation of the system before it is introduced into the classroom setting.

D. Conceptual Framework

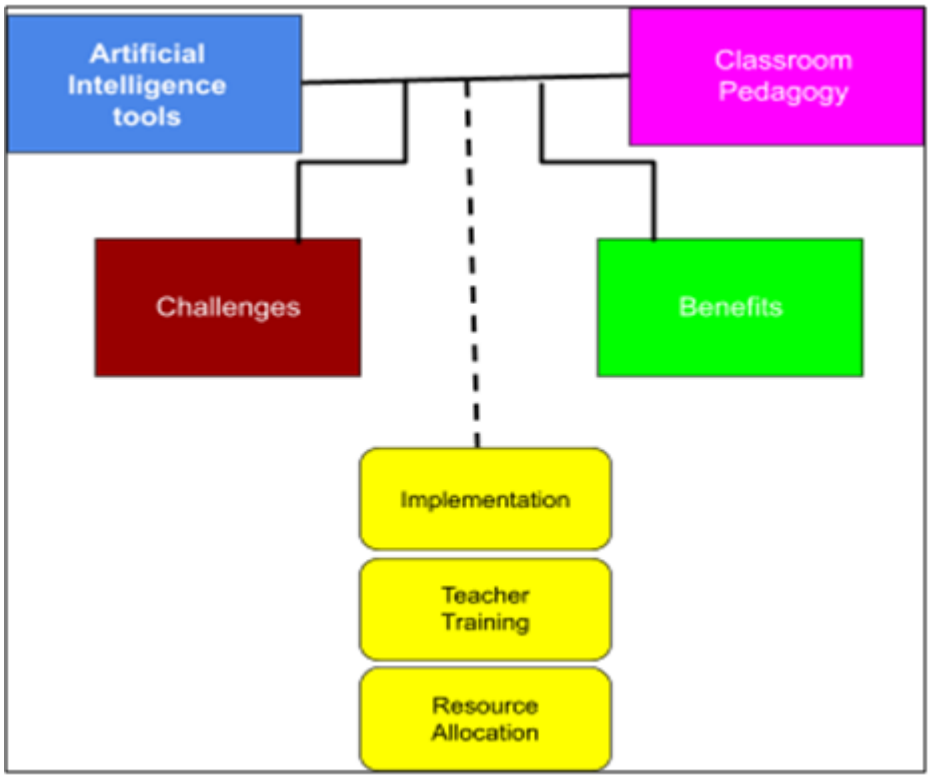

Fig 2 Conceptual Framework

The figure above as the conceptual framework of this study illustrates the outcome once artificial intelligence and classroom pedagogy is integrated into the classroom setting. As the diagram shows, the possibility that challenges may arise when an AI tool is introduced and incorporated in the classroom pedagogy due to lack of training from teachers and lack or scarcity of resources supply. On the other hand, benefits on the use of AI will be experienced if the tool is properly implemented, the teachers are well trained to use the system, and proper resource allocation is provided to the institution thus efficacy of this method will be beneficial to the teaching and learning process.

E. Significance of the Study

This study will determine the impact of Al-powered educational tools to the pedagogical performance of teachers which will be the basis for the proposed Al-based innovation.

➢ *Therefore, the Results of this Study could be Highly Significant and Beneficial to the Following:*

- *Department of Education*

The result of the study will provide valuable information about the impact of Al-powered educational tools on the performance of teachers which will be helpful in providing adequate programs or activities for both teachers and students to enhance their knowledge on how to effectively use artificial intelligence in the classroom.

- *Teachers*

The findings of the study will help teachers to become aware of the actual impact of Al-powered educational tools in pedagogical performance hence adapting it effectively in the teaching-learning process. Moreover, it will also provide the teachers with information on some of the Al- educational tools which can be used to automate some tasks which frees up teachers to focus more on important tasks such as developing relationships with students and preparing for instruction.

- *Students*

The result of the study will help the students to become motivated in learning since Al-powered educational tools can provide personalized learning opportunities such as interactive modules and textbooks, including content for students with disabilities making the educational system as inclusive and accessible as possible.

- *Future Researchers*

The study will provide knowledge on future researchers about the impact of Al-educational tools to the pedagogical performance of the teachers and can make it as a guide to factors that are excluded from the study.

F. Scope, Limitation, and Delimitation of the Study

The main objective of this study is to determine the impact of Al-powered educational tools in the pedagogical performance of teachers. This study also includes the Al-powered educational tools commonly used by the respondents nowadays and the challenges that the teachers have encountered in adapting these tools in the teaching-learning process.

This study is limited to the following: (1) the respondents of the study who are the teaching personnel of selected schools for the school year 2023-2024, (2) the research instrument to be used which will be a survey questionnaire in an online platform.

On the other hand, this study is delimited to the following: (1) other factors that may affect the pedagogical performance of the teachers, (2) relationship of demographic profiles of teachers such as age and years of teaching experience on the usage of Al-powered educationaltools.

G. Definition of Terms

For a better understanding of this study, the following terms are defined in the context of this research.

➢ *Artificial Intelligence.*

It is defined as a branch of computer science which provides systems and algorithms capable of performing tasks that typically require human intervention. Inthe context of this research, these are the system and algorithm tools that are utilized by the teachers, making an impact in their pedagogical performance.

➢ *Pedagogy.*

It is the method and practice of teaching, especially as an academic subjector theoretical concept.

➢ *Machine Learning (ML):*

A subset of AI where algorithms learn from data without being explicitly programmed.

➢ *Deep Learning (DL):*

A type of ML that uses artificial neural networks to learn from largeamounts of data.

➢ *Natural Language Processing (NLP):*

A subfield of AI that deals with the interaction between computers and human (natural) languages.

➢ *Educational Technology (EdTech):*

Technologies used to support and enhanceteaching and learning.

- *Intelligent Tutoring System (ITS):*
  An AI-powered system that personalizes learning byadapting to individual student needs and learning styles.

- *Adaptive Learning:*
  An approach to education that uses data and algorithms topersonalize the learning experience for each student.

- *Personalization:*
  Tailoring the learning experience to meet the individual needs and interests of each student.

- *Augmented Reality (AR):*
  Overlays digital information onto the real world, enriching learning experiences.

- *Virtual Reality (VR):*
  Creates immersive, simulated environments for learning and skill development.

- *Chatbots:*
  AI-powered conversational agents that can answer questions, providefeedback, and offer support to students.

- *Educational Games:*
  Games designed for educational purposes, often incorporating gamification elements and adaptive features.

- *Educational Robots:*
  Robots used in education to teach coding, robotics, and other STEM subjects, as well as foster social and emotional learning.

- *Automatic Graders:*
  AI-powered systems that automatically grade tests andassignments, providing faster and more objective feedback.

- *Data Analytics Tools:*
  Tools used to collect and analyze student data to track progress,identify areas of difficulty, and inform teaching practices.

- *Predictive Analytics:*
  Using data to predict future student performance and identify students at risk of falling behind.

- *Personalization Platforms:*
  Platforms that use AI to recommend learning materials, pathways, and activities based on individual student data.

- *Ethical Considerations:*
  Issues concerning privacy, bias, and fairness in the use of AI in education.

- *Digital Divide:*
  The gap between those who have access to technology and those who do not.

- *Teacher Training:*
  The importance of training teachers to effectively use and integrate AI tools in their classrooms.

- *Assessment:*
  Measuring the effectiveness of AI tools in education and their impact on student learning.

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CHAPTER TWO
REVIEW OF RELATED LITERATURE AND STUDIES

A. Artificial Intelligence in Education:

Currently the importance of artificial intelligence in education worldwide is recognized and the proliferation of the various AI tools in different fields contributed to the advancement of several processes and approaches. Artificial Intelligence (AI) has the potential to address some of the biggest challenges in education today, innovate teaching and learning practices, and accelerate progress towards SDG 4 (UNESCO, 2019). Artificial intelligence (Al) is increasingly having an impact on education, bringing opportunities as well as numerous challenges (COE, 2022).

Several studies were conducted and these researches ascertained that AI has extensively been adopted and used in education, particularly by education institutions, in different forms (Chen, Chen & Lin, 2020) and has made an impact in the field since its integration. Education is helped by AI in at least two ways: (1) the educational process – assistance and modifications to pedagogy and educator's routine function; and (2) the educational ambit and content – what kind of education is needed (Alam, 2021). AIED refers to the use of AI (Artificial Intelligence) technologies or application programs in educational settings to facilitate teaching, learning, or decision making (Hwang, Xie, Wah, Gašević, 2020) The main research topics include intelligent tutoring systems for special education; natural language processing for language education; educational robots for AI education; educational data mining for performance prediction; discourse analysis in computer-supported collaborative learning; neural networks for teaching evaluation; affective computing for learner emotion detection; and recommender systems for personalized learning (Chen, Zou, Xie, Cheng & Liu, 2022).

- *The Following are the Analysis made on the Policy of the Artificial Intelligence Applicationin Education:*

Artificial intelligence products used by the teachers are mobile teaching, followed by teachers' online training platforms. Some teachers use automatic correction assignment systems in teaching. With the help of smart classrooms, robotic assistants, and other major future teaching, intelligent products, the frequency of usage of AI is low which indicates that artificial intelligence products are underdeveloped in education and teaching and also the teachers are not well trained about the usage of AI tools and other resources of AI tools and other resources of AI available for teaching but it have great development potential in the future.

- *Basic Education*

The application of artificial intelligence in basic education includes providing infrastructure support, training teachers and students, and offering financial aid. It is based on information networks, platform foundations, and digital resources, enabling the construction of smart campuses and the development of innovative applications with trustworthy security measures to enhance the sustainable development capacity of education.

AI in basic education and AI in secondary and higher education are very different. AI in basic education mainly focuses on basic concepts and simple AI activities (e.g., drawing concept maps and AI framing). However, AI in secondary and higher education mainly focuses on programing (e.g., Scratch and Google Teachable Machine), and complex concepts. Primary and Preschool students need to learn AI. There are many benefits for these children to learn AI when they are exposed to these learning tools. For example, children enhanced computational thinking skills and problem solving skills through AI activities (Su & Yang, 2022; Williams, Park, Oh, & Breazeal, 2019; Kandlhofer et al., 2016) and improved AI knowledge (Williams, Park, Oh, & Breazeal, 2019) through AI curriculum. Furthermore, young children playing with the AI robot improved several inquiry literacy skills (i.e., creative inquiry, emotional inquiry and collaborative inquiry skills) (Kewalramani et al., 2021).

The curriculum named "AI for Kids", was designed by the author's research team in Hong Kong. This curriculum aims to highlight the role of AI-powered technologies in human's daily life and to enable children to learn about AI using an embodied, project-based approach. The project focuses on environmental protection, especially ocean protection, which is culturally responsive to Hong Kong children's learning interests. The AI literacy curriculum helps to enable young children to:(1)Recognize the basic principle of data processing of AI – the process of inferring results from information;(2)Understand and apply the basic principle and process of making judgments of AI - synthesizing information and identifying corresponding objects according to designated key elements; and;(3) Understand the concept of prejudice, and recognize that AI also has prejudices and errors.

Ultimately, implementing AI education would help equip children with early AI literacy. This knowledge will prepare them to face the challenges of the digital future and promote sustainable development and social justice and human society.

- *Higher Education:*

AI in higher education classrooms is paving the way for a revolution in learning, shifting the focus from memorization to deeper understanding. By adapting to individual needs and learning styles, AI tools personalize the educational experience, offering tailored resources and feedback. This empowers educators to transform from knowledge providers to insightful guides, fostering critical thinking and problem-solving skills. However, like any powerful tool, AI requires careful integration to ensure equitable access, prevent misuse, and protect students' data privacy.

The potential benefits of AI are vast and transformative. Imagine AI systems recognizing learning styles and creating individualized learning paths, with interactive simulations and virtual worlds bringing concepts to life. Instant feedback on assignments and assessments allows students to pinpoint areas for improvement, while tailored support for students with special needs ensures no one is left behind. AI can guide students in making informed choices about courses, degrees, and careers, while chatbots provide round-the-clock support. Beyond its immediate benefits, AI equips students with skills and familiarity with technologies relevant to future careers. And finally, AI's insights into student learning patterns offer educators invaluable feedback to continuously improve their teaching methods.

Erin & Barbara (2017); In this study they developed a summary of critical success factors in virtual work based on a compilation of theoretical and empirical findings from multiple streamsof virtual work research, differentiating between those that are relatively fixed for the individual worker and those that can be influenced or changed through training and individual development. Tassos & Antonis (2011); The Author, in their approach, studies the present real-world, authentic tasks that enable context and content-dependent knowledge construction. The Creators have also provided multiple representations of reality by representing the natural complexity of the world. They also show us the findings that collaboration and social negotiation are not only limited to the participants of an Educational Virtual Environment but exist between participants and avatars, offering a new dimension to computer-assisted learning. Micheal & Ruth (2010); The Word slinger discusses the issues arising from combining artificial intelligence and artificial life techniques with those of virtual environments to produce just such intelligent virtual environments. In their viewpoint, they also include environments providing knowledge to direct or assist the user rather than relying entirely on the user's knowledge and skills, those in which the user is represented by a partially autonomous avatar, those containing intelligent agents separate from the user, and many others from both sides of the area. Tassos & Vassilis (2004); The Wordsmith considers the measurement of presence in educational virtual environments (VEs) since presence is correlated with higher levels of cognitive performance and emotional development, factors that contribute to knowledge construction.

Tony, et al., (2020); The Pen-pushers talk about AI or any technology applied to education; its application can be at different levels, and in particular case of higher education, proposals have been directed towards at least two levels: strategic or institutional applications; and direct teaching and learning. Olaf, et al., (2019) The Originators in their study, declares that Artificial Intelligence is to proceed based on the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. The authors specify that an attempt will be made to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. Challenges and Issues on the use of AI in education While there are many benefits to incorporating AI into the classroom, there are also several challenges that teachers must overcome. One of the biggest challenges is the need for technical expertise. Teachers who are not familiar with AI may find it difficult to integrate this technology into their teaching practices, and they may need support and training to get started. Another challenge is the cost of AI tools and applications. Many schools and universities do not have the resources to purchase and maintain the technology they need to incorporate AI into the classroom, and they may need to seek external funding or partnerships to support their efforts. Finally, there arealso ethical concerns associated with incorporating AI into the classroom. As AI becomes more sophisticated, there are concerns about its impact on privacy, security, and the job market. Teachers must be aware of these concerns and work to ensure that their students are protectedas they explore this exciting and rapidly-evolving technology.

- *Challenges in the use of AI in Education*

Navigating the AI landscape is a crucial skill for future generations. To empower them, we must first empower their educators. Investing in AI literacy training for teachers is key. Equipping them with knowledge of AI's strengths and limitations will not only boost their own confidence, but also their ability to guide students in harnessing AI responsibly. Additionally,data collection for some AI uses raises valid privacy and security concerns. Educators must be vigilant, implementing robust policies to safeguard sensitive information. A formal school-wide policy outlining responsible AI use promotes consistency and clarity. Regularly vetting existing classroom tools by the tech team can prevent surprises from new AI features.

As a nascent technology, AI tools lack extensive research on their impact and effectiveness. While future studies will expand our understanding, for now, teachers must rely on their judgment to identify the most effective classroom applications. Continuous evaluation ofdata is crucial. If an AI tool fails to deliver promised progress, replacing it with alternative methods is wise. AI skills are vital for 21st-century success, but unequal access can exacerbate the digital divide. When introducing AI resources, ensure equitable implementation so all students benefit. Remember, every student deserves the opportunity to thrive in an AI-powered future.

While there are many benefits to incorporating AI into the classroom, there are also several challenges that teachers must overcome. One of the biggest challenges is the need for technical expertise. Teachers who are not familiar with AI may find it difficult to integrate this technology into their teaching practices, and they may need support and training to get started. Another challenge is the cost of AI tools and applications. Many schools and universities do not have the resources to purchase and maintain the technology they need to incorporate AI into the classroom, and they may need to seek external funding or partnerships to support their efforts. Finally, there are also ethical concerns associated with incorporating AI into the classroom. As AI becomes more sophisticated, there are concerns about its impact on privacy, security, and the job market. Teachers must be

aware of these concerns and work to ensure that their students are protected as they explore this exciting and rapidly-evolving technology.

➢ *Synthesis of the Study on Artificial Intelligence in Education*

- *Global Recognition and Potential:*

AI in education is gaining worldwide recognition for its potential to address challenges, innovate teaching practices, and accelerate progress towards achieving Sustainable Development Goal 4 (quality education). Numerous AI tools are emerging across various fields, contributing to advancements in different educational processes and approaches.

- *Applications and Benefits:*

AI facilitates teaching and learning in diverse ways, impacting both the educational process (pedagogy and routine functions) and the content or scope of education.

Examples include intelligent tutoring systems for special needs, natural language processing tools for language learning, educational robots for AI education, and data mining for performance prediction. Benefits include personalized learning, enhanced feedback, improved accessibility, and development of essential 21st-century skills like critical thinking and problem-solving.

- *Focus on Specific Levels:*

The study differentiates applications of AI between basic, secondary, and higher education levels.

Basic Education: Focuses on providing infrastructure support, training, and financial aid, emphasizing development of AI literacy through programs like the "AI for Kids" curriculum.

Higher Education: Emphasizes personalized learning, deeper understanding, and critical thinking skills development through interactive simulations, virtual worlds, and instant feedback tools.

- *Challenges and Considerations:*

Integrating AI effectively requires addressing challenges like teacher technical expertise, cost of tools, ethical concerns surrounding data privacy and biases, and ensuring equitable access to avoid exacerbating the digital divide.

The study highlights solutions like teacher training, robust privacy policies, data evaluation, and responsible AI use policies.

Implementing AI in education presents immense opportunities for revolutionizing learning experiences, equipping students with vital skills for the future, and promoting sustainable development. Navigating the challenges carefully and thoughtfully is crucial to ensure responsible and equitable integration of AI for the benefit of all learners.

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CHAPTER THREE
METHODOLOGY

This chapter presents the research design, research environment, respondents/subject of the study, data gathering procedures as well as the statistical treatment of data.

➢ *Research Design*

In this study, a quantitative descriptive research method will be used to determine the impact of Al-powered educational tools on the pedagogical performance of the teachers.

➢ *Research Environment*

The study was conducted in <name of school> for AY 2023-2024.

➢ *Respondents/Subject of the Study*

The main subjects of this study were the teaching personnel of <name of school> to be able to determine the impact of Al-powered educational tools on the pedagogical performance of teachers. The Al-based innovation is the proposed research output of the researcher that would enhance the pedagogical of teachers in terms of making personalized learning experience, grading and feedback, and creating interactive learning materials.

The study includes 21 teaching personnel from <name of school>. The sample size was determined using random sampling technique.

➢ *Data Gathering Procedure*

A request was made to the principal of each selected school that allowed the researchers to conduct the survey. The questionnaires were administered during the First Semester of the A.Y 2023-2024. The duration of the study was from August 2023 to January 2024. The google forms were also disseminated to the respondent's social media platforms withan assurance that said data would be treated with strict confidentiality.

➢ *Research Instrumentation*

A survey questionnaire is crafted by the researchers according to the problems that are needed to be answered. The survey questionnaire will be administered to the respondents usinggoogle forms to determine the impact of Al-powered educational tools on the pedagogical performance of teachers. It is evaluated and validated by professionals whose expertise is teaching. The participants were asked to assess several value statements (presented in rows) on a three-point Likert scale.

Table 1 Research Instrumentation

Scoring of Responses		
Options	**Range**	**Verbal Interpretation**
3	2.61-3.00	High
2	1.81-2.60	Average
1	1.00-1.80	Low

All participants received the questionnaire in a similar order to ensure consistency when analyzing the responses to draw conclusions from the research results. The questionnaire was structured in such a way that similar questions were posed to all participants in a similar order.

➢ *Statistical Treatment of Data*

Descriptive statistics such as frequency count, mean, percent and rank are considered. The data were summarized, and an accurate and reliable interpretation was produced using the statistical techniques listed below.

➢ *The Following Statistical Procedure was Applied to achieve the Study's Goals:*

- *Common Al-Powered Educational Tools*

Frequency counts and percentage were the basic statistical tools used to determine the commonly used Al-powered educational tools of teachers to enhance their pedagogical performance.

- *Impact of Al-powered Educational Tools to Pedagogical Performance*

The weighted mean and ranking were used to determine the extent of impact of Al-powered educational tools to the teachers' pedagogical performance. The rating scale is used as a guide for the interpretation of the weighted mean.

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CHAPTER FOUR
RESULTS AND DISCUSSION

Table 2 Frequency Distribution of Teachers' Most Used Al- Educational Tools

Common Al-educational Tools	Count	Percentage
Grammarly	12	57.14
Canva ClassroomMagic	5	23.81
Google Bard	2	9.52
Pictory	1	4.76
Curipod	0	0
Eduaide	0	0
Magicschool.ai	0	0

The table above shows the frequency distribution of the teachers' responses on which is the most commonly used AI in the education field today. This result is derived from the survey answered by 20 teachers from different schools. According to the data, Grammarly is the most used AI-educational tool, with 57.14% of teachers reporting using it. This suggests that Grammarly is a popular tool among teachers, and it may be well-suited for a variety of educational purposes. Grammarly is a free AI writing assistance that is a good tool to use for checking grammar, spelling, and tone. This tool comes in web-based and mobile applications somost teachers may have found it more accessible than the rest of the other applications. Additionally, Grammarly has been one of the first AI tools that was launched making it the most common writing partner to its users. The Next on the list is Canva Classroom Magic with 23.81% of teachers using it. This suggests that Canva Classroom Magic is also a popular tool among teachers, and it may be particularly useful for creating visual materials for instruction.

Canva magic tool is an added feature to the Canva tool which started as a photo editing tool. The current version of Canva already provides various features to its users and is now being used due to its wide variety of templates.

Google Bard is at the third spot with 9.52% of teachers who selected it as a common AI tool. This may suggest that Google Bard is a relatively new tool, but it is already being adopted by teachers. However, since it is used by a significant number of teachers, it may have the potential to become more popular in the future.

The fourth selected most common AI tool is the Pictory which is used by 4.76% of teachers. This suggests that Pictory is a less common tool than Grammarly, Canva Classroom Magic, and Google Bard. However, it is still used by some teachers, and it may be a good option for teachers who are looking for a tool to create videos or other multimedia content. Next on the list is Curipod, Eduaide, and Magicschool.ai which are not used by any of the teachers in the sample. This suggests that these tools are either not well-known among teachers or they do not meet the needs of teachers.

Overall, the results table suggests that Grammarly and Canva Classroom Magic are the most popular AI-educational tools among teachers. Google Bard is also a popular tool, and it has the potential to become even more popular in the future. Pictory is a less common tool, but it is still used by some teachers. Curipod, Eduaide, and Magicschool.ai are not used by any of the teachers in the sample.

It is important to note that this data is based on a small sample size and may not be representative of the entire population of teachers. Further research with a larger sample size would be needed to draw more generalizable conclusions about teachers' use of AI-educational tools.

Table 3 Impact of Al-Educational Tools in the Pedagogical Performance of Teachers

Pedagogical Aspects	Mean	Standard Deviation	Interpretation
Providing Personalized LearningExperience	2.6	0.53	Average
Grading and Feedback	2.61	0.56	High
Adapting lesson to individual studentneeds	2.62	0.49	High
Identifying at-risks students	2.50	0.54	Average
Creating engaging and interactive content	2.657	0.48	High
OVER ALL	2.60	0.53	Average

The overall impact of AI-educational tools on the pedagogical performance of teachers is average, with a mean score of 2.6. This suggests that AI-educational tools can have a positive impact on teachers' pedagogical performance, but the impact is not large. There is some variation in the impact of AI-educational tools across different pedagogical aspects. Grading andFeedback, Adapting lessons to individual student needs, and Creating engaging and interactive content show a higher impact compared to Providing Personalized Learning Experience and Identifying at-risk students. This suggests that AI-educational tools may be more effective for some tasks than others. The variations in impact may be due to several factors, such as:

- The specific AI-educational tools used.
- The teachers' experience and skills in using these tools.
- The subject matter being taught.
- The needs and learning styles of the students.

Overall, AI-educational tools have the potential to positively impact teachers' pedagogical performance, but the specific impact varies depending on several factors. More research is needed to determine the best ways to use AI-educational tools to improve teaching and learning.

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CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter summarizes findings, conclusions, and recommendations.

A. Summary of Findings

The following significant findings are summarized From a thorough analysis of the data collected and the results obtained.

➢ *The Al-Powered Educational Tools Commonly used by the Teachers*

Based on the findings of the study the most common AI-powered educational tool used by the respondents is Grammarly at 57.14%, Canva Classroom Magic at 23.81, Google Bald at 9.52%, Pictory at 4.76% and the Curipod, Eduaide, and majicschool.ai at zero not applicable.

➢ *The Pedagogical Performance of Teachers in Terms of:*

- *Providing Personalized Learning Experience*

➢ *Grading and Feedback*
➢ *Adapting Lessons to Individual Student Needs*
➢ *Identifying At-Risk Students*
➢ *Creating Engaging and Interactive Content*

Analysis of the result showed that from 20 participating educators the Impact of Al-Educational Tools in the Pedagogical Performance of Teachers the overall total is Average.

B. Conclusions

Based on the findings of the study, the following conclusions are drawn,

- The findings revealed that most educators do not use all the common AI educational tools some tools are not applicable to use.
- The integration of Artificial Intelligence into education holds immense potential for transforming traditional pedagogical approaches. The study's findings suggest that leveraging AI-powered tools can lead to improved educational outcomes, increased efficiency, and a more personalized learning environment. However, successful consideration of ethical consideration, teachers' training, and ongoing support.
- The Impact of Al-Educational Tools on the Pedagogical Performance of Teachers Basedon the study results they are high in grading and feedback, adapting lessons to individual student needs, and Creating engaging and interactive content. And average interpretation in Providing Personalized Learning Experiences and Identifying at-risk students.

C. Recommendations

Based on the results and conclusions of the study, the following recommendations are offered:

- The educators should undergo comprehensive training programs to expertise themselves with common AI educational tools and their uses. Continuous professional development ensures that teachers can effectively engage AI in their teaching practices.
- Encouragement between educators, researchers, and developers to refine AI-based pedagogical tools continually. Invest in ongoing research to stay level of advancements in AI educational technology and their potential applications in education.
- Ensure that AI-powered educational tools are accessible to all educators, future educators and all students, regardless of socioeconomic background.
- To establish clear ethical guidelines for the use of AI tools in education. these guidelines should address issues such as data privacy and transparency to ensure the responsible and equitable use of AI-powered educational tools.

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