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ARTIFICIAL INTELLIGENCE APPLIED TO TEACHING AND LEARNING LEARNING PROCESS

Dr. V. GNANAVEL, Professor.

SIGA College of Education. Villupuram, Tamilnadu, India.

Abstract: Changes in the demands of education require innovation and creativity in the learning process. With the development of Artificial Intelligence (AI) in the field of education to help process daily activities including teaching and learning. The objective of this study is to investigate Artificial Intelligence (AI) in education, especially in the teaching and learning process. Artificial Intelligence (AI) is the process of modeling human thinking and designing a machine so it can behave like humans. In the future progress of science and technology, teachers' work such as correcting, student attendance, giving daily tests and exams, explaining knowledge, making administrative reports and other systemic work can be submitted to be completed by technology devices. Teachers can save more energy and can focus more on non- systemic work to create a golden generation with more character and quality with natural intelligence where robots cannot do it. Technology only runs systemically and is automated based on human commands, while the human mind, especially teachers deliver new knowledge. Therefore, the teacher's intelligence will be unmatched. AI that emerged as the industrial revolution is also the result of the creative minds of human natural intelligence. So when compared, between the two will never have an equal position.

Keywords: Artificial Intelligence (AI), education, teaching and learning, History of Artificial Intelligence, Types of Artificial Intelligence, AI in Action: Core Components of Ai-Based Education.

INTRODUCTION

Today's technology has become an unavoidable part of the passage of time. Technology has not only changed people's lifestyles but has also changed how we work, learn, and interact. Various kinds of innovations appear all the time, making our activities and work more practical and effective. A more recent technological development is the emergence of the term artificial intelligence which is

abbreviated as AI (artificial intelligence) which is currently starting to steal attention as a tool to act like humans.

In its development, artificial intelligence has also penetrated the world of education. AI systems allow people to learn with the help of education assistants such as bots. The development of the times requires the world of education to adapt to technological developments to improve the quality of education, especially the adjustment of information and communication technology. Artificial intelligence or (AI) is a technology where machines can learn and understand logic like humans. This technology is said to be able to help simplify human life which is very complex (Fitria, 2021a). AI itself works by combining the presence of several data, iterative processing, and intelligent algorithms. This allows the software to learn automatically from patterns or features in the data. AI can also be said to be a very broad field of study. The scope of theories, methods, technologies, and subfields that exist in AI is very wide, including machine learning, neural networks, cognitive computing, computer vision, and scientific language processing.

The role of Artificial Intelligence (AI) technology is increasingly evident in various sectors, including the education sector. The presence of AI technology has transformed the educational curriculum, especially in the fields of technology, science, mathematics, and engineering. But AI will also change the face of the world of education as a whole. One technology that has recently received attention is Artificial Intelligence (AI). This technology has an important role in facilitating various job functions, including in the field of education.

HISTORY OF ARTIFICIAL INTELLIGENCE:

- **The Seeds of AI (1940s-1950s):** The invention of programmable computers in the 1940s sparked imaginations. In 1950, Alan Turing proposed the "Turing Test," a way to gauge if a machine could exhibit intelligent behavior indistinguishable from a human. This was a critical philosophical and scientific step.
- **The Birth of a Field (1956):** The Dartmouth Summer Research Project, organized by pioneers like John McCarthy, is widely considered the official birth of AI as an academic discipline. It was here that the term "artificial intelligence" was coined.
- **Early Successes and Challenges (1960s-1970s):** Researchers developed early AI programs, like ELIZA, a chatbot that could simulate conversations, and Shakey the Robot, one of the first robots to reason about its environment. However, the complexity of creating true intelligence led to periods of reduced funding and progress, often called "AI Winters."
- **Revival and Growth (1980s-2000s):** The development of expert systems and later, the rise of machine learning, breathed new life into AI research. Milestones like

IBM's Deep Blue defeating a chess grandmaster in 1997 showcased AI's growing capabilities.

- **The Modern AI Boom (2010s-Present):** Advances in computing power, the availability of massive datasets, and breakthroughs in deep learning, especially with neural networks, have fueled the current AI revolution. This era has seen the emergence of powerful tools that are transforming industries.

TYPES OF ARTIFICIAL INTELLIGENCE:

1. **Artificial Narrow Intelligence (ANI):** This is the only form of AI that currently exists. ANI models are designed to perform a single, specific task, such as identifying images, engaging in chat, or filtering emails. Examples include voice assistants, facial recognition technology, and generative AI models like Gemini and other large language models (LLMs). Despite its name, ANI does not possess reasoning or self-awareness; instead, it combines data with an algorithm to make predictions within predefined parameters. While ANI offers many benefits, it also carries risks, as poor training data can lead to biased or inaccurate outputs, which can be critical in applications like loan approvals, hiring decisions, and predictive policing. Cybercriminals can also potentially exploit ANI to create sophisticated AI-driven scams.
2. **Artificial General Intelligence (AGI):** This is a proposed future step in AI technology. Theoretically, AGI would be capable of performing a broad range of tasks and would utilize human-like reasoning to learn, adapt, and improve. AGI does not yet exist. Unlike ANI, AGI is expected to be adaptive, autonomous, and capable of learning from its actions. Fictional examples include droids from Star Wars. However, AGI may raise significant safety and ethical concerns, as malicious actors could program AGI with harmful intent, leading to potentially limitless destructive capabilities if unregulated.
3. **Artificial Superintelligence (ASI):** This is the most advanced theoretical form of AI. ASI would be a self-aware entity operating beyond human control, significantly surpassing human intelligence in reasoning, creativity, and even emotional intelligence. Like other forms of AI, there are concerns that ASI could pose an existential threat to humanity, with some AI researchers suggesting a non-negligible chance of extremely bad outcomes, including human extinction.

CORE COMPONENTS OF AI-BASED EDUCATION

- **Personalized Learning:** AI adapts educational content to match a student's learning style, speed, and knowledge gaps.
- **Intelligent Tutoring Systems (ITS):** These computer programs offer tailored, one-on-one instruction and immediate feedback, acting as a "super-tutor".
- **Automated Administrative Tasks:** Tools, such as Teach mate, help teachers with grading, lesson planning, and content creation, saving significant time.

- **Predictive Analytics:** Systems identify at-risk students and predict learning outcomes, allowing for early intervention.
- **Smart Content Generation:** AI creates interactive, diverse, and accessible content, including textbooks, summaries, and assessments.

Key Benefits

- **Improved Student Outcomes:** Tailored instruction helps students learn faster and more effectively.
- **Increased Accessibility:** AI provides support for neurodiversity and multilingual learners.
- **Efficiency:** Teachers can focus on human interaction rather than paperwork.

Method:

The method of collecting data use document. If the data needed to answer the research problem are sought, in documents or library materials, the collection activities, that data is referred to as a document (Adi, 2021). The documents are can be both written documents, photographs, pictures, and electronic documents that can support the research.

The example document used in this research is taken from books, articles journals both national and international related to the research. The method of analyzing data uses several steps, they are compiling related data from books and journals, analyzing the data (content) in the form of words and pictures then concluding.

Source Selection

A strategy that included consultation with academic databases such as Google Scholar, PubMed, and Scopus was used to select relevant sources of information. Inclusion and exclusion criteria were applied to select relevant articles, reports, and papers. In addition, manual searches were performed, and experts in the field were consulted to ensure the selection was complete.

Search and data collection process

The search for information was carried out using specific keywords such as “artificial Intelligence in education,” “Teaching and Learning,” “AI-generated educational resources,” “interactive learning environments,” and “AI – Based education.” Boolean operators were used, and time and language limits were set to refine the results. Additional searches were performed on the references of the selected articles.

FINDINGS AND DISCUSSION

Findings

Artificial intelligence has been widely applied to various educational technology platforms as follow:

a. Virtual Mentor

The function of AI which is currently quite widely applied to various educational technology platforms, especially those based online, is as a virtual mentor. Mentoring is a process in which a more knowledgeable person (the mentor) assists a less-knowing person (the mentee) in achieving a learning objective (Klamma et al., 2020). AI can provide feedback on students' learning activities and practice questions, then provide recommendations for material that needs to be re-studied like a teacher or tutor. Zhang (2016) states that Virtual Mentor (VM) is a multimedia-integrated e-Learning environment that stresses interaction, personalization, and intelligence.

b. Voice Assistant

This AI technology has similarities with virtual mentors. It's just that Voice Assistant relies more on the voice function as a center for interaction and communication. Voice assistants incorporate AI using cloud computing and can communicate with the users in natural language (Terzopoulos & Satratzemi, 2019). Several Edutech platforms have also adopted Voice Assistant technology to help students find content and materials more quickly and practically.

Voice Assistant is also one of the most widely recognized and used AI technologies in various fields, including education. Examples of commonly known voice assistants are Google Assistant (Google), Siri (Apple), Cortana (Microsoft), and others. Voice Assistant allows students to search for materials, reference questions, articles, and books by simply speaking or mentioning keywords. Furthermore, the VA will display the information you want to search for according to the keywords mentioned. In addition to presenting information in the form of text and images, Voice Assistant can also speak and explain the information you need like a personal assistant.

c. Smart Content

Smart Content is an AI technology that functions to share and find programmable digital book and material content more easily and quickly. Common examples of the application of this technology are found in various digital libraries today, both in schools, universities, and public libraries. AI can find and categorize the books we are looking for quickly and structured. We will even be given book recommendations and other content relevant to what you are looking for. Smart Content is a summary of various learning materials, from digital textbooks to interfaces that can be tailored to our needs. The examples are as follow:

➤ Cram101

Artificial intelligence can find and categorize the books you are looking for quickly and in a structured way. We will even be given book recommendations and other content relevant to what we are looking for. Examples of smart content technology that have been used are Cram101 which has the function of breaking digital textbooks into specific parts. Cram101 is an online

service that uses artificial intelligence to read textbooks, summarize them and post highlights and key points of the material online.

➤ **Netex Learning**

Netex Learning is yet another company focused on creating smart content platforms. The solution is full of AI-based features. The Netex platform also offers a personalized cloud platform with virtual training, conferences, and more. The application of artificial intelligence to smart content functions to share and find programmable digital book and material content more easily and quickly.

d. Presentation Translator

AI presents many opportunities to share knowledge around the world. Using Artificial Intelligence solutions, students can study various courses and training programs. There are many platforms with interactive learning materials from the best tutors. AI also provides opportunities for students who speak different languages or have vision or hearing and speaking problems.

e. Global Courses

This AI technology has been widely applied in various fields, including education. Simply put, Global Courses users or students can search for and take online courses from all over the world. The course platform can recommend your interests and interests according to the keywords you have previously entered.

There are various free and open courses that you can try right now with a variety of interesting, interactive, and structured features and content. Examples of courses that have implemented AI technology include courses on MOOCs, Udemy, Google AI, Alison, Khan Academy, edX, Udacity, Coursera, and others (Zhang, 2021).

f. Automatic Assessment

AI is widely used for online automatic assessment and question correction purposes. The use of features like this makes it easier for teachers and tutors to prepare and conduct quizzes and tests easily and practically. Teachers and tutors no longer need to make questions and correct questions manually. The use of features like this makes it easier for teachers and tutors to prepare and conduct quizzes and tests easily and practically. Teachers and tutors no longer need to make questions and correct questions manually.

g. Educational Games

Educational games are games that are designed to learn but can still offer play and fun. Educational games are all forms of games that are created, to provide an educational experience or learning experience to the players of the game. Educational content. Examples of educational games are Duolingo, Khan Academy Kids. Quick Brain and Puzzle Kids.

h. Intelligent Tutoring System (ITS)

Intelligent Tutoring System (ITS) or commonly known as Intelligent Computer-Aided Instruction is a system to provide teaching that can adapt to students' abilities. ITS is one of the developments of an expert system on artificial intelligence in the field of learning. Examples of Intelligent Tutoring System (ITS) are Intelligent Tutoring System (ITS) Based on Augmented Reality (AR) for Dimensional Geometry Material, Intelligent Tutoring System for Nun Sukun or Tanwin law learning, Intelligent Tutoring System (ITS) for circular learning, and various other ITS. (Abu Ghali et al., 2018) states that The Intelligent Tutoring System (ITS) is a computer program that provides students with personalized education and feedback without the need for human intervention.

DISCUSSION

Education is not just about acquiring knowledge. Education is a complex process in which we not only acquire knowledge of various concepts but also learn to apply them in daily life with our social skills. Machines cannot teach empathy, sympathy, and other emotions that are an important part of our personality development. This means that no matter how sophisticated AI is, no matter how many examples of using AI, this technology will not be able to replace the role of teachers or educators. The role of AI is limited to helping and empowering teachers in making the learning process a fun experience for students.

With the application of AI, learning activities can be carried out at any time. The presence of AI-based applications provides opportunities to learn anytime and anywhere, not limited by space and time. In addition, students also have the opportunity to find teachers other than the teachers at the school. With this online education platform and the availability of “teachers” to choose from, students have the opportunity to communicate with other teachers, even with teachers from other countries. The learning experience and abilities of students will certainly be able to develop better.

CONCLUSION

The existence of artificial intelligence may be able to provide knowledge to students, but developing character cannot be done. That is an educator's job. How to inspire, motivate, make students become good students. So the role of the teacher in providing motivation, inspiration, and developing character are what AI cannot replace because AI is not given feelings and emotions like humans in general. In the end, if we look at technological developments, we must be able to adapt as technology advances. If we do not adjust, we are an educator (teacher/lecturer) may be replaced by technology.

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