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Artificial Intelligence Powered Personalization: Tailoring Content in E-Learning for Diverse Audiences

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Abstract

In the twenty first century instructors engage their learners through machine learning. Schools use machines such as C3 server to generate lesson plans and study guides for the various subjects, Chatbots to engage in discussions. The information in these machines are generated from time to time so that the information remains up dated and always up to the standard. To investigate the effectiveness of the use of robots in learning and imparting information to learners, the researcher used five groups from different schools. Qualitative research was used to conduct the study. The researcher used purposive sampling to select the participant from different learners in schools from KwaZulu Natal Province. Semi-structured interviews were used to extract the information from different groups. Collected data was coded into themes. Research findings have revealed that with the rapid emergence of artificial intelligence, learners tend to be critical thinkers and problem solves more especially when it comes to coding and robotics. Through machine learning teachers tend to finish their syllabus early and learners tend to get good grades.

Keywords: Machine learning. E-learning, fourth industrial revolution, digital learning, Deep learning

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Introduction

AI-powered educational technology includes resources for administrators, teachers, and students. Learners can receive personalized support via chatbots, sophisticated tutoring systems, adaptive learning platforms, and educational games. Programs for automated grading, feedback, and planning serve educators. These new technologies enable the teachers to present the subject content in diverse audience. Learners learn in their own pace anytime and anywhere.

Artificial intelligence (AI) is the capacity of a computer to carry out cognitive tasks that we identify with human minds, including perception, reasoning, learning, interacting with the outside world, problem-solving, and even creative expression. AI's introduction has made life simpler for both educators and pupils.

Literature Review

AI tools have the potential to provide any young person access to a virtual "tutor," as they are interactive and easily customizable. For instance, AI might assist in creating customized work plans for students based on teacher evaluations and marking (Sotala, 2012).

The science of creating machines with human-like thought processes is known as artificial intelligence. It is capable of actions deemed "smart." Unlike humans, AI technology can process enormous amounts of data in many ways. AI wants to be able to do human-like tasks including pattern recognition, decision-making, and judgment. Since the fourth industrial revolution is currently underway, academics and researchers are focusing on artificial intelligence. The majority of institutions, including regular and open-distance learning ones, have begun to use machines for instruction and learning. According Kane (2016). The capacity for learning and thought in a computer program is known as artificial intelligence. Anything that includes a program performing a task that we would typically associate with human intelligence qualifies as artificial intelligence (Sotala, 2012).

Instead of utilizing pens and paper to complete assignments, students now complete their work on computers. Students can use the Learning Management System to turn in their assignments. Through the use of digital tools, they can interact with both their instructors and fellow students. They have anywhere, at any time, access to the technological instruments. Students save time thanks to new technologies. The new technologies allow access to the study material without waiting for hard copies to be sent by the university. Online libraries are a feature of modern technologies that allow students to look up any material they require for their studies (Sotala, 2012).

Pupils are free to work when and how they like. Studying with modern technology is less expensive than going to school full-time. Students can study and earn degrees even from economically disadvantaged remote locations. Students might engage in social interaction by establishing groups for work. Pupils can exchange helpful knowledge. Pupils gain the abilities required for a group debate, such as enhanced problem-solving and communication skills (Calderon, 2019).

AI-driven chatbots are a great resource for students because they can answer questions right away, offer assistance, and help them navigate the complexities of learning. This round-the-clock accessibility guarantees that students get help right when they need it (Kang & Jang 2023).

Artificial intelligence (AI) and machine learning (ML) applied to education pedagogy will surely facilitate dramatic improvements in academic pedagogical engagements. Most intriguingly, they are thought to convert conventional teaching tasks into seamless, digital ones for efficient and successful learning. Using a bibliometric analysis, this study attempts to clarify the sharp increase in trends and the ongoing development of AI and ML in educational pedagogy in order to further investigate the discourse (Shakikhanli, & Bilicki, 2023)

Artificial intelligence has evolved historically, starting with simple artificial intelligence and progressing to applied artificial intelligence, machine learning, and deep learning. Its impact, capabilities, and applications have also changed over time. Based on the findings of our study, several academics hypothesized that AI and ML will continue to advance into more complex tools than they are now (Okagbue et al. 2023).

Applications of artificial intelligence have huge benefits and have the potential to completely transform any professional field. In theory, all facets of intelligence, including learning, may be so accurately defined that a computer might be programmed to replicate them. The goal is to figure out how to enable machines to use language, abstractions, and concepts to solve problems that are now exclusive to humans and advance their own capabilities (Calderon, 2019).

Reduction of Human Error: Because people make mistakes occasionally, the term “human error” was coined. If computers are properly programmed, they are not prone to these errors. Artificial intelligence makes choices by using a specific set of algorithms using previously collected data. As a result, mistakes are decreased and there's a potential to achieve accuracy with more precision. (Yeasmin, 2019)

Takes chances rather than people: Among the main benefits of artificial intelligence is this. By creating an AI robot that can perform perilous tasks for us, we can transcend many of the dangerous restrictions that come with being human. Whether it's traveling to Mars, disarming a bomb, exploring the deepest regions of the ocean, or mining coal, It is useful in both man-made and natural disaster situations (Yeasmin, S., 2019).

Availability around-the-clock: A typical person works four to six hours a day, not including breaks. Humans are designed to take periodic breaks to rejuvenate and prepare for a new workday. They even have weekly off days to maintain a healthy balance between their home and professional lives. However, unlike humans, we can use AI to make machines work continuously for 24 hours at a time without interruptions and without even becoming bored (Khanzode, and Sarode, 2020).

Assistance with Repeated Tasks: We will be doing a lot of repetitive tasks in our daily work, such as mailing thank-you notes and checking specific documents for flaws, among other things. We can effectively automate these repetitive processes with artificial intelligence, and we can even eliminate the "boring" tasks that require human labor and allow them to become more imaginative (Ntlatlapa ,2023)

Faster Decisions: By combining AI with other technologies, we can make computers make decisions and act more quickly than a person. Human decision-makers consider a variety of aspects, both practically and emotionally, but AI-powered machines follow preprogrammed processes and produce outcomes more quickly.

High creation costs are one of AI's concerns; as AI is constantly evolving, hardware and software must also keep up with the current standards. Machines require frequent maintenance and repairs, which are very expensive. Because they are extremely complicated machines, their creation comes at a significant expense (Ntlatlapa ,2023)

According Birhane., Kalluri, Card., Agnew, Dotan, & Bao, (2022) to One of the challenges of AI is high Costs of Creation: As AI is updating every day the hardware and software need to get updated with time to meet the latest requirements. Machines need repairing and maintenance which need plenty of costs. It' s creation requires huge costs as they are very complex machines.

Making humans lazy: AI is making humans lazy with its applications automating the majority of the work. Humans tend to get addicted to these inventions which can cause a problem to future generations. (Greener, Kandathil, Moffat, & Jones, 2022

No Emotions: Without a question, machines perform far more effectively than humans do, but they are unable to replace the interpersonal relationships that define a team. The ability to bond with people is a crucial component of team management that machines are incapable of achieving (Shakikhanli, & Bilicki, 2023)

Ignorance of Non-Traditional Thinking: Machines are limited to executing tasks for which they are specifically programmed or constructed; if they are left untrained, they frequently malfunction or produce meaningless results that could have serious ramifications (Gao, M., Liu, X., Xu, A., and Akkiraju, 2022)

The two theories—Knewton and Carnegie Learning—serve as the foundation for the investigation. Leaders in educational technology, such Carnegie Learning and Knewton, provide adaptable systems that allow for real-time customization of learning activities and information. Ongoing evaluation enables quick feedback and aids in systemic strategy modification. Simple rules-based systems and complex machine learning algorithms are two examples of adaptive learning approaches (Hamet & Trebley,2017).

Kang & Jang (2023) argued that the idea that students gain knowledge and skills through actively participating in their surroundings is encapsulated in the Carnegie Learning Way. Additionally, Carnegie Learning thinks that teamwork and efficient communication are critical abilities for a successful learner.

Methodology

According to Creswell (2018 :83), interpretive paradigms are a sort of learning process where we build our idea of the world—or our reality—from our observations of it as well as from examining the words and deeds of others. This paradigm was chosen because it will allow the researcher to meet with participants face-to-face and hear about their experiences with technology. Another advantage is that interpretivism and qualitative methods complement one another. In order to address the research question, it also outlines the methodology for selecting the individuals, the location for the study, and the steps involved in gathering and analyzing data (Babbie and Mouton, 2011 :15). a reasonable strategy for this research because of its flexibility with regard to the data source. There will be a deliberate selection made. Thematic analysis will be used to look over the collected data.
A qualitative research approach is better suitable since it stresses a wide range of variables, is holistic in character, seeks to understand the complex relationships that exist between variables, and includes the researcher as a member of the sample (Creswell, 2018 :70).

According to the researcher's sample criteria, a population is an entire set of elements (people) who share specific characteristics (Babbie 2016 :120).
Purposive sampling was the method employed by the researcher. A collection of non-probability sampling strategies known as "purposeful sampling" pick units based on the qualities you require in your sample. Put differently, purposive sampling involves the "on purpose" selection of units. According to Creswell (2014), you should choose

participants carefully in order to see if they can shed light on your research subject. Choosing participants for purposeful sampling entails doing so because you think they could add value to your analysis. (Cresswell, 2014)

Five groups of students from various KwaZulu Natal schools were chosen in order to gather data regarding the usefulness of artificial intelligence and its function in digital learning. Black (2017 :99) defines sampling as the process of selecting units, or individuals, from the population of interest so that the results of the study can be fairly generalized by the researcher through sample analysis. This study will employ a non-probabilistic sample method called purposeful sampling, sometimes referred to as typical case sampling.
In this study, semi-structured individual interviews were used. We will use semi-structured interviews because they are among the most widely used and well-liked techniques for obtaining data in the social sciences (Creswell, 2018 :85). Since he believes that semi-structured interviews are effective in eliciting unique and firsthand knowledge pertaining to particular issues, the researcher employed them. With the use of semi-structured interviews, the researcher will gather comprehensive reports on students' experiences regarding the effectiveness of digital learning.

The collected data was analyzed using the six-phase methodology developed by Braun and Clarke (2016 :297–298). The familiarization, coding, theme generation, theme review, theme definition and naming, and writing up are the six processes in the guide. The interviews were recorded and then transcribed to enable the researcher to assess the conversation and produce a story that is true to the participants' original viewpoints. Thus, the initial step involved transcribing the recorded interview responses. Following the processing of the raw data, the transcripts were reviewed and reread. Reading the content repeatedly made it easier for the researcher to become comfortable with it. After being coded, the data will be created and organized logically.

Results and Discussion

The following is the summary of the five groups interviewed and discussion of the results will also follow :
GROUP 1 : Things become simpler with machine learning. Even when the teacher is not present, the teacher can leave the robot in the classroom with preprogrammed settings. During the instructor's period, we can operate the machine, record key points, finish activities, and load completed activities into it. The machine can then grade us, assign individual scores, evaluate our performance, and potentially provide feedback. To learn effectively, we don't need to wait for the lecturers to attend workshops.

GROUP 2 : With the Chatbot, we can have insightful conversations. Using the chatbots actively encourages us to think. With the new, coming machines, we can participate in discussions and share knowledge. In performance, we are right up there with the eagles.

GROUPS 3 Robots are reliable information sources. As long as you have enough data, a device to use, and a working network coverage, it is simple to get information from the computers when the teacher assigns us a research project or assignment. Because they provide the results of your search more quickly, machines are useful.

GROUPS 4 The use of machines in learning facilitates the solution of challenging issues. We don't need to break our brains trying to figure out a difficult problem. Machine learning is quick to adjust to new circumstances. Machine learning will modify its predictions in accordance with changes in the data set. This guarantees that the forecasts are consistently precise and current. On the other hand, when the data set evolves over time, traditional approaches may lose their accuracy.

GROUPS 5 Artificial intelligence-driven language tools, such as Skype and Duolingo, are eradicating social and cultural barriers in education and daily life by translating speech and text and teaching new languages in a personalized manner. Digital translation services "offer a means of understanding" that might not be feasible otherwise, but they are not "perfect," as Microsoft Education Leader Mark Sparvell acknowledges. Overall, employing robots has improved my academic performance and helped me become more fluent in the language.

Rapid problem solving in learning has been made possible by the emergence of machine learning and deep learning. I expeditiously assisted the students in conducting their inquiries. Students are free to complete their assignments whenever and wherever they choose. Even in the absence of the teacher, students can complete their assignments. It

is the teacher's responsibility to purchase, program, and maintain equipment to ensure that it is always operating efficiently for learning.
Prediction is a skill that machines possess, which is crucial for science courses. When compared to conventional teaching and learning methods, machines are more precise. Machines are a source of information for everything, including business and science.

All information sources, whether they are scientific or business-related, are found in machines. Math issues that are challenging for humans can be solved by machines. Emerging machines and new technologies assist students in passing tasks and raising their GPA.The new devices allow students to participate in meaningful discussions. They are able to exchange thoughts. Students also noticed the speedy delivery of results when searching information from the computers.

Conclusion

AI is here to stay. During this Fourth industrial revolution, it is essential for educators and students to learn how to use the new machines for instruction and learning. A significant part of the integration of ICT and the curriculum should be played by teachers. Teachers must receive training on how to operate the newest technology.

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