

HARNESSING THE POTENTIALS OF ARTIFICIAL INTELLIGENCE IN THE TEACHING AND LEARNING OF POLITICAL SCIENCE EDUCATION

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Abstract

The paper examines the potentials of incorporating Artificial Intelligence (AI) in the teaching of Political Science Education. The primary objective is to investigate how AI technologies might improve the overall quality and efficacy of teaching, leading to enhanced learning outcomes in Political Science education. The study employs a retrospective research approach, analyzing past data to gain insights into the development and impact of AI in the teaching of Political Science. The research design involves a comprehensive collection and analysis of secondary data from educational databases, government papers, academic journals, and other relevant repositories. Results from the study highlight the significance of AI in the teaching of Political Science where individuals are prepared for societal and political life by acquiring all the necessary skills. Further findings of the study indicates that artificial intelligence promote the innovative development of teaching resources and teaching environment, teaching and learning methods, the development of school teaching management and teaching evaluation, and promote the reform of subject structure and educational content with a view to encouraging the application of artificial intelligence in promoting the transformation of teaching and learning. The study recommends the integration of AI into the national curriculum, adequate funding and resources, ongoing professional development for teachers, and a strategic curriculum development that fosters a blended learning environment.

Keywords: Artificial intelligence and Political Science education.

Introduction

As artificial intelligence (AI) is increasingly becoming a part of our daily lives, the government and schools are paying more and more attention to the development of artificial intelligence in education (Malik, Tayal, & Vij 2019). Artificial intelligence technology has not only promoted changes in schools' teaching methods, learning methods, campus environment, and curriculum, but the entire education industry is also undergoing changes through AI (Karsenti 2019). From basic education to higher education and adult education, schools are increasingly transforming with AI technology. These systems can help people learn better and achieve their learning goals (Hinojo-Lucena, Aznar-Díaz, & Cáceres-Reche, & Romero-Rodríguez 2019).

Artificial intelligence technology is believed to play an important role in promoting the reformation of teaching and learning in schools. It will bring new intelligent teaching tools to schools, form new teaching and learning modes, and promote innovation in teaching evaluation methods and teaching management methods. Educators should actively change their way of thinking, explore new forms of combinations between artificial intelligence and teaching, promote the deep integration of technology and teaching, and the innovative development of education and teaching (Guo & Xiao 2019). The reformation of education and teaching in schools will break the time and space restrictions in traditional education, thus form a

superhighway of information, promote fair processes in education, and make education and teaching more interesting and reasonable (Zhang, Zhang, & Li 2019). Students are able to develop according to their own potential, whereas teachers' repetitive workload will be replaced by artificial intelligence systems, and the campus environment will become more intelligent (Fu 2019).

Artificial intellect is an innovative technical framework that encompasses the creation of computer systems with the ability to execute activities that usually need human intellect (Aina, Gbenga-Epebinu, Olofinbiyi, Ogidan, & Ayedun 2023). These activities involve problem-solving, acquiring knowledge, comprehending language, and seeing visual information. AI has become increasingly prominent in recent years, bringing about a revolutionary transformation in the methods by which jobs are completed in numerous businesses. Within the realm of education, artificial intelligence offers a multitude of possibilities to augment the learning process. Intelligent systems provide the ability to adjust to the specific requirements of each learner, deliver tailored learning experiences, and provide immediate feedback (Aina et al., 2023). AI applications in education encompass adaptive learning platforms, intelligent tutoring systems, and virtual simulations. Through the use of artificial intelligence, educators have the ability to construct dynamic and interactive learning environments that accommodate the various learning styles and capabilities of students.

The convergence of AI and scientific education presents significant opportunities for tackling the obstacles encountered by the Nigerian educational system. The use of AI tools and technology in the teaching of political science has the potential to fundamentally transform the methods of teaching and learning, hence enhancing accessibility, engagement, and effectiveness of education. This paper seeks to examine the potentials of artificial intelligence (AI) on the teaching of political science education in Nigerian.

The Concept of Artificial Intelligence

Artificial intelligence (AI) is a concept that has been in use since 1956, when it was first coined at a workshop at Dartmouth College, it was defined then as a machine's ability to perform a task that would have previously required human intelligence such as self-driving cars, robots, ChatGPT or other AI chatbots, and artificially created images, (Diaz, 2023). Artificial Intelligence is a method of making a computer, a computer-controlled robot, or a software think intelligently like the human mind (Duggal, 2023). It leverages on computers and machines to mimic the problem-solving and decision-making capabilities of the human mind. Artificial Intelligence (AI) according to Mezieobi (2018) is the computer-controlled robots that think intelligently like human beings. These robots are controlled electronically with the aid of the computer by mimicking the competences of the human mind. Liu (2016) viewed AI as intelligent machines or intelligent systems that simulate human intelligence activities and extend the science of human intelligence.

To UNICEF AI refers to machine-based systems that can be given a set of human-defined objectives, make predictions, recommendations, or decisions that influence real or virtual environments. AI systems interact with us and act on our environment, either directly or indirectly. Often, they appear to operate autonomously, and can adapt their behavior by learning about the context. (UNICEF 2021: 16) This definition has potentials for several reasons. First, it does not depend on data, although

it does accommodate data-driven AI techniques such as artificial neural networks and deep learning; second, it therefore also includes rule-based or symbolic AI and any new paradigm of AI that might emerge in future years; and third, it highlights that AI systems necessarily depend on human objectives and sometimes “appear to operate autonomously”, rather than assuming that they do operate autonomously, which is key given the critical role of humans at all stages of the AI development pipeline (Holmes & Porayska-Pomsta 2022). Artificial intelligence is therefore an emerging technology and the simulation of human intelligence by machine capable of understanding, reasoning, learning, and applying knowledge to function, act and mimic the problem-solving and decision-making capabilities of the human mind to solve problem.

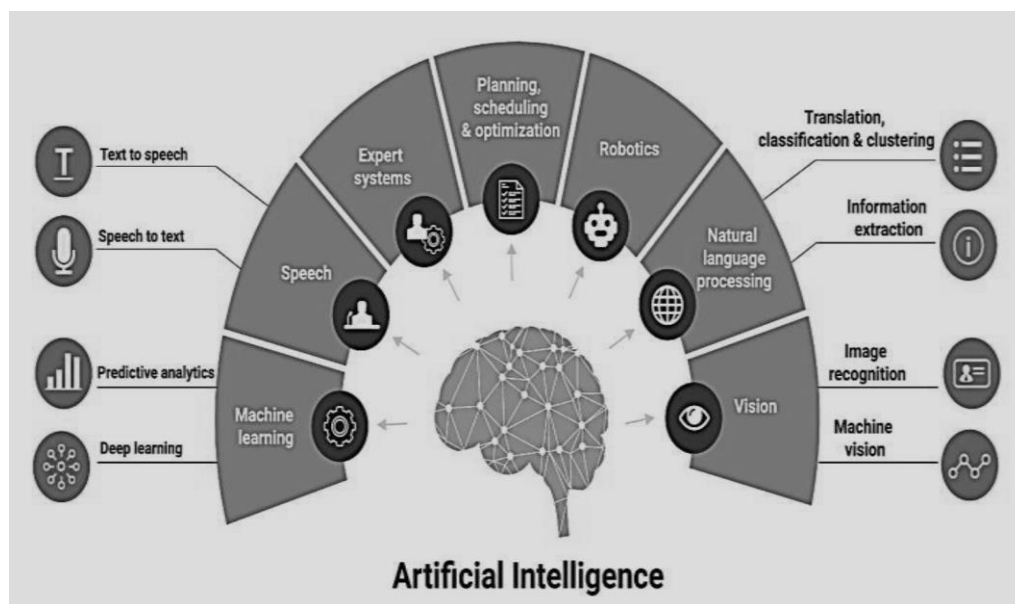


Fig: Pictorial Diagram of AI Components (**Source:** Vijayakumar & Sheshadri, 2019).

The above diagramme shows the various sub-areas of Artificial Intelligence which include: expert systems, natural language processing, pattern recognition and robotics, aim to simulate human intelligence with computers (Vijayakumar & Sheshadri, 2019).

The Concept of Political Science Education

Political Science Education is the study and teaching of political science, focusing on the analysis of political systems, institutions, behaviors, and policies. It aims to equip students with knowledge, critical thinking skills, and analytical tools to understand complex political issues and phenomena. It is the process of learning about politics, governance, and civic engagement. It involves acquiring knowledge, critical thinking skills, and values necessary to participate in democratic processes, make informed decisions, and contribute to society. The goal of political education is to empower citizens to engage actively in their communities, understand their rights and duties, and contribute to shaping public policy and decision-making processes.

The Use of Artificial Intelligence in Education

The use of artificial intelligence continues to grow in the education sector. It is becoming increasingly clear to all that it offers many exciting possibilities for the learning outcomes of pupils/students and already promises important help in achieving modern educational goals. We will briefly examine some potential benefits that AI offers to students and teachers.

According to Mureşan (2023) AI brings benefits and opportunities to education by facilitating personalization of learning, providing instant feedback and improving efficiency in the assessment process. Thus, artificial intelligence can be integrated into online learning platforms, allowing content and activities to be customized according to the needs and knowledge level of each student. Learning management systems can use artificial intelligence to provide personalized recommendations, automatic feedback and monitor student progress. Thus, pupils and students can access relevant materials and resources according to their individual needs. Virtual reality can also help students encourage collaboration and teamwork, and tools like social media can be used to connect students with their peers and instructors.

Furthermore, AI can be used to create tutorials and interactive virtual assistants, systems that can answer students' questions, provide additional explanations, and guide students in real-time through the learning process. Thus, through tutorials and virtual assistance students can benefit from additional support and learn at an individualized pace receiving real-time guidance to support the learning process (Mahendra 2023).

If we talk about *the verification part of learning*, AI can automate many time-consuming administrative tasks in teaching and learning. It could be grading assignments, providing feedback on student work, or even detecting plagiarism. Artificial intelligence algorithms can be trained to recognize patterns and evaluate student responses in various subjects. As Oana (2021) observes this allows teachers to receive quick and detailed feedback on student performance, provide personalized interventions based on each student's individual needs, and even save time and resources.

One of the key aspects of the influence of artificial intelligence in education is the ability to *adapt the learning process to the individual needs of pupils/students*. By collecting and analyzing data about student/student progress and performance, AI can identify weaknesses and automatically adapt content and teaching methods to support individual performance improvement. Thus, a personalized and more effective learning experience can be ensured. A highly effective use of AI is to *forecast performance through data analysis, identifying patterns and trends*. By collecting and analyzing data about student performance and behavior, AI can provide valuable insights into individual performance and make predictions about a student's success or failure. This can help teachers and schools make informed decisions and provide early intervention to support pupils/students.

Huang (2021) maintains here that some benefits for *eliminating manual administrative work in schools*, colleges and universities, such as scheduling, rescheduling classes, marking attendance, marking papers, finance and accounting and record keeping. The same can be said for tasks ranging from managing large data sets to processing student requests and coordinating extracurricular activities, large time-consuming activities that can now be outsourced to AI. Also, the administration

of the premises often consumes a lot of time. With AI capabilities, these repetitive tasks can be automated - monitoring water and energy consumption, controlling heating or air conditioning. Student transportation falls into the same category, an area where AI can have a major impact.

But while artificial intelligence brings many benefits to education, there are also challenges and concerns associated with its widespread use. These include privacy and security of personal data, lack of human interaction, which can affect the development of pupils/students' social and emotional skills, trust in the system which requires these systems to be transparent and provide clear explanations of how they arrive at conclusions and recommendations. The use of artificial intelligence in education brings with it a number of significant opportunities and advantages even if limitations are also identified. From personalizing learning to instant feedback and automated assessment, AI can improve the teaching and learning process, providing a more efficient and effective experience for students and teachers. However, it is important to strike a balance between technology and the human aspects of education.

Artificial Intelligence and Political Science Education

Educational institutions play an important role in the continuity of societies. The socialization processes of individuals participating in social life take place within the education system (Gül, 2004). Since the cultural structure of societies is transferred from generation to generation through the education system, the traditions of society, practical knowledge and techniques, and the whole set of moral, religious, social rules and behaviours are transferred through education. The realization of this transfer is ensured through various courses. Among these courses, social studies, which focuses on citizenship education, has a special importance. This is because political science is a course that is closely linked to the concept of citizenship. In this course, important issues related to citizenship are addressed, such as participation, belonging, and democratic values, and social problems, recognition of political factors, rights and responsibilities of citizenship.

In addition, political science provides students with a great deal of information from the social sciences in preparing individuals for social and political life. In this context, the content of the subjects that make up political science consists of interrelated disciplines such as history, economics, civics and sociology. Each of these disciplines is critical to the background of citizens (Kissock, 1981). Huang (2021) states that political science helps students to develop a sense of self and community and encourages individuals to understand their position as citizens in an inclusive, democratic society. Given this important mission of the political science course, it is necessary to design the political science course based on new approaches in order to develop the type of person required by the age (Abbass, 2023). Moreover, this need can be seen in another dimension. It is stated that combining the knowledge, skills and values of different disciplines in the social studies curriculum according to the students' level and transmitting them to the students with an interdisciplinary approach has an important effect. (Kuprenko, 2020). Moreover, changes in learning styles and developments in the characteristics expected of individuals in today's world show that innovative approaches are needed in social studies education. In addition, the fact that individuals today give more space to digital technologies in their lives and can access information quickly has made it necessary to adopt a teaching approach in social studies that is suitable for these changes (Flasiński, 2016). When examining the

reports prepared on the use of technology in education worldwide, it is emphasized that the use of technology in education is of great importance (Önger, 2023). Recent technological developments have emphasized the importance of using technology in social studies education and revealed the need to use new technologies effectively in political science courses in order to raise individuals who can cope with political and social life, global order and technological advances in a digitalized world (Popenici, 2017).

Technology in political science has the potential to be a teaching tool in teaching both content and processing skills to students (Yetişensoy & Rapoport, 2023). In this context, the study conducted by Çetin (2022) states that political science instruction supported by innovative learning practices has a significant effect on students' academic achievement and retention of learned information. For this reason, the incorporation of innovative teaching practices in the teaching of political science is extremely important to achieve the objectives of the course. Artificial intelligence, which is one of the innovative teaching practices and a new technology that has been developed in recent years based on information technology, has started to find a place in learning and teaching of political science (Xie, Ruan, Lin, Wang, Wang, Lai, Xie, Fu & Lu, 2022). So much so that artificial intelligence has even become a political goal for some countries. In December 2019, the South Korean government announced the National Strategy on Artificial Intelligence, which introduced plans to make South Korea "the most advanced country in artificial intelligence" by relaxing regulations in the field, drafting a basic law, and promoting artificial intelligence education at the national level (Lee & Jeong, 2023). In the light of developments in the field of artificial intelligence, it is stated that in the future, AI-assisted teaching will be available at all levels of education and will play an important role in all areas of education (Murugesan & Cherukuri, 2023). In the changing world order, the ability of education to respond to change is not limited to students (Lee & Jeong, 2023). Murugesan and Cherukuri (2023) emphasize in their study that students are obliged to use modern artificial intelligence tools and that it is extremely important for educational models to follow this trend (.

In addition, it is vital to develop learning activities supported by age-appropriate AI tools to strengthen children's understanding of AI (Yang, 2022). Political science teachers can benefit from simple AI-supported technologies such as navigation and translation applications, various suggestion systems, image and voice recognition, and chatbots in their hands-on AI teaching activities. A lesson plan with a hands-on activity that can be used to teach AI literacy in political science education is presented in most micro teaching lab.

According to Edinyang, (2018) today's students can make a significant contribution to the training of individuals who can keep up with the changing world order by adapting to artificial intelligence applications, which is the technology of the future. Since political science is a course that includes knowledge of various social sciences and aims to develop digital competence and digital literacy skills, artificial intelligence applications and artificial intelligence-supported teaching can be very convenient in terms of providing the learning outcomes obtained from this course.

Artificial intelligence undoubtedly offers opportunities for knowledge exploration and allows teachers to connect with students more quickly, saving time. In particular, it is thought to help create more personalised and meaningful learning opportunities, such as learning about new developments that are often neglected

(Ahmad, Murugesan & Kshetri, 2023; Keiper, Fried, Lupinek & Nordstrom, 2023; Murugesan & Cherukuri, 2023). In this context, it can be said that it will contribute to several areas in terms of human interaction, such as conducting research, accessing new resources, and providing targeted ways out of complexity when accessing information, improving students' thinking process, modelling complex teacher and guidance strategies, and managing emotions (Bittencourt et al., 2023; Cooper, 2023; Keiper, Fried, Lupinek & Nordstrom, 2023).

Summarily therefore, AI performs functions independently of teachers, while in others it augments teaching capabilities. Applications of AI-based education technology in the teaching of political science include the following:

Tutoring: AI programs commonly referred to as Intelligent Tutoring Systems (ITS) or adaptive tutors engage students in dialogue, answer questions, and provide feedback.

Personalizing Learning: ITS and adaptive tutors tailor learning material, pace, sequence, and difficulty to each student's needs. AI can also provide support for special needs students, for instance by teaching autistic children to identify facial expressions.

Testing: Computer adaptive assessments adjust the difficulty of successive questions based on the accuracy of the student's answers, enabling more precise identification of a student's mastery level.

Automating Tasks: AI can perform routine tasks such as taking attendance, grading assignments, and generating test questions.

Artificial Intelligence and the Transformation of Teaching and Learning in Schools

Teaching Resources and Teaching Environment

First, with the development of artificial intelligence technology, a large number of companies have developed a variety of intelligent teaching tools and learning tools, and intelligent auxiliary learning equipment, such as intelligent teaching platforms, teaching robots and intelligent learning software, etc. These advanced teaching and learning tools have brought a lot of convenience to teachers and students, bringing new vitality to teaching and learning. In the era of artificial intelligence, a large number of intelligent devices have entered the classroom. Teachers and intelligent assistants will exist together in the classroom. Students and teachers will each wear various intelligent machines with sensor devices. The entire education and teaching process is intelligent. Secondly, the development of artificial intelligence has brought great convenience for students and teachers to obtain learning resources. In the process of intelligent evolution of learning resources, the machine has performed quality control and semantic annotation on the resources, and resources are divided into text, video, and other forms. In this way, when the intelligent learning environment senses learners' needs, it can adaptively push learning resources that are suitable for the learners, and with the development of search engines, learners can quickly find the resources they need without wasting a lot of time in finding materials (Zhu & Wang 2019). Finally, the development of artificial intelligence has provided convenience in building an intelligent learning environment, driving the digital education resource environment to an intelligent learning resource environment. Schools can work with artificial intelligence education companies to use artificial

intelligence to create an environment that is conducive for learners to carry out efficient and deep learning.

Teaching and learning methods

Artificial intelligence can assist teachers of social studies to prepare lessons, teachers can use artificial intelligence, big data and other technical advantages, to help students' personalise learning, and to design scientific and appropriate learning programs. Artificial intelligence and big data can also be a powerful assistant for teachers. Artificial intelligence technology allows teachers to monitor the teaching process in real time and accurately guide the teaching to achieve intelligent and precise teaching. Big data can help teachers understand students' learning situations at any time, help them solve difficulties, help teachers to correct homework, replace teachers' mechanical work, reduce the burden on teachers, help teachers to be free from simple and tedious teaching affairs tasks, and enable teachers to have more time to communicate with students. Artificial intelligence can help teachers; it will change the role of teachers, and promote the transformation of teaching models from knowledge transfer to knowledge construction. Education in the era of artificial intelligence needs to cultivate the core literacy of students. The responsibility of teachers is not to instill knowledge, but to help students to grow, to become life mentors or psychological consultants, to help students discover the advantages and realize the value of life.

Teaching Evaluation.

Teaching evaluation is an important way to check and promote learning. In terms of this, diagnostic teaching evaluation in particular, has been identified as one of the areas of most potential for artificial intelligence (Savin-Baden et al. 2019). At present, artificial intelligence technology has also spawned many intelligent diagnostic industries. From the aspect of teacher evaluation, currently, based on artificial intelligence, automatic data aggregation, feature analysis, deep learning and modeling simulation of teaching behavior characteristics can make a detailed and accurate evaluation of teachers' classroom teaching quality. The evaluation of teachers will move towards a comprehensive evaluation produced by artificial intelligence technology, rather than a single evaluation between students and teachers. In this way, diversity in evaluation will give fairer and more objective evaluations to teachers and provide teachers with greater space to improve, thus providing the direction for teacher's development.

In terms of student evaluation, with the help of artificial intelligence technology, the platform actively collects and automatically captures various data points of student learning at any time to form a data set for all students as a whole and each individual student (Guerrero & Wiley 2019). Based on a specific analysis model, the platform quickly and promptly forms a diagnostic evaluation report for each student's learning, and gives personalised learning resources and development suggestions to effectively achieve "a student with a ruler and a student with multiple rulers" to promote students to be their best selves, by changing a ruler to evaluate the current situation of all students. This makes the evaluation more scientific, objective and timely.

Reformation of Educational Content

First of all, as artificial intelligence will be integrated into our daily lives, it is indispensable that the school's curriculum include the basics of artificial intelligence and its application-related professional settings. By doing so, students can learn about artificial intelligence in all aspects. Secondly, the cross-border integration of artificial intelligence has broken the boundaries between subjects. This requires comprehensive talents, as the subject content that is independent and unrelated to each other is not conducive to development of students' comprehensive capabilities. This requires barriers to be broken down between various subjects and content integration, so that it is conducive for the students' positive transfer of knowledge. Again, education in the intelligent era is enhanced rather than complement education, focusing on students' individual development. Therefore, in the future, the traditional class teaching system will be broken down, and customized educational content will be gradually moved according to everyone's interest and specialty. Finally, due to the large storage capacity of intelligent machines, acquired knowledge can be easily retrieved. Therefore, the education content in schools will focus on the construction of students' tacit knowledge. Instead of focusing on students' abilities to memorize, they will increasingly focus on training students' practical ability and emergency response ability in real life situations.

Conclusion

In the modern sense, the term artificial intelligence emerged in the 1950s with the aim of solving complex mathematical problems and creating machines that could think like humans. Simple early studies in the field evolved into more complex ones that integrated deep learning and machine learning techniques. With these advancements, applications have been developed that can learn from data over time, query this data, and even generate new data. These advancements in the field of artificial intelligence have had significant impacts on various economic, social, academic, and other areas. Artificial intelligence has made significant contributions to reducing human time waste by collecting and processing large datasets, as well as generating new data from them. Additionally, it has brought about significant developments in the fields of education and teaching. The use of artificial intelligence in education offers advantages such as personalized teaching for students, collaborative learning, learning companionship, serving as a research tool for advancing the learning sciences, and providing exploratory learning opportunities. These advantages also extend to monitoring student development, continuous assessment, and providing feedback to educators. Considering the advantages it offers in education, the use of artificial intelligence in the teaching of political science, a discipline with a multidisciplinary structure, is crucial. Ensuring lasting learning in political science and achieving desired goals require the creation of effective teaching designs and the inclusion of innovative teaching practices. Given its wide scope and the use of technological tools, political science becomes a subject that can be easily taught through technological applications. Considering the changes in the world order and the new responsibilities expected from the citizens of the future, it is essential to strengthen political science education with innovative applications. In this context, using future technologies such as artificial intelligence in political science can help future individuals better adapt to the world of tomorrow.

Recommendations

For the purpose of providing effective teaching and learning, schools should embrace new and emerging technologies such as artificial intelligence technologies and other smart technologies. This will help to improve the quality of teaching, learning and research processes in the school environments. However, this requires a proactive training and retraining of teachers to acquire the required knowledge, skills and competence on how to use AI tools for improved teaching and learning. Therefore, schools in Nigeria and other developing world must adopt innovative, smart and cutting-edge technologies to meet the information needs of the current dynamic ICT savvy users in the changing school environment. Hence, curriculum developers should establish clear guidelines and policies to ensure responsible and ethical use of AI.

The successful integration of AI into the Nigerian educational system also requires careful consideration of contextual adaptability. Researchers should investigate the ways in which AI systems may be more specifically adapted to incorporate the distinct cultural and contextual intricacies of the Nigerian educational environment.

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