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Application of Artificial Intelligence in Nigerian Universities' Education for 21st Century Skills Development

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Abstract

Due to the significant impact of artificial intelligence in the developed countries, this paper addresses the need for the application of artificial intelligence in Nigerian universities' education for effective 21st century skills development among undergraduate students in Nigeria. It intends to explore the complexities of integrating Generative (AI), into Nigerian universities' education programme while navigating its challenges and prospects. Drawing on theoretical frameworks and practical insights, it seeks to provide a comprehensive understanding of AI's transformative potential in education. Academic knowledge contents alone are no longer sufficient to prepare undergraduate students in Nigeria for the competitive world. With increasing global competitiveness, undergraduates need the drive for skills that are challenging and inspiring to thrive in today's world. Also examined is the application of artificial intelligence for 21st century skills development for sustainable lifelong learning in university`s education program. It further examines the prospects and challenges associated with the application of Generative Artificial Intelligence into Nigerian universities' educational programmes. A modest attempt to clarify the concept of artificial intelligence is made. AI in Nigerian Universities education, 21st-century skills development, prospects of AI for Nigerian Universities education and ultimately the challenges in implementing AI in Nigerian Universities programme were discussed. Finally, it advocates AI for Nigerian Universities education despite its numerous challenges in implementing it in educational program, draws conclusion and offers key recommendations.

Keywords: Artificial intelligence (AI), undergraduate education, skills development, university and generative artificial intelligence.

Introduction

The fast-changing world has influenced human routine across the globe. Today's technology has become an inevitable part of the passage of time. In fact, technology has not only changed people's life style but has also changed how we work, learn and interact. In the realm of education, the application of AI holds tremendous possibility in Nigeria, especially in the context of students" skill development, assessment and educational evaluation in the universities. Oguejiofor and Eya (2022) [33] stated that the trends of computer-based and web-based educational system is receiving more attention in this era of information and communication technology due to expulsive expansion of the World Wide Web and internet. In today's world, technology is completely pervasive, and students adapt to it faster than anyone else (Bhat, 2020) [5]. Students, as opposed to teachers, are growing up in a digital age. It is entirely natural to incorporate technology into all aspects of their education in order to make them tech-savvy. Technology enriches classrooms with digital learning aids like computers and portable devices to improve teaching and learning. It broadens course options, experiences and learning materials; fosters 21st century skills; lightens students involvement and motivation: and leads to improved learning and understanding (United State Department Of Business Education, nd). Artificial intelligence (AI) however, is not a new concept or phenomenon. Much of the theory that underpins AI was developed by computer scientists such as Alan Turing, Marvin Minsky and John McCarthy as far back as seventy years ago, and AI has been used for some time now in industries such as finance and in STEM fields. What has changed dramatically over the past decade is access, speed and availability (Kelly, 2021) [45].

Ouyang and Jiao (2021) [46] observed that artificial intelligence is a powerful tool to facilitate new paradigms for instructional design, technological development, and

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education research that are otherwise impossible to develop in the traditional education modes. Artificial intelligence according to Williams *et al* in Onwuachu (2014) [47] is a group of related technologies that attempt to develop machines to emulate human-like qualities, such as learning, reasoning, communication, seeing, and hearing. The authors further stated that the artificial intelligence main areas include robotics, perception system, expert system, natural language processing, fuzzy logic, neural networks and genetic algorithms. In education, artificial intelligence is applied to enhance teaching and learning processes which culminates in the learners‟ skill development. Srivastava (2024) stated that artificial intelligence in education promotes personalize learning experiences, redefine teaching practices, offer real-time feedback, and support educators with advanced tools and insights, leading to more effective and engaging educational environment. It has in store significant attention in the educational field due to its potential to revolutionize learning processes, personalize instruction, and improve educational outcomes.

Benhamou and Janin (2018) [4] averred Artificial Intelligence to involve a collection of technologies that enable machines to act with a very high level of intelligence similar to humans. Ralph and George (2010) [39] described artificial intelligence as a cluster of technologies, and various computing science approaches to make flexible rational decisions that align with unpredictable environmental conditions. Current iterations of AI therefore, are largely industry-driven, created with the utmost goals of enabling new businesses and improving on the efficiency of existing fields. Artificial intelligence is gradually transforming every facet of our economy, such as the healthcare, energy, agriculture, finance, manufacturing, education sector etc. Artificial Intelligence can be used to play a major role in shaping the growth of some core sectors in Nigeria economy. The adoption of Artificial Intelligence in education will help the universities meet up with global digitalization faster. Artificial Intelligence is considered a tool for sustainable development (Ralph and George, 2010) [39].

In this dynamic context, the key to guaranteeing an inclusive society lies in the ability to accurately identify and even predict shifts in skills requirements and systemic „pressure points‟, such as demographics with limited access and opportunities, and in providing timely responses along the education value chain. While a number of policy responses have so far focused on developing or attracting the limited pool of high-level talent in AI, there is a need for education and training institutions, particularly those that focus on intermediate skills, to acknowledge and embrace their share of the transformation effort.

AI augments human skills in the workplace (Nuseir, Basheer and Aljumah, 2020) [29] and serves as an educational partner, enhancing content and competencies (Tan, 2020) [40]. Elhajjar, Karam and Borna (2021) [12] advocate integrating AI into education to equip students with skills essential for future jobs and digital society’s demands, such as innovation, creativity, and design thinking. AI in education employs diverse tools, techniques, and systems in educational activities. Investing in human capital to embrace AIEd tools is vital for societal development, despite widespread distrust and misconceptions about AI's role in human activities, especially in education (Antonenko and Abramowitz, 2023) [2].

AI technology in education is expected to grow significantly in the coming decades, presenting new opportunities and challenges (Khosravi, 2022) [49]. Researchers, policymakers, and practitioners are integrating AIEd to enhance teaching, personalised learning, assessments, and administrative services (Chiu *et al*., 2023) [9]. AI represents progress in education, offering benefits on multiple levels, and stimulates the evolution of teaching and learning through technologies like chatbots, robots, automated assessment, digitised artefacts, and intelligent tutoring systems, despite occasional organisational challenges (Chiu *et al*., 2023) [9].

The demand for adaptive digital learning with AI support has surged in the past decade, driven by challenges like the Covid-19 pandemic and social conflicts in contemporary societies (Matzavela & Alepis, 2021) [22]. Online and blended learning are now prevalent in modern communities and emerging economies as they strive to integrate these methods into the educational system. AIEd provides feasible solutions to complex societal problems, enabling students to engage closely with global challenges and develop real-life problem-solving skills.

The application of AI in education for skill development has the potential to redefine pedagogical practices. Adaptive learning systems powered by AI can tailor instructional content based on individual student needs, fostering a more personalized and student-centric learning experience (Khan, 2016; Luckin *et al*., 2016) [50, 51]. This shift towards personalized learning aligns with the diverse learning styles and preferences of students, promoting a more inclusive and effective educational environment

Furthermore, the integration of AI in Nigerian universities educational system for skills development and assessment necessitates a re-evaluation of the roles of educators and students. While AI systems can automate certain aspects of skills development and assessment, the human touch in terms of interpretation, empathy, and contextual understanding remains irreplaceable (Buckingham, 2012) [52]. Striking the right balance between human and machine contributions is crucial for fostering a symbiotic relationship that enhances the overall educational experience across Nigerian Universities. The intersection of AI and educational assessment marks a pivotal moment in the evolution of learning and evaluation methodologies.

Artificial intelligence is highly needed to stimulate the effective acquisition of 21st-century skills and help its recipient to realise their full potentials and excel in the competitive corporate world. Therefore, the adoption of artificial intelligence in Nigerian universities‟ education is long overdue.

Artificial Intelligence Conceptualized

Artificial Intelligence is one of the trending concepts in contemporary literature. In other words, Artificial Intelligence is a subject matter that scholars in different fields of endeavor are currently trying to harness its importance and applicability in their unique fields of endeavor. As noted by Calo (2017) [7], there is no universal consensus concerning the standard definition of AI and what it constitutes. AI actually refers to a variety of techniques that vary in complexity and share a common outcome that is the imitation of human cognition or decision-making. Artificial Intelligence is sometimes called Machine Intelligence, it is an Intelligence displayed by machine as opposed to natural Intelligence demonstrated by humans and animals (Mc Corduck, 2004) [24]. This means machines perform tasks like intelligent beings and animals. Artificial Intelligence is an area of Computer Science with the help of digital electronics that emphasizes the creation of intelligent machines that work and react like humans. Artificial Intelligence is embedded with the ability to reason,

make meaning, generalize or learn from past experiences. According to Benhamou and Janin (2018) [4], Artificial Intelligence involves a collection of technologies that enable machines to act with a very high level of intelligence similar to humans. Merriam-Webster English Dictionary (2018) stated that artificial intelligence is "a part of computer science that deals with giving the ability to the machines to look as if they have natural human intelligence". It has been noticed that computers can be programmed to handle very complex tasks since it was developed in the 1940s. It helps in discovering proofs for mathematics theorems and playing chess with great proficiency. Artificial Intelligence has been studied for years and it is still seen as one of the most challenging subjects in digital computers. Nevertheless, it has created waves all over the world. The main goal of artificial intelligence is to create technology that allows computers and machines to function in an intelligent manner.

According to McCorduck (2004) [24] the intelligence of artificial intelligence has been broken down to particular traits, which as learning, reasoning, problem-solving, perception, translation between languages, planning and speech recognition. The aforementioned traits have received the most attention in Artificial Intelligence technology. Artificial Intelligence in the educational sector has influenced students, administrative staff and lecturers. Artificial Intelligence application is in wide use by educators and learner from nursery to tertiary education level. Some of the tools and technologies used are teaching robots, intelligent tutoring systems, and adaptive learning system and such applications are adaptive skill building, scheduling career education and many other.

Branches of Artificial Intelligence

According to Ralph and George (2010) [39], Artificial Intelligence has several specialty areas, such as

i). Expert system
ii). Robotics
iii). Vision system
iv). Natural language processing and voice recognition
v). Learning systems and
vi). Neural networks.

i). Expert Systems: An expert system consists of hardware and software that stores knowledge and makes inferences, similar to those of a human expert. Expert system can do the following:

a) Provide expertise needed for training and development to share the wisdom and experience of human experts with many people. An expert system will be an easy way to get across many students in the teaching and learning process. Expert systems provide suggestions for spelling and error in Google search engine.
b) Develop solutions faster than human experts.
c) Provide rare expertise.
d) Capture and preserve irreplaceable human expertise.
e) Develop system more consistently than human expertise.
f) Solve a problem that is not easily solved when using traditional programming technologies.

ii). Robotics: Robotics is an interdisciplinary field of science and engineering with mechanical engineering. Computer Science and many others. Robots are deployed to conduct tasks that might be laborious for humans to perform steadily. Robotic has many applications.

iii). Vision Systems: Another area of Artificial Intelligence is Vision System. Vision System includes hardware and software that permit computers to capture, store, and manipulate visual images. This feature can search huge database of fingerprints in very high speed. It performs fingerprints analysis with almost the sample Vision level of precision as human experts. Vision System are also effective at identifying people, based on facial features. Visual System save time and cost.

Natural Language Processing and Voice Recognition: Natural language processing allows computer to understand and react to statements and commands made in a natural language such as English. For example, Google has service called Google Voice Local Search that allows one to dial a toll-free number and search for local business using voice commands and statements. Natural language processing system corrects spelling mistakes, convert abbreviations into words and commands, and allows people to ask question in English. In some instances, voice recognition is used with natural language processing. Voice recognition involves converting sound waves into words. After converting sounds into words, natural language processing systems react to the words or commands by performing a variety of tasks.

iv). Learning System: learning System is another branch of Artificial Intelligence; it is a combination of software and hardware that allows a computer to change how it functions or reacts to situations based on feedback it receives. For example, some computerize games have learning abilities. If the computer does not win a game, it remembers not to make the same move under the same condition again. Learning System software requires feedback on results of actions or decisions.

v). Neural Network: Neural Network is an increasingly important aspect of Artificial Intelligence. Neural Networks is also called Neural Net. Neural network is a computer system that can act like or simulate the functioning of a human brain. It uses parallel processors in a structure that is based on the human brain. Furthermore, neural networks can process many pieces of data at the same time and learn to recognize patterns. This branch of artificial intelligence can help in the payment of fees in schools that have high population of students. So that their names will not be entered each time they want to make payment or register for things continuously in the school rather password or pins will be used.

AI in Nigerian Universities Education

The undergraduate curriculum in most public universities in Nigeria tend to heavily relied on conventional teaching methods, focusing majorly on theoretical knowledge and rote learning. While this approach appears to have provided a solid foundation for learning, it often falls short in equipping students with the practical skills and problem-solving abilities required to succeed in the modern, technology-driven workforce. To remain competitive and prepare their graduates for the challenges of the 21st century, these institutions must undergo a transformative shift that embraces the power of AI.

Integrating artificial intelligence (AI) into teaching and learning in Nigerian university presents a significant opportunity to enhance educational practices. A number of

studies highlight the potential benefits and implications of incorporating AI in educational settings like Nigeria. Makarenko (2024) [26] stresses the pivotal roles of AI in personalizing learning, improving educational accessibility and efficiency, and preparing students for challenges in the modern labour market. Omorogiuwa *et al*. (2023) [38] emphasize the need for reviewing AI program curricula and fostering effective collaborations among academia to enhance research outputs in African universities.

Furthermore, Uluskan (2022) [42] demonstrates the application of AI in assessing university services through a hybrid approach combining structural equation modelling and artificial neural networks. This approach could be adapted to evaluate students' perceptions and satisfaction with assessments in the Nigerian university context. Additionally, Chen *et al*. (2020) [11] highlight how AI has enabled personalized learning experiences by customizing curriculum and content to meet students' individual needs, thereby improving overall learning quality and skills development among the students. Moreover, the study by Wang (2024) [43] on reforming English precision teaching in colleges using AI technology showcases the positive impact of integrating AI on classroom interaction and learner performance. These findings underscore the potential benefits of leveraging AI in educational practices to enhance teaching methodologies and student outcomes.

Several studies have examined applications and stakeholder perceptions of AI technologies for educational assessment. A survey of students and faculty in China found positive views of AI-enabled assessment and learning analytics systems, with 73% agreeing AI could improve fairness and 51% indicating it would enhance learning experiences (Zawacki-Richter *et al*., 2020) [44]. In contrast, a study across Australia, UK, and China identified student concerns about AI scoring of written assignments, including accuracy, fairness, and impacts on writing skills (Timms, 2016) [41]. Faculty have shown mixed opinions as well, recognizing potential efficiency gains but questioning AI's capabilities for authentic, holistic assessment (Lipnevich *et al*., 2020) [53]. Researchers have highlighted the need for greater transparency in AI systems and stronger evidence on impacts to student motivation and metacognitive skill development from relying on automated assessment processes (Eynon, 2013; Kovanović *et al*., 2021) [54].

As the world rapidly evolves, the application of cutting-edge technologies like Artificial Intelligence (AI) has become increasingly crucial in shaping the future of universities education. This paper therefore, bring to the fore the apparent need for Nigerian universities to adopt these transformative tools within their undergraduate curriculum, empowering students to thrive in the dynamic job market and driving innovation across various sectors.

21st Century Skill Development

Skill acquisition is the natural estate of business education programme with elf-reliance and more of employability motives. Omidiji and Ogwu (2019) [37] defined skill acquisition as a systematic and sequential development of skills that promotes efficiency and effectiveness in the performance of a specified job. Skill acquisition is the process of developing capacities through all levels of education and training, occurring in formal, non-formal, and on-the-job settings, which enable individuals in all areas of the economy to be fully and productively engaged in livelihoods and to have the capacity to adapt their skills to meet the changing demands and opportunities of the economy and labour market especially in the e-world (Enang and Okute, 2019) [13]. Skill acquisition is the ability to be trained on a particular task or function and become expert in it. Some of the needed skills in business education for one to be self-reliant include communication skills, reading skills, and manipulative skills. Skill acquisition has been described by many as the recipe for eradicating extreme poverty and hunger by creating avenue for employment, thereby creating job opportunities and wealth creation. Gumbari in Mshelia (2019) asserts that skill acquisition in Nigeria should be perceived as a catalyst to increase the rate of economic growth, create job opportunities, reduce import of manufactured goods and decrease trade deficits that result from such import.

Ezeji and Okorie as cited in Nwanaka and Amaehule (2011) [30] assert that while stressing the importance of skill acquisition in the national growth, emphatically contended, "that Nigeria's social and economic problems will drastically reduce if people are given adequate vocational training in skills, raw materials, machineries and equipment". It is only with skilled men that materials can be harnessed, manipulated and transformed into products with quality skill acquisition programme.

21st century skills are abilities, learning dispositions and competencies required for success in the 21st century society and workplace. With the unprecedented level of unemployment in the labour market and changing job markets, there is an increasing pressure for universities to produce graduates sufficiently exposed to a curriculum that is relevant to the workplace, equipped with related skills, and most importantly skills for survival and lifelong learning. 21st Century skills are essential for individuals to thrive in the modern workplace and they are becoming increasingly important as technology, particularly AI continue to advance. According to Iyoha, Umeh and Maamaa (2022) [18], the abilities and competences that are typically regarded as 21st century talents are diverse yet have similar characteristics. They contended that, the skills, aptitudes, and cognitive styles that have been acknowledged as essential for success in 21st-century culture and the business make up 21st century prowess. It is indeed a part of a broader global trend emphasizing the abilities students need to learn in order to succeed and be independent in a quickly evolving virtual era. The mastery of abilities like analytical thought, cognitive flexibility, and team spirit is the foundation of meaningful learning that is linked to these kinds of competencies. These abilities are distinct from conventional cognitive credentials in that they do not heavily rely upon pedagogical knowledge.

AI impacts on the types of skills that are most valued in the 21st century as it automates routine tasks, there is increasing demand for skills such as critical thinking, problem-solving, creativity, emotional intelligence and adaptability (United Nation, 2021). American Association of Colleges of Teacher Education (AACTE-2010) categorized these skills into three groups;

Learning Skills: They are skills for critical thinking, highly required for problem solving, creativity and innovation, collaboration and communication. These are skills that help students to adapt and improve upon a modern work environment. (Joshua, 2017) [19].

Literacy Skills: These skills are concerned with elements in digital comprehension. They include; Information literacy (helps students understand facts, figures, statistics and data), Media literacy (methods and outlets in which information is published) and Technology Literacy (machines involved in

the information age with examples as computers, cloud programming and mobile devices).

Life Skills (FLIPS): Flexibility (one's ability to adapt to changing circumstances). Leadership (motivating a team or others to accomplish a goal), Initiative (self-starters and persist along the line of activities), Productivity (the drive and ambition needed to sustain lifelong learning. Students‟ ability to complete work in an appropriate amount of time) and social skills (this has to do with meeting and networking with others for mutual benefits. Business is done through the connections one person makes with the others around them.

However, According to Iyoha, Umeh and Maamaa (2022) [18], over time, these skills have been categorized as follows:

- **Learning and Innovation Skills:** Critical thinking and problem solving, communication and collaboration, creativity and innovation;
- **Digital Literacy Skills:** Information literacy, media literacy, information and communication technologies (ICT) literacy; and
- **Career and Life Skills:** Flexibility and adaptability, initiative and self-direction, social and cross-cultural interaction, productivity and accountability

Despite 21st-century skills' great opportunities, a wide gap still exists in the knowledge-deployment of these skills among students in Nigeria's tertiary institutions.

Prospects of Artificial Intelligence in Nigerian Universities Education

Reducing the Workload of Lecturers: One major opportunity for Artificial Intelligence in education is the role that Artificial Intelligence can play in solving workload-related problems experienced by lecturers. In recent years, the lecturers have often shown dissatisfaction with the high workload experienced in education. This increased workload is partly due to the additional administrative tasks that lecturers have been given with the existing range of tasks as well as due to the reduction of new teachers entering the workforce. Artificial Intelligence can support the lecturer by automating (administrative) tasks to reduce the workload. Tasks that we expect Artificial Intelligence to be able to automate and/or facilitate shortly are mainly related to proofreading (e.g., highlighting strengths and weaknesses in an essay, after which the instructor primarily assesses these points) and the composition of the course material (with the help of automatic classification of content).

Personalized Learning for Skill Development: The application of Artificial Intelligence in personalized learning is considered a great opportunity. Lecturers have limited time and attention and therefore cannot teach each student individually. Artificial Intelligence does not have this limitation. This allows an Artificial Intelligence to better align education with the wishes of the students. As a result, the teacher is better able to focus his or her attention on 'problem students‟, and the student goes through the curriculum at his or her own pace and level. The automation of tasks will proceed steadily. We expect that it will start with performing small tasks such as selecting and practicing course material. Improvements within adaptive learning systems through the implementation of deep learning algorithms could aid in these tasks.

Supporting the Teacher With Data-driven Insights (Learning Analytics): Artificial Intelligence can support the lecturer by combining data and making it interpretable. With these learning analytics, the teacher can gain holistic and well-founded insights into students. Artificial Intelligence can expose cognitive biases and thus make education fairer with regards to ethnicity or gender for example. Artificial Intelligence which is not aware of ethnicity or gender cannot take these variables into account in the school advice. It is known that students with a non-western migration background generally receive lower school advice than native-born students. Artificial Intelligence can correct possible (unconscious) prejudices of a lecturer.

Improved Assessment

In the field of assessment, Artificial Intelligence can enable a shift from periodic assessment to continuous assessment. One major criticism of standardized tests is that they are merely snapshots and not a good representation of a student's knowledge. With Artificial Intelligence, the knowledge level of a student can be continuously monitored without the necessity of periodic tests. Synergy with other digital learning applications

Finally, Artificial Intelligence can increase the effectiveness of existing digital learning resources by replacing a manually programmed rule with rules learned by Artificial Intelligence. In combination with new technologies, such as virtual reality (VR), augmented reality (AR) and serious games, synergy can take place through the application of Artificial Intelligence. These technologies create a virtual space that can be fully controlled so that the learning outcomes can be optimized. A possible risk here is that knowledge gained in a virtual environment is generalized to a limited extent to 'the real world', and that other, less formalized knowledge acquired by a student at school (for example on a social level) gets less attention.

Challenges of Artificial Intelligence Utilization in Nigerian Universities

The utilization of artificial intelligence (AI) in Nigerian universities education is a subject of growing concern. It is often said that Nigeria may take at least eleven years to catch up with the global advancements in AI integration, as highlighted by experts (Olanrewaju, 2018) [36]. This lag in AI adoption can be attributed to various pressing challenges and barriers inherent in the Nigerian context. One of the most fundamental challenges faced by university`s education in Nigeria is the erratic supply of electricity (Nnamdi, & Nwanyanwu, 2021) [28]. The consistent power supply is critical for effectively powering of the AI applications that are becoming increasingly essential in modern education. AI relies heavily on computational processes, and frequent power outages disrupt the seamless operation of AI tools, making them unreliable in a classroom setting or lab.

There is a dearth of adequate infrastructure to support the integration of AI into Nigerian university`s education. AI systems require substantial computing power, storage, and network capabilities. Without the necessary infrastructure, implementing AI tools becomes a daunting task. The lack of investment in these critical areas hinders the progress of AI adoption. (Nnamdi, & Nwanyanwu, 2021) [28].

Financial constraints are another significant roadblock to the incorporation of AI in universities in Nigeria. Purchasing and maintaining AI equipment, including hardware and software, can be expensive. For many media organizations in Nigeria, allocating the required funds for such investments is a significant challenge, especially given the already strained financial conditions they often operate under (Olanrewaju, 2018) [36].

Cultural and socio-economic factors also play a substantial role in inhibiting the adoption of AI in university`s education in Nigeria. These factors can encompass resistance to change, traditional work practices, and the perception that AI might replace human jobs. This resistance to change can further slowdown the integration of AI tools into the journalistic process (Nnamdi, & Nwanyanwu, 2021) [28].

The cost of internet connection poses yet another obstacle. AI often requires a high-speed and stable internet connection for data retrieval, analysis, and sharing (Ndiomewese, 2017) [27]. In Nigeria, where internet infrastructure is still developing and access can be costly, this poses a significant challenge. Moreover, there is a shortage of skilled individuals who can effectively handle AI tools. The training of personnel in Nigerian universities who can handle AI is expensive and can be challenging to find professionals with the necessary expertise in AI and education.

Furthermore, the application of AI in university`s education presents a number of pedagogical challenges. Mishra and Koehler (2006) [55] assert that many educators may lack the necessary skills to effectively use AI tools and understand their pedagogical implications. Also, teachers may be resistant to adopting new technologies, especially if they feel it threatens their autonomy or expertise. Incorporating AI into existing curriculum requires careful planning to ensure it aligns with learning objectives and overall educational goals. In the word of Mishra and Koehler (2006) [55] creating assessments that effectively evaluate students' understanding of AI concepts and their ability to use AI tools can be complex. AI-based assessments may inadvertently perpetuate biases if not carefully designed and calibrated. Also, overreliance on AI can hinder students' development of critical thinking and problem-solving skills. AI should not replace human interaction and guidance, especially in areas like emotional support and mentorship. According to O'Neil (2016) [56] AI algorithms can perpetuate existing biases if not carefully designed and trained. Collecting and using student data for AI applications raises concerns about privacy and data protection. Also, there are concerns about AI replacing certain roles in education, such as administrative tasks. Addressing these challenges requires a multifaceted approach, including teacher training, infrastructure investment, and ethical considerations

Application of AI in Nigerian Universities Education and Skill Development among Undergraduates

The application of AI into university`s learning education will help students develop the knowledge and skills needed to pursue careers in entrepreneurship, technology and any other demand of industries. It is also essential for developing digital literacy, critical thinking skills, personalized learning skills and preparing students for future academic and career success. It encompasses other various applications such as personalized instruction, intelligent tutoring systems, virtual mentors, adaptive learning systems, educational games, virtual reality simulations, and automated grading systems. Artificial intelligence in education may also be seen as use of technology to address cognitive, physical, academic, social and emotional factors that impact learning. According to Ibrahim, (2023) [17], using AI can inspire students to generate ideas and solutions, fostering creativity and innovation, which are essential 21st century skills necessary in today's competitive and evolving job market through the following skills:

Personalized Learning: AI-powered educational platform can tailor learning experiences to the individual needs and learning style of business education students allowing them to progress at their own pace and focus on with additional support.

Critical Thinking and Problem Solving: AI can create interactive simulations and scenarios that require students to analyse, evaluate and solve complex problems thus fostering critical thinking and problem-solving skills.

Collaborative and Communication: AI can facilitate collaboration among students by providing a virtual environment for group work as well as enabling communication and feedback through chatGpt, chatbots and virtual assistants.

Creativity and Innovation: AI tools can stimulate creativity by providing students with resources for generating new ideas, designing solutions, and experimenting with various forms of expression, such as creative writing or visual arts.

Information Literacy: AI can assist students in navigating and evaluating vast amount of information, teaching them how to discern credible sources, validate information and think critically about the content they encounter. These are many more reasons for the advocacy of AI integration in university`s education programme in Nigeria

Conclusion

Without any doubt, Artificial intelligence has influenced many sectors and education is one of them. It is a contemporary method of tutoring or teaching and learning, which can address and resolve many issues related to learning in university`s education Nigeria. It can resolve issues, such as content accessibility, lecturers‟ deficiency where a student can learn without stress or impacting others. Artificial Intelligence implementation and adoption is unavoidable in business education. This paper provides a strong argument for the adoption and use of artificial intelligence application in university`s education in Nigeria. It also offers the policymakers in education guidance about the opportunities and challenges of artificial intelligence application in universities education and how many issues can be addressed through it.

Recommendations

Following the critical issues discussed in this study, recommendations were made that:

i). Government should invest in the comprehensive training programs for university`s lecturers to enhance their digital literacy, data literacy, and understanding of ethical considerations in AI integration. This will empower them to effectively utilize AI tools and navigate ethical challenges.

ii). Collaboration and transparency should be encouraged among stakeholders, including lecturers, policymakers, technologists, and students, to ensure a holistic approach to AI integration. This collaboration can lead to better-informed decisions and strategies

iii). Government should intensify efforts in the provision of ICT facilities and resources, as well as the improvement of power supply in the universities.

iv). Lecturers should organize lessons and other activities bothering on the use of AIs to keep students abreast of, raise awareness, improve skills and knowledge in the utilization of these emergent technologies.

v). Universities should create awareness and utilization of the different AI technologies in teaching and learning

various courses. University authorities should put into practice user education programmes for students to be encouraged learn how to use AI and other technologies for academic purposes and other activities.

vi). University`s education curriculum should be reviewed, so that 21st century skills be adequately integrated into the curriculum to prepare business education undergraduate students for the world of work and lifelong learning.

vii). lecturers should organize regular workshops, seminars, symposiums on the use of AI tools for effective teaching and learning and skills development among undergraduate students

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