

ARTIFICIAL INTELLIGENCE FOR CREATIVITY AND INNOVATION IN ECONOMICS IN SECONDARY SCHOOLS: CHALLENGES AND WAY FORWARD

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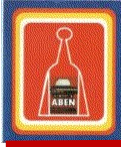
Abstract

The integration of Artificial Intelligence into education is transforming the way we learn and teach. In this era of technological advancement, Artificial Intelligence is becoming increasingly essential in the classroom, offering new intelligent teaching tools, innovative teaching and learning modes, and promoting creativity and innovation in teaching evaluation methods and management. The reformation of education and teaching in schools is breaking the time and space restrictions of traditional education, forming a superhighway of information, and making education more interesting and informative. Artificial Intelligence refers to the replication of human intelligence patterns by computer systems, codes, or machines to act and reason like humans. As it pertains to teaching economics, Artificial Intelligence can be used to enhance creativity and innovation through tools such as ChatGPT, Chatbot, Educational copilot, Grammarly, QuillBot, Turnitin, and others. Economics aims to equip students with the basic principles necessary for useful living and higher education, prepare them for the practical solution of economic problems, and raise their respect for the dignity of labor. Integrating Artificial Intelligence for delivery of Economics education can revolutionize the way students learn and understand as it would facilitate creativity and innovation. This paper raised that Artificial Intelligence has the potential to reshape teaching and learning in innovative ways, providing better ways of grading written answers and essays, and promoting creative thinking and problem-solving skills. By embracing Artificial Intelligence, secondary schools can create a nurturing environment for the next generation of creative thinkers and problem solvers.

Keywords: Artificial Intelligence, Creativity and Innovation, Economics Subject, Challenges, Way-forward

Introduction

Technology is fundamentally transforming education. In a world that is increasingly driven by technology, integrating Artificial Intelligence into the classroom has become imperative (González-Pérez & Ramírez-Montoya, 2022). This is not just a matter of following trends but of making more profound and systematic changes to the very nature of education. Artificial Intelligence has begun to permeate daily life in a variety of forms and applications, as well as being used and impacting education and teachers. Some examples include translation systems, search engines, Chatbots, ChatGPT navigation programs, and specialized web applications that provide learning in a variety of fields (Kingsley, 2023). Artificial Intelligence refers to the replication of human intelligence patterns by computer systems, codes or machines to act and reason like humans (Bupo&Akpomi 2023). Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems (Yashpal, 2024). Artificial Intelligence would bring new intelligent teaching tools to schools, form new teaching and learning



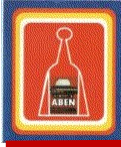
modes, and promote innovation and creativity in teaching evaluation methods and teaching management methods. Educators ought to actively change their way of thinking, explore new forms of combinations between Artificial Intelligence and teaching, promote the deep integration of technology and teaching, and the innovative development of education and teaching (Guo & Xiao, 2019). The reformation of education and teaching in schools would break the time and space restrictions in traditional education, thus form a superhighway of information, promote Artificial Intelligence 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 would be replaced by artificial intelligence systems, and the school environment would become more intelligent (Fu, 2019).

In this 21st century era, the academic world is becoming more and more personalized and thus the way of learning is transforming from traditional to Application based education system. In the 2019 pandemic outbreak, numerous learning management systems came forth to assist students to learn in online mode such as WebEx, Zoom, Microsoft team, and Google Meet. Hence, students have no need to attend the class physically (Bupo&Akpomi, 2023). Students in secondary schools were not left behind.

In secondary schools, the affordances of using Artificial Intelligence within teaching and learning modalities are emerging and these affordances have implications for teacher education, such as the need for Artificial Intelligence literacy for new educators (Navidi & Landry, 2021). This transformative technology is the catalyst for nurturing the innovators and creativity of tomorrow. Artificial Intelligence is an instrumental tool in sparking creativity and solving complex problems in a classroom setting (Liu, 2020). By embracing Artificial Intelligence, secondary schools are not just enriching the educational experience but are taking a giant leap towards creating a nurturing environment for the next generation of creative thinkers and problem solvers. Potential abilities are developed in the process of learning, communicating and acting within secondary and higher educational environment. Therefore, modern technologies of psychological and pedagogical support of the personality development in the framework of the educational process also ought to be focused on the results of the research devoted to creativity and innovation among adolescents and students of secondary school.

Creativity and innovation is an essential aspect of teaching and learning that is influencing worldwide educational policy and teacher practice and is shaping the possibilities of 21st century learners (Annie & Leon, 2018). Economics Students ought to be aware of how Artificial Intelligence can support their creativity and learning. Modern education favours problem-solving-based pedagogies, which emphasis the importance of fostering children's ability to think creatively (Marrone, Taddeo & Gillian, 2022). Marrone et al 2022, further stated that Artificial Intelligence in education address some of the main concerns associated with the creativity slump, particularly an emphasis on the creative process. This helps in improving creative thinking in students and comfortability using Artificial Intelligence, and to adequately prepare students to enter the modern workforce. Economics teachers can tap into the boundless potential of Artificial Intelligence to significantly enhance students' creativity and innovation in secondary schools. In education Artificial Intelligence is being adopted in the teaching and learning process, hence traditional teaching methods are transforming drastically and Economics subject in secondary schools cannot be left out.

Economics subject has become increasingly important in today's world, as it provides students with the skills and knowledge necessary to navigate complex economic systems (Pandey & Sonal, 2023). Teaching and learning of Economics in secondary school with Artificial Intelligence is essential for developing digital literacy, critical thinking skills, and preparing



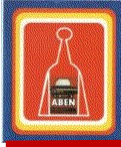
students for future academic and career success. A basic understanding of Artificial Intelligence systems enables students to engage and ideate with Artificial Intelligence technologies safely, responsibly and ethically. Artificial intelligence technology has not only promoted changes in schools' teaching methods, learning methods, campus environment, and curriculum, but the entire education industry is also undergoing changes through Artificial Intelligence (Karsenti, 2019). From basic education to higher education and adult education, schools are increasingly transforming with Artificial Intelligence technology. These systems can help people learn better and achieve their learning goals (Hinojo-Lucena, Aznar-Díaz, Cáceres-Reche, & Romero-Rodríguez, 2019). As artificial intelligence (AI) is increasingly becoming a part of our lives, the government and schools are paying more and more attention to the development of Artificial Intelligence in education (Malik, Tayal, & Vij, 2019). Given the growing prevalence of Artificial Intelligence (AI), it is domineering or secondary school pupils to possess a comprehensive comprehension of both the theoretical foundations of Artificial Intelligence and its diverse practical applications (Balka, 2021). However, traditional teaching methods may not be sufficient to fully engage students of economics and enhance creativity and innovation. This is where artificial intelligence (AI) come in.

Concept of Artificial Intelligence (AI)

Artificial intelligence refers to the replication of human intelligence patterns by computer systems, codes or machines to act and reason like humans (Bupo&Akpomi, 2023). Artificial Intelligence (AI), generally expressed by the general public as the ability of machines or computers to think and act as humans do, represents the efforts towards computerized systems to imitate the human mind and actions (Wartman & Combs, 2018). In this respect, the basic definition of artificial intelligence is expressed as the skilful imitation of human behaviour or mind by tools or programme (Mohammed & Watson, 2019). According to Timms (2016) stated that the current structure may create an illusion that leads to certain beliefs the Artificial Intelligence would come within the computer format used at home. It could get into our lives within different functions and shapes. Andrew (2017) Artificial Intelligence artificial intelligence to be the new electricity of this age. Artificial Intelligence is a candidate to be presented as the basic building block of the Fifth Industrial Revolution by providing itself to be a powerful factor in ensuring economic development with its potential (Golic, 2019). Pannu (2018) viewed that Artificial Intelligence gives the ability to the machines to think analytically, using concepts. Barua (2023) also identified Artificial intelligence tools such as SciSpace, Schoarlcly, Jenni AI, ChatGPT, Paperpal, Casper, Grammarly, QuillBot, Elicit, Turnitin, Consensus, Search Smart, Mendeley and, Evidence Hunt. Artificial Intelligence would continue to play an increasingly important role in various fields. Therefore, rtificial intelligence is the impersonation of human knowledge procedures for discourse and visual acknowledgment, interpretation of the dialects and virtual decision-making by machines for creativity and innovation on teaching and learning of Economics in secondary school.

Concept of Economics as a Secondary School Subject

Economics was first taken in the West African School Certificate Examination as a school subject in Nigeria in 1967. Since school certificate was a two years course, it may be said that economics came into the secondary school curriculum in Nigeria in 1966, much later than most other secondary school subjects. Economics was, however, taken by private candidates in the General Certificate Examination before it became a secondary school subject. It was recognized that economics problems were at the heart of modern society. Ever since economics was first taken as a school subject in West African School Certificate Examination in 1967, the number of

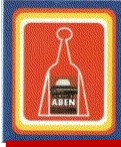


schools that teach it, and the number of candidates that take the examination have witnessed a phenomenal increase. For example, in 1967, it was 0.07% of the total number of candidates that sat for the examination, in 1969 it was increased to 12.56%, in 1970, it was 17.16% and by 1976 exactly 10 years of its inception, the population has risen to 76.95% (Noun, 2016). Gbemisola and Vusy (2016) submitted that the Nigerian Educational system constantly changes through consistent research and meaningful innovations. According to Gbemisola and Vusy (2016) the concept and philosophy of the 6-3-3-4 was to cater for the 'whole man' that is, to provide for the intellectual, social, material and spiritual needs of a student through its multi-purpose curriculum. With this mind, the secondary school curriculum is divided into three parts namely: Core subjects or vocational subjects, Pre-vocational subjects and Elective subjects or non-vocational subjects. The core subjects such as Mathematics, English language, one Nigeria language among: Yoruba, Igbo and Hausa and others like Physics, Chemistry, Biology, Agricultural Science, and Economics are basic intended to give students opportunity to offer Arts or Science subjects in higher education. Noun (2016) submitted that Economics is concerned with human behaviour such as how people earn their living and make a choice between alternatives to satisfy their wants. It focuses on the study of firms and the government whose activities are geared to the production of goods and services for the satisfaction of human want since economics is concerned with human behaviour. So, Economics is a social science, and like any science subject, the reasoning procedure in Economics is methodological, its analysis is systematic, and the validity of its various theories is tested. Adu, Galloway and Olaoye, (2018) opined that the teaching of Economics provides a learner with the opportunities to live meaningfully within the changing economic world. The following are the objectives or attainable outcomes of teaching Economics:

1. To equip students with the basic principles of Economics necessary for useful living and higher education;
2. To prepare and encourage students to be prudent and effective in the management of scarce resources;
3. To raise students' respect for the dignity of labour and appreciation of economic, cultural and social values of our own society; and
4. To enable students to acquire knowledge for the practical solution of the economic problems of the society, such as Nigeria, developing countries and the world at large.

Adu et al. (2018) also listed the following reasons why students study economics in senior secondary schools as follows:

- a) The study of Economics enables a student to understand the nature of the complexity of the economic activities in which he is only a very small part.
- b) It enables students to understand and appreciate various government policies where choices have to be made such as probably to spend more money on free education and therefore provide less employment opportunities.
- c) The study of Economics provides the students with basic skills for analysing Economic problems thereby preparing them better for positions where economic decisions have to be made
- d) The study of Economics helps a government to promote growth and development therefore improving the quality of life of the citizens.
- d) Knowledge of Economics is useful to analyze fascinating patterns of socio-economic behaviour.
- e) The study of Economics is useful to understand and alter the inequalities in the distribution of income and opportunities. (Adu, 2016)



Artificial Intelligence in economics education can revolutionize the way students learn and understand economics in secondary schools by using Artificial Intelligence tools such as ChatGPT, Paperpal, Casper, Grammarly, QuillBot, Elicit, Turnitin for creativity and innovation in Economics. Modern technologies are emerging at faster rate, and should be applied in teaching and learning of Economics subject in secondary schools in other for the teachers and students to remain updated in the current dispensation of technological advancement for foster creativity and innovation.

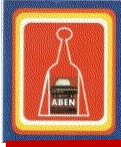
How Artificial Intelligence fosters Creativity and Innovation in Economics Education

The role of Artificial Intelligence in education reshapes teaching and learning in innovative ways. Recently numerous software companies are coming up with their Learning Management System (LMS) to provide better ways of grading written answers and essays in schools. According to Bupo and Akpomi (2023), that Learning Management Systems are Virtual Learning Environments (VLE) where teachers can interact with their students by providing educational resources (or links to these resources) and providing feedback on inquisitions from students. It is a platform where teachers and students can come together to interact to achieve an educational goal (Rowell, 2018). There are some Artificial Intelligence tools that can facilitate learning of economics subject such ChatGPT, Chatbot, Grammerly, Turnitin, Educational copilot, semantic scholar etc.

ChatGPT is an Artificial Intelligence tool that uses natural language processing to create human-like conversational dialogue. The language model can respond to questions and compose various written content, such as articles, social media posts, essays, code, and emails. Javaid, Haleem, Singh, Khan, and Khan (2023) stated that chatGPT offers a personalized learning experience, enabling students to engage with content tailored to their unique needs and pace, enhancing the overall educational process without replacing teachers. chatGPT also enables users to pose and answer a variety of questions, summarize texts, and interact with it like peers (Sok, 2023). Another Artificial intelligence tools called Chatbot.

Chatbots are now used across various sectors, including education. Most of the latest intelligent Artificial Intelligence chatbots are web-based platforms that adapt to the behaviors of both instructors and learners, enhancing the educational experience (Chassignol, Khoroshavin, & Bilyatdinova, 20218). Artificial Intelligence chatbots have been applied in both instruction and learning within the education sector. They possess the ability to generate text, create diverse creative content, and provide informative answers to questions, although their accuracy may not always be perfect Chatbots specialize in personalized tutoring, homework help, concept learning, standardized test preparation, discussion and collaboration, and mental health support. Also there are some Artificial intelligence tool that is used to checkmate chatbot and chatGPT named Ai-Turnitin.

Turnitin is an etool designed to identify and flag unoriginal written content, with the goal of detecting and preventing plagiarism. While technological advances are invaluable to education, technology has also made it easier for students to cheat and plagiarize assignments. Some of the ways technology can facilitate plagiarism include copying text directly from the Internet, buying term papers online, and readily sharing files among peers. Though technology has made it easier for students to commit acts of academic dishonesty, technology can also be used to keep students accountable and honest. Turnitin represents one digital tool that can help curtail plagiarism and promote academic integrity. Turnitin generates similarity reports on student submissions, which can provide educators with information about plagiarized sources, but the reports can also be used to help students understand the proper use of quotation marks, how to cite sources properly, and how to paraphrase. In response to the recent emergence of Artificial



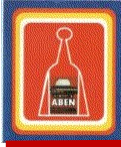
Intelligence tools (such as ChatGPT) capable of generating convincing human-written text, Turnitin have now released a new Artificial Intelligence detection tool that will detect texts created by Artificial Intelligence tools known as turnitinArtificial Intelligence detector (University of Lincoln, 2024). Also Grammarly is an Artificial Intelligence tool that's been utilized in educational sector.

Grammarly is an AI-powered writing assistant that generates content, improves existing content, and fixes any grammatical errors to make sound and concise content (Tom 2024). Grammarly is undeniably a powerful writing assistant that offers numerous benefits, such as error-free writing, enhanced style, and plagiarism detection. Kripesh (2024) observed that Grammarly is one of the most popular grammar checkers and proofreading tools, and it offers basic grammar checking options. Galuh and Antonina (2023) explained that while doing the writing activities, teachers and students may find several problems in their writing, such as errors in their sentence structures, grammatical errors, punctuation, word choices, and other kinds of language errors.

Quillbot is a paraphrasing and summarizing tool that helps millions of students and professionals cut their writing time by more than half using state-of-the-art Artificial Intelligence to rewrite any sentence, paragraph, or article (Eka & Rahmah, 2022). QuillBot is one of the most popular applications known as a paraphrasing tool. QuillBot offers a product that uses Artificial Intelligence to suggest paraphrases, grammatical checkers, summarizing, and even plagiarism detectors.

Education Copilot is an AI-powered platform that helps teachers streamline lesson planning, prep work, and creating educational materials. Ahmed (2023) stated that Education Copilot is an AI-powered platform that simplifies lesson-making plans and instruction techniques for educators and college students as well. The platform generates customizable lesson plans, academic handouts, templates, PowerPoint, and scholar performance reviews in seconds. Educators can spend time, power, and awareness on scholar studying and improvement with its unique Artificial Intelligence lesson planner feature. The reformation of education and teaching in schools would break the time and space restrictions in traditional education, thus form a superhighway of information, promote Artificial Intelligence 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 would be replaced by artificial intelligence systems, and the school environment would become more intelligent (Fu, 2019).

Economics teachers can coordinate all the learning activities of students ranging from registration, class activities, assignments, education resource material provision to examinations, assessment and giving out feedback. Artificial Intelligence can help to create customized learning plans and individualized programme to meet the unique needs of each student. It can analyze data on student performance, learning style, preferences, and interests to offer Artificial Intelligence recommendations. Artificial intelligence help teachers improve personalized education for their students (Sekeroglu, Dimililer&Tuncal, 2019). It is identified that personalized learning with other pedagogical models, such as mobile learning, ubiquitous learning, game-based learning, collaborative learning, etc., has a high potential to enhance the respective model by improving the learning progress and outcome of learners. Economics teachers can, however, identify students' learning abilities with data collection some of the practical Artificial Intelligence notwithstanding, it is identified that personalized learning with other pedagogical models, such as mobile learning, ubiquitous learning, game-based learning, collaborative learning, etc., has a high potential to enhance the respective model by improving the learning progress and outcome of learners (Pandey & Sonal, 2023). Artificial Intelligence can help to create customized learning

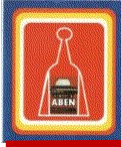


plans and individualized programs to meet the unique needs of each student. It can analyze data on student performance, learning style, preferences, and interests to offer Artificial intelligence recommendations. These data make the added value and global impact of artificial intelligence more understandable for the future economy, and in our case, for the future of education, which in turn, directs the economy and workforce, paving the way for the new Industrial Revolution. The in-depth development of artificial intelligence would affect many situations, from the restructuring of the social order in the broadest sense to the education and administration processes in classes and schools. Schools that are expected to adapt to the digital age and embed 21st century skills in their Artificial Intelligence agenda are some of the Artificial Intelligence institutions that could be most affected by the development of artificial intelligence. Karsenti (2019) points out that new forms of technology would fill in our lives and captivate our youth, and this case may leave schools with no choice but to make room for them. Educators can, however, identify students' learning abilities with data collection. Artificial Intelligence-driven tools promote communication and teamwork among students, fostering interactive discussions and group projects. Artificial Intelligence (AI) is applied in teaching across various facets, transforming traditional educational approaches. In essence, Artificial Intelligence in teaching transforms content creation, personalizes learning experiences, fosters collaboration, and supports data-driven decision-making. Artificial Intelligence serves as a facilitator of creativity by generating interactive learning materials, such as simulations and virtual labs, enhancing content beyond traditional methods. Moreover, it plays a pivotal role in shaping collaborative learning environments. These applications collectively contribute to a more dynamic, efficient, and student-centric educational environment such as:

Language learning systems: Artificial Intelligence create lessons for real situations and needs, such as directions for a trip, communicating with the doctor at the hospital, and meeting a foreign speaking classmate (V-soft, 2023). Artificial Intelligence are on various operating systems and a multitude of electronic devices, computers, laptops, tablets, and mobile phones. Artificial Intelligence allow the voice communication of students who speak different languages. Also, offer, voice and text recognition, of objects in real time via camera, for immediate. Improving the capabilities of students in special education. Akash (2023) opined that Students with various learning difficulties, such as comprehension of written or spoken language, difficulty in spelling, hyperactivity, distraction, various learning gaps, socialization difficulties, and students with mobility Artificial Intelligence, is directly helped with the appropriate applications of artificial intelligence and join world classes, with students who need to be treated accordingly and special instructors who have the appropriate qualifications for the specific case.

Virtual libraries: Through Artificial Intelligence programme students would be able to advance to libraries and scientific articles targeted, Artificial Intelligence knowledge, saving time, and expanding the possibilities of a school library. Thus, economics students would have the opportunity to deal with more complex issues and focus on the broader study and understanding of their teaching subjects (Frąckiewicz, 2023).

Simulations: Virtual environments that combine Artificial Intelligence to cover every requirement or every aspect of students' thinking and imagination. Even with the students being a part of the virtual world, the simulation environments are immersive and engage the participants. Tangible and total participation in the experiments, in contrast to traditional classrooms, where there were many restrictions to do so. Artificial Intelligence offer an easy way to gain hands-on experience without being in a similar environment, properly preparing for the rigors of the real world. Artificial Intelligence prepare students for a collaborative environment by providing



opportunities for collaborative work and problem solving. Engaging with such innovative environments paves the way for the future business world for students (Bouroniko, 2023).

Time management and creating a study plan: This reduces students' stress and boosts confidence in their abilities (Rem, 2023). Artificial intelligence applications allow students to create a study plan, that is, suggest what to do and when, prioritize key study items, Artificial Intelligence for faster study with better learning outcomes.

Virtual classrooms and collaborative environments. Classrooms are becoming global through virtual environments. A student has access to, may connect with, and encounter classmates from all over the world, as well as groups with comparable learning styles and interests. Artificial intelligence can provide access to appropriate and better learning opportunities for excluded people and communities, people with disabilities, refugees, people out of school, and those living in isolated communities (Pedro, Subosa, Rivas, & Valverde, 2019). Artificial Intelligence enables real-time use of virtual whiteboards, virtual teaching aids and simulations, in collaborative environments with students and teachers from around the world. Such environments can eliminate the limitations of a real classroom and give new possibilities and perspectives to students. Beyond automation, Artificial Intelligence shapes personalized learning, adaptive assessments, and innovative content creation. The importance of Artificial Intelligence in education marks a profound shift in teaching and learning.

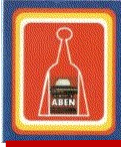
Importance of Artificial Intelligence in Secondary Schools

Haseski (2019) briefly states that the use of Artificial Intelligence in secondary schools would make learning more individual, provide effective learning experiences, enable students to discover their talents, improve their creativity and reduce teachers' workload. Artificial Intelligence are now becoming an important point of academic literature and scientific circles. With more usage of artificial intelligence in education, major transformations is foreseen in the education systems and its processes. It would help to mitigate the learning gaps, generate learning interests among students, increase-learning ability, and language affinity, and improve learning pace. Salunke (2020) stated that with the help of Artificial Intelligence in the education sector the quality and more of industry ready professionals would be out in the job market.

Although quality education seems to require the active participation of human teachers, artificial intelligence envisages increasing education and quality at all levels, especially by providing personalization (Grosz & Stone, 2018). In today's digital world, it's hard to imagine running a classroom without a using electronic learning facilities (Amesi & Ezeora, 2020). Given the growing prevalence of Artificial Intelligence (AI), it is imperious for secondary school pupils to possess a comprehensive comprehension of both the theoretical foundations of AI and its diverse practical applications (Balka, 2021). This is why Artificial Intelligence needs to be incorporated in classroom using some strategies for creativity and innovation in Economics subject in secondary schools.

Strategies for Economics Teachers to Incorporate Artificial Intelligence in Classrooms for Creativity and Innovation:

1. **Provide access to students to Artificial Intelligence tools** such as chatbots, virtual assistants, and personalized learning platforms that can help them learn more effectively.
2. **Encourage collaboration among** students by providing a platform for them to work together on projects and share ideas.
3. **Artificial Intelligence assess** student learning by providing real-time feedback and insights into student progress.
4. **Personalize learning** for students based on their individual needs, interests, and learning styles.



5. **Artificial Intelligence provide students with feedback** on their work and help them improve their skills.
6. **Artificial Intelligence conduct research** more efficiently and effectively.
7. **Integrate Artificial Intelligence with existing curriculum** or into existing lesson plans to make them more engaging and interactive.
8. **Foster creativity** among students by providing them with new and innovative tools and resources.
9. **Encourage exploration and experiment** with them to discover new ways of learning and creating.

Teachers can leverage the strategies of Artificial Intelligence in education to enhance classroom dynamics and enrich the learning experience in several ways. Artificial Intelligence-driven educational tools can facilitate personalized learning. These tools analyze individual student data to tailor instructional content, accommodating diverse learning styles and preferences. Teachers, therefore, ought to be conversant with the development in the technology space and how this affects the teaching of business and educational management to raise students that can cope with the present world of work (Bupo&Akpomi, 2023). These strategies ill not only be centered at teachers but also to Economics student for them to know the strategies on how to use Artificial Intelligence for creativity and innovation'

Strategies for Economics students to utilize Artificial Intelligence for Creativity and Innovation

1. Use Artificial Intelligence tools for self-assessment to track your progress as student and identify areas where you need to improve.
2. Personalize learning path with Artificial Intelligence based on your individual needs and preferences.
3. Collaborate with Artificial Intelligence-powered chatbots and virtual assistants and interact in the class with classmates and get help with your work using several sources for acquire knowledge or have feedback.
4. Create with Artificial Intelligence new and innovative projects that showcase your creativity and problem-solving skills.
5. Artificial Intelligence as feedback tools to receive feedback on your work and improve your skills.
6. Stay up-to-date to be informed about the latest Artificial Intelligence technologies and how they is used to support your learning.
7. Experiment with Artificial Intelligence tools and explore new ways of learning and creating.
8. Take ownership of your learning and set goals for yourself.
9. Think critically about Artificial Intelligence and its role in education and consider the potential benefits and drawbacks of using these technologies.

The fusion of Artificial Intelligence and education is indeed a game-changer, promising a brighter and more innovative future. Therefore, xcluding Economics students from using Artificial Intelligence for Creativity and Innovation would be very risky. To mitigate these dangers, it is essential to promote equitable access to Artificial Intelligence education for all Economics students, regardless of their background or socioeconomic status. This would help to ensure that everyone has the opportunity to benefit from the advancements in Artificial Intelligence. Moreover, Artificial Intelligence is transforming the job market, with increasing demand for professionals skilled in Artificial Intelligence and related fields. Teaching students about Artificial Intelligence can help them develop the knowledge and skills needed to pursue careers in



technology, data science and other in-demand industries. Artificial Intelligence learning can inspire students to generate ideas and solutions, fostering creativity and innovation but there are also some challenges to its implementations.

Challenges facing Artificial Intelligence for Creativity and Innovation in Economics

While Artificial Intelligence is a valuable tool for teachers, there is a danger that it could lead to education because it does not encourage students to think outside the box. Transferring the roles of teachers to computers is seen as a danger in the studies on artificial intelligence (Humble & Mozelius, 2019). According to Bupo and Akpomi (2023) some of the challenges attached is seen as:

- a. High cost of these technologies
- b. Lack of technical know-how
- c. Poor orientation of major key-players
- d. Lack of necessary infrastructure (power supply and internet facilities)
- e. Lack of funds

According to Pandey (2023), some of the challenges of Artificial Intelligence for creativity and Innovation which are:

- i. Lack of access to high-quality data.
- ii. Need for specialized expertise.
- iii. Lack of a team of experts with knowledge in both economics and computer science.

There is a wide range of not knowing how to apply Artificial Intelligence in teaching because of the complexity and cross-disciplinary nature of Artificial Intelligence, so teachers must possess a high level of intellect and comparative expertise in the usage of Artificial Intelligence. The results of Artificial Intelligence education as a whole are unexpected since there are significant gaps in professional knowledge, technology application expertise. Another challenge is that Artificial Intelligence would replace human teachers altogether, leading to a loss of the human element in education. **Teachers play a vital role in fostering creativity and critical thinking in students, and their input cannot be replaced by Artificial Intelligence.** While Artificial Intelligence is used to provide automated feedback and support, there is a danger that it could lead to a lack of empathy and understanding for the needs of individual students. There is a concern that **Artificial Intelligence would be used to replace creative tasks, such as writing or painting, leading to a decline in creativity and originality in teaching and learning Economics in Secondary Schools in Rivers State.** With Artificial Intelligence models like DALL-E that can generate realistic images from textual prompts, it is possible for people to create images without having any artistic skills. While this is a useful tool for designers and artists, there is a danger that it could lead to a homogenization of artistic expression that stifles creativity.

Conclusion

Artificial intelligence has entered almost in all the areas of our lives. Also it is the way to change the trends of life in all the aspects. Artificial intelligence is here to encourage the implementation of artificial intelligence education and promoting the development of cognitive and pedagogical skills. In order to make aware and use of the applications of Artificial Intelligence, secondary schools ought to apply artificial intelligence into for economics curriculum in order to lead the trend of the times. It is the concern of each and every Economics teacher to understand the benefits of Artificial Intelligence and how to use in an effective way to practice as a familiar skill. Artificial Intelligence redefines education by fostering creativity through innovative content creation, shaping collaborative learning environments, and facilitating comprehensive assessments. Its multifaceted role as a catalyst for dynamic and effective educational paradigms positions Artificial Intelligence as an invaluable tool in preparing students for the challenges of the



future. The integration of Artificial Intelligence marks a transformative shift, enriching the educational experience for both educators and learners alike. Artificial Intelligence helps teachers in economics in seeking out new ideas through research, professional development, and collaboration continually reviews curriculum to meet the ever-changing needs of the student. It can empower teacher to adjust to instructional methods for varied learning styles and tries out new assessments which offer students creative ways to demonstrate their knowledge and skills. When a teacher is empowered with Artificial intelligence knowledge for creativity and innovation, teachers' takes risk and is not afraid to let student choose their learning path while staying focused on the key learning competencies. Teachers can integrate Artificial Intelligence-generated content, such as simulations and virtual labs into lessons to make subjects more interactive and engaging. Furthermore, teachers can use artificial Intelligence analytics to gain insights into student performance trends. Finally, teachers can use Artificial Intelligence in the classroom to personalize learning, provide real-time support, integrate interactive content, streamline administrative tasks, and make data-informed decisions. It is the concern of teachers to understand and apply common artificial intelligence products, such as ChatGPT, Chatbot, QuillBot, Educational copilot, Duolingo, Gradescope, and Grammarly for creativity and innovation in Economics in Secondary Schools in Rivers State.

Way forward

Despite these concerns, there is also the potential for Artificial Intelligence to enhance creativity and innovation in economics in secondary schools. Artificial Intelligence is used as a tool to help students explore new ideas and perspectives, and to generate new insights and perspectives. With Artificial Intelligence, it is possible to analyze large amounts of data and identify patterns and connections that would be difficult for humans to identify on their own. This can help students to think more critically and creatively about the world around them. Providing students with access to Artificial Intelligence education can help close opportunity gaps, ensure they have the skills and knowledge to compete in the global workforce, and create a more diverse pool of talent in Artificial Intelligence and related fields. This diversity can lead to better problem-solving, creativity and innovation in the development of Artificial Intelligence technologies and solutions.

The following are way forward for this study:

1. We must embrace change and embrace the potential of Artificial Intelligence for creativity and innovativeness in Economics, in this journey, we ought to also prepare students for the future of work.
2. Secondary Schools are required to train and develop their students to upgrade them to face the challenge of the Artificial Intelligence revolution and fight successfully in the Artificial Intelligence age.
3. **Stay informed** about the latest Artificial Intelligence technologies and how they is used to improve learning in the classroom.
4. Most important, is time to focus on ethical considerations, as Artificial Intelligence becomes more prevalent in education (and everything and everywhere, all at once) it is important to focus on the ethical considerations surrounding its use, including issues of bias, privacy, and data security.
5. Artificial Intelligence has the potential to revolutionize the education sector by enhancing learning experiences, supporting teachers and offering more personalized learning opportunities for students. We must equip teachers with the knowledge and strategies they would need to use this new technology to improve and streamline everyday processes as well as classroom implementation. To prepare for this future, the task of



states and nations is to create a teacher profile that would work with these support structures (Wogu, Misra, Olu-Owolabi, Assibong& Udoh, 2018).

6. **Secondary schools ought to start small** by incorporating Artificial Intelligence into a few classrooms or specific areas of the curriculum before scaling up.
7. Provide teachers and staff with training on how to use Artificial Intelligence tools effectively and ethically.
8. Encourage a culture of innovation and experimentation, where teachers and students can explore new ideas and technologies in a safe and supportive environment

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