

**IMPACT OF ARTIFICIAL INTELLIGENCE IN LEARNING SOFTWARE ENGINEERING IN
FEDERAL UNIVERSITIES OF TECHNOLOGY
IN SOUTH-EAST NIGERIA**

By

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ABSTRACT

Systems approach to Educational Technology emphasises eclecticism which admits importing good techniques and technologies that would enhance the process of education. Artificial Intelligence is one of such technologies. Its efficacy in the social arena gives credence to its adoption in the school system. With the geometric increase in the rate of knowledge generation students need to be assisted to embrace this new technology to assist them in learning. With the rigorous algorithm involved in software development this researcher thought it wise to investigate the impact of AI in students' learning of software engineering as a gap in knowledge observed in tertiary institutions in Abia State. The study investigated the impact of Artificial Intelligence in learning software engineering in tertiary institutions in Abia State. Four objectives guided the study. The study was purely opinion research adopting face-to-face interview as a blue-print. AI has been embraced by Nigeria schools (including those studying software engineering), however, at a low level with the AIs dedicated to entertainment rather than the real teaching/learning AI platforms; though ChatGPT and SnapChat are gradually becoming popular among students. While respondents agreed to have positive results in learning software development through the use of AI they also expressed negative consequences concomitant to this including encouragement of examination malpractice, making students lazy to think thus reducing their cognitive operations. AI encourages plagiarism in project writing is rife. In consequence it was recommended that on admission, university authorities should include in the introductory courses of 101 subjects the use of AI to learn to give them the right direction and positive attitude to the use of AI for learning thereby reducing some of the abuses of AIs acquired through self-teaching on embracing the learning kits.

KEYWORDS: Artificial Intelligence, Software Engineering Education, Psychology of Learning, Learning Outcomes, Federal Universities of Technology, South-East Nigeria.

INTRODUCTION

Every human society is a system driven by multiple subsystems for growth, development and sustenance of man in it (Helbeing, 2013). These social systems include the education sub-system, agriculture subs-system, engineering sub-system, economic sub-

system, information sub-system and in fact any functional segment of the society which when removed causes chaos or break down in the functioning of the entire human society. The education sub-system is the engine that drives all the other sub-systems of the society as all innovations in the society originates from it (OECD, 2017). Because of this multiple system personality of the society, equity, innovation and inclusivity among other balancing operations must be lubricants in the social leadership paraphernalia for its longevity. This is because the society is cumulatively dynamic as everything in it is in a state of fluid (Schleicher, 2018). For the society to change and move in the positive direction for positive changes to be generated flexibility, sensitivity interdependency and reciprocal balancing in system leadership operation are inevitable. As veteran educationists current and retired principals of secondary schools stand a better chance to suggest how to sustainable development incorporating equity, innovation and inclusivity could be built into the school leadership for vibrancy and longevity.

STATEMENT OF THE PROBLEM

It has been observe through plagiarism tests conducted on the projects turned in by many students that the projects were copied. This observation motivated investigating the general impact of AI in students' learning of, particularly, software development in tertiary institutions in Abia State. This is even more required now that examination malpractice is becoming a culture among students. The downward trend in students' academic performance and achievement raises alarm over this ugly trend. In consequence the problem of this study put in question form is to find out the impact of AI in learning software engineering among students of tertiary institutions in Abia State.

OBJECTIVES OF THE STUDY

The main objective of this study is to seek the views of students on how the use of AI has impacted on their learning of software engineering. Specifically the study investigated:

1. The major study areas of students' software engineering areas that AI has impacted on,
2. Teaching/Learning AIs Platforms Available in Nigeria,
3. Problems of using AI kits in Nigeria Tertiary institutions
4. Students learning use of AI in school

METHODOLOGY

This study adopted the face to face interview and analytical (with literature review) research design. This design was adopted because it sought to find the opinion of stake holders on the impact of AI on students' learning of software engineering. However, the studied population consisted mainly of third year students of universities offering software engineering in Abia State. It involved face to face interaction with the student met by accident (accident sampling method). In all a total of 65 students involving 25 males and 40 female were interacted with for their opinion. The objectivity in their opinion as gleaned from actions and non-prior knowledge of the interview gave the findings of this study some dignity personality and credence.

Teaching and Learning has hitherto been achieved through personal engagements with different study material and personal experiences that involve searching and synthesizing ideas to build knowledge. This required students, researchers and scholars to roam, with uncertainties, from one book to another and from one journal article to another (Kokoli, 2024). Advances in computer technology have revolutionised these tedious approaches making teaching and learning easy. Computer engineering services in both hard and software

development have grown simultaneously to give humanity a lease of life to achieve greatness in knowledge creation and acquisition. To further help to close the gap in knowledge synthesis and reduce the drudgery in research and learning AI development was induced in all aspects of education including AI software engineering (Collin, Lepage, & Nebel, 2023). However, since the advent of AI packages and their entry into the Nigeria school system, particularly the tertiary institutions and their impact on students learning of software development has not been fully explored. This thus creates a gap in knowledge which this study intends to fill particularly as it concerns this study area.

BACKGROUND OF THE STUDY

AI is a set of software technologies that enable computers to perform a variety of advanced functions including the ability to see, understand, translate spoken and written languages, analyse data, make recommendations and more (Bjelobaba, Waddington, Perkins, Foltýnek, Bhattacharyya, & Weber-Wulff, 2024). The development resulted in factoring the deferent areas of human services needs for AI application into 15 research categories and 5 themes — namely, natural language processing in software engineering, use of artificial intelligence in the management of the software development life cycle, use of machine learning in fault/defect prediction and effort estimation, employment of deep learning in intelligent software engineering and code management, and mining software repositories to improve software quality (Kokol, 2024).

MAJOR STUDY AREAS OF STUDENTS' SOFTWARE ENGINEERING AREAS IMPACTED ON BYAI

Software engineering on the other hand is an aspect of computer science concerned with the application of theory, knowledge, and practice to building reliable software systems that satisfy the computing requirements of customers and users. (Encyclopædia Britannica, n.d). This means that software engineering is a clientele service whereby a computer software engineer analyzes user needs, designs, constructs and tests an application that will satisfy the needs of end-users through the use of software programming languages. For Webopedia, (2021) software engineering could be defined as the systematic and disciplined approach to the design, development, testing, implementation, and maintenance of application software and computer systems software. The development of Artificial intelligence has come to revolutionise this aspect of computer software development task. Thus, Alqahtani, Dzogovic, & Sobaih (2025) put this succinctly and overtly by saying that Artificial intelligence (AI) has witnessed an exponential increase in use in various applications. As a result of the universal applicability of AI in software development the academe+mic community recently started to research and inject new AI-based approaches to provide solutions to traditional software-engineering problems (Yan, Sha, Zhao, Li, Martinez-Maldonado, Chen, Li, Jin, & Gašević, 2023).

AI has been used in many areas of software development in Nigeria such as in software package planning, designing, analysis, testing, and improvement (Belmar et al. 2022 and Yuan & Liu, 2025, February). These are:

- a. Software development life cycle (SDLC) demands that an Engineer understands what the end user wants as this will enable him to work towards it. This too, will help him to clearly specify his goal, structure his algorithm into systemic and functional mudules that can be connected in tandem.

- b. System design requires the engineer to create an architectural blue-print that would act goal director and give the engineer a focus (e.g. data base design, user interface plan and data flow)
- c. Implementation (coding) calls on the software development engineer to prepare functional flowcharts, write executable instructions using any of the known high level languages such as C++, python, Java or JavaScript).
- d. Test is then done for debugging consistency and reliability in functioning.
- e. Development stages releases the software to the end user for customer application and subsequently
- f. Maintenance which follows any software malfunctioning in the process of use.

Common methodological areas of software engineering that is handled by AI robotics include: Waterfall Model – Step-by-step, linear process.

Agile – Iterative and flexible approach, with frequent updates.

Scrum – Agile framework with sprints and daily meetings.

DevOps – Integrating development and operations for faster delivery.

For efficiency and achievement of expected objectives the software engineer needs some skills like: Programming skills in different languages (like Python, Java, C++, JavaScript, etc.), Problem solving and logical thinking (like the ability build algorithms using logics), Knowledge of algorithms and data structures, System design and architecture, Testing and debugging, Version control (e.g., Git) and Communication and teamwork (Alqahtani, Dzogovic, & Sobaih, 2025).

There are even more expert areas of software development engineering that require advanced AI application such as front-end development (what users see (UI/UX, web or mobile apps); Back-end development (Server-side logic, databases, APIs); Software architecture (Designing system structure and components); Testing and Quality Assurance (QA) (Ensuring the software is reliable); DevOps (Automating deployment and system operations); Security Engineering (Protecting software from cyber threats) and Project management (Coordinating people, time, and resources) (Raihan, Siddiq, Santos, & Zampieri, 2024 and Yuan, & Liu, 2025, February 1). In the real world arena the computer engineer should also wear the shoe of a client to be able to quickly understand what the client wants as in the building of packages like Mobile apps (WhatsApp, TikTok, Uber), Web platforms (Google, Amazon, YouTube), Banking and financial, Health information systems, Systems Scientific simulations end Embedded systems (e.g., in cars, airplanes, or medical devices) (Jyrwa, Jayaraman, & Joseph, 2025).

Teaching/Learning AIs Platforms Available in Nigeria

A number of AI platforms that could be explored for the teaching and learning of software engineering in Nigeria tertiary institution are available and include:

- a. Dodona Intelligent tutoring system for computer programming. Offers real-time feedback, supports active learning. Use for programming assignments: students submit code, get automated feedback; helps lecturers scale marking; supports learning analytics. You need to set up and maintain content; it's best suited for courses with many students; may require infrastructure; limited to languages supported (Gartner, Inc. (2024, April 11)).
- b. Git SEED: A Git-backed automated assessment tool for programming and SE projects. It gives personalized feedback and integrates with tools like GitLab. Great for project courses: students manage version control, submit via GitLab, get feedback on code

quality, testing, etc. Can help in teaching software engineering practices (git, testing and code review). Must ensure students know Git; the feedback tools may need configuration; language-agnostic but specific evaluation pipelines still needed per course (Gartner, Inc. 2025, July 1).

- c. Code Grade Provides a ready environment for AI/ML and programming, includes auto-grading, supports notebooks and popular AI libraries. For courses involving AI, ML or software engineering with Python: assign labs, have students work in browser without local installs; instructors can set test cases. Saves setup time. May require subscription; internet access needed; support for custom languages/tools can be limited; high-resource usage for some libraries (Tufano, Agarwal, Jang, Zilouchian Moghaddam & Sundaresan, 2024).
- d. Tabnine AI assistant for code completion, bug suggestions, documentation, explanations. Supports many languages and integrates with popular IDEs. Useful in teaching programming, especially for helping students when coding: they can see suggestions, learn best practices; helps with refactoring etc. Good for labs or individual work. Overreliance risk: students might use it to generate code without understanding; licensing and cost; need to ensure academic integrity (Qiu, Puccinelli, Ciniselli & Di Grazia, 2024).
- e. Hyperskill (JetBrains Academy) Project-based learning; integrated environment; instant feedback; multiple languages. Use for self-paced parts: students work on projects outside class; helps reinforce topics in software engineering (OOP, testing, etc.). Also good for supplementary work. Not all content free; might not line up exactly with your syllabus; student motivation required; internet access (Hassan, Oliva, Lin, Chen, & Jiang, 2024).
- f. Mindgrasp AI For students: auto-generate summaries, notes, flashcards, quizzes, Q&A from study material. Good support tool: helping students review software engineering theory (design patterns, software lifecycle, architecture) or reading materials; faculty can recommend it. Doesn't generate code; more useful for theory or reading; quality depends on input materials; subscription / cost issues (Brokman, 2025).
- g. Commonly, Nigeria students are much familiar with social media platforms which combine entertainment with teaching like tik tok, Reel, whatsapp, chatGPT and you Tub among others and with extreme poverty of the knowledge of the real teaching learning platforms mentioned above.

Software engineering education in Nigerian tertiary institutions is being significantly influenced by Artificial intelligence (AI) through personalized learning, automated tools for tasks like grading and feedback, and enhanced learning experiences like simulations. However, there are significant challenges, including infrastructure limitations, lack of faculty expertise, and an introduction, adoption and adaptation gap between current approaches and more advanced global practices. These barriers need to be address to effectively harness AI's potential in tertiary institutions to enhance AI literacy, and integrate more advanced AI techniques into their curriculum (Brokman, 2025 and Zhou, 2025).

PROBLEMS OF USING AI KITS IN NIGERIA TERTIARY INSTITUTIONS

While acknowledging that AI has made significant inroad into tertiary education in Nigeria particularly in the teaching and learning of software engineering there are a number of challenges militating against its full potentials. These include:

- i. Infrastructure and resources: Many institutions face problems related to inadequate infrastructure as a result of poor funding and institutionalised corruption.
- ii. Limited access to technological resources needed for AI integration. Many of the AI platforms and others not listed are available to Nigeria personnel for use.
- iii. Inadequacy of Qualified personnel: A shortage of necessary expertise to implement and teach AI-related concepts is a strong barrier.
- iv. Adoption gap: While there is some AI adoption in Nigeria, many institutions have not yet fully embraced the more sophisticated techniques like intelligent tutoring systems that are more common elsewhere overseas.
- v. Curriculum lag: There is a need to align curriculum contents and training skills with the demands of the AI-driven economy to ensure graduates are workforce-ready.
- vi. Poor Funding: Poor funding has been the bane of Nigeria education system that needs political will to be solved.
- vii. Poor power supply: The power supply problem in Nigeria is just at the same basement as the funding problem that needs a messiah for a rescue.

STUDENTS LEARNING USE OF AI IN SCHOOLS

It is acknowledged that more than ever before AI systems have enabled software engineering students to easily search for and retrieve study materials from the internet Ngonso, Uduehi Ukhurebor (2025). In this case AI retrieves the most relevant materials and organises them in a readable and easily understood manner for students. In fact, many a time AI retrieves and presents to student esoteric knowledge students do not know exist. AI does not only provide learners with theories but also with practical rules and methods of doing things. Serious-minded students exploit the enormity of the materials in the internet as well as the speed of operation of the internet to study and be ahead of their mates in class (Zeng, *et al*, 2023, October 2). It has been speculated that Nigerian universities are very slow to catch up with the use of ICT in teaching and learning. A study conducted by Ngonso et al. (2018) on the use of ICT in teaching mass communication revealed that lecturers and students were unable to tap into the full potential of interactive media. The use of this new technology in the Nigerian educational setting has been studied by a few scholars. In a study conducted by Inyaoiza (2024), findings showed that the students are aware of AI and do use it for academic purposes. The result of the study also showed that 233 respondents, representing 58.3%, used Snapchat AI for educational purposes. This also implies that in every 10 students at the Federal University Lokoja, 5 used Snapchat AI for academic purposes. The findings of this study further showed that students used Snapchat AI for assignments more compared to other aspects of their study. The data showed that 125 (31.3%) out of 400 students used AI for assignments, and 288 (72%) out of 400 respondents agreed that the use of Snapchat AI has

improved their knowledge of their course of study. The findings also revealed that 168 (42%) respondents believed that Snapchat AI improved their understanding of their course of study through simplification of topics, while 105 (26%) said that AI provides practical examples. This study did not examine whether or not students have received formal training in the use of AI for academic purposes. This result collaborated with the Ngonso et al. (2018) study on the influence of Twitter on the cognitive development of Nigerian students. In this study, the authors found that Twitter now 'X' very engaging and useful, which resulted in its everyday usage, increasing their knowledge, which aided their cognitive development. The researchers concluded that there is a significant positive relationship between the influence of Twitter and the cognitive development of youths and therefore recommended that institutions of higher learning in Nigeria should use Twitter as an educational and learning tool. Many of the respondents sadly expressed some negative consequences of the use of AI in school including encouraging examination malpractice, making students lazy to think thus reducing students' cognitive operations. AI encourages plagiarism in project writing thus leading to the production of future lecturers who may not be able to conduct authentic and credible researches. Many students bury themselves in entertainment AIs to the extent that they forget their studies; a bad study behaviour which leads them to accumulate to themselves.

CONCLUSIONS

Based on this study this researcher has drawn the following conclusions:

- AI has been embraced by Nigeria (including those studying software engineering). However, their level of embracing this technology is still low. They are still operating with the AIs dedicate to entertainment rather than the real teaching/learning AI platforms; though ChatGPT and SnapChat are gradually becoming popular among student.
- With the rapid improvement in AI technologies it is hoped that better and more student friendly AI platforms will soon emerge. As the problems that constrain AI use in Nigeria mitigate students' use of AI in learning will help improve students' learning not only in software engineering but also in other aspects of knowledge acquisition.
- There is that awareness in students of tertiary institutions that AI can be used for learning purposes; it is a matter of time before it becomes viral and universal in application. In consequence university authorities need to be proactive in removing the barriers to AI adoption and adaptation in school.
- There is a plethora of problems mitigating students' use of AI in learning software including inadequacy of expertise, inconsistent power supply, poor funding and poorly structures curriculum among others.

RECOMMENDATIONS

Based on this study the following recommendations were made:

- On admission into the university the university authorities should include in the introductory courses of 101s the use of AI to learn. This will help to give newly admitted students the right direction and the positive attitude to the use of AI for learning and thus reduces some of the abuses of AIs acquired through bad self-teaching and embracing of the kits.

- University lecturers should be forward looking in importing and introducing to their students current events in to academic world to their students whether they are in the curriculum or not. This will help to bridge the gap in the introduction of some of these technologies into our school system.
- Lecturers should give students assignments that would introduce them to the use of AI to do assignments. This would make the students to know the academic benefits of AI.
- Federal government should try as much as possible to remove the bottlenecks that stand on the way to optimising the use of AI in learning not only software engineering but all the school subjects in the school system.

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