UTILIZATION OF ARTIFICIAL INTELLIGENT-ENABLED SELF-DIRECTED LEARNING PLATFORMS BY ELECTRICAL/ELECTRONIC TECHNOLOGY EDUCATION STUDENTS IN PUBLIC UNIVERSITIES IN ANAMBRA STATE

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Abstract
This study assessed the utilization of AI-enabled self-directed learning platforms by students of electrical/electronic technology education in public universities in Anambra State. The research was guided by two research questions and one null hypothesis, which was tested at a 0.05 level of significance. The researchers adopted a descriptive survey research design. The participants were 126 male and female students of electrical/electronic technology education. The instrument for data collection was a structured questionnaire. The findings revealed that students are utilizing all the listed AI-enabled self-directed learning platforms. Also, the finding confirmed that there is no statistically significant difference in the mean ratings of male and female electrical/electronic technology education students in the level of utilization of AI-enabled self-directed learning platforms. Based on these findings, the study recommends that the ICT departments of public universities in Anambra State should organize comprehensive training through workshops and seminars to expose students and lecturers to more AI tools for effective delivery of instructions.

Keywords. Artificial intelligence, awareness, self-directed learning, technology education, utilization.

Introduction

Artificial Intelligence (AI) has emerged as a transformative force in various sectors. And according to Alkhasawneh (2025) Artificial intelligence (AI)-powered personalized learning systems are transforming education.

Machii, J., Murumba, J. & Micheni (2021) defined AI as a system's ability to correctly interpret external data, learn from such data, and use those learning to achieve specific goals and tasks through flexible adaptation. AI has revolutionized students' interactions, research assistance and academic support assisting them in conducting research, writing and solving problems (Mazin & Mohammed, 2024). It has revolutionized student interactions with education by generating instant, accurate, and contextually relevant information (Baidoo-Anu & Owusu Ansah, 2023). AI fundamentally enhance teaching methodologies and learning experiences, providing robust support for the development of personalized learning environments (Crompton & Burke, 2023). More importantly, AI is a tool used across subject disciplines, including engineering education (Shukla, Janmaijaya, Abraham & Muhuri, 2019).

Self-Directed Learning (SDL), at its core, refers to a process in which individuals take the initiative, with or without assistance, to diagnose their learning needs, set goals, identify resources, choose and implement strategies, and evaluate outcomes (Zawacki-Richter, Marin, Bond & Gouverneur, 2019). Self-directed learning (SDL) is an approach where individuals take the initiative to identify their learning needs, set goals, and choose learning methods, with or without the help of others. It includes developing dispositions that support motivation, self-regulation, perseverance, adaptability, and resilience. SDL also has become indispensable in equipping students with the necessary skills for lifelong learning, including adaptability, critical thinking, and problem-solving (Merriam & Baumgartner, 2020).

Awareness refers to the understanding or consciousness of a specific concept or technology. It involves recognizing its presence, relevance, and potential implications. According to Kaur and Bhardwaj (2017), awareness is a cognitive state that influences behavior and decision-making, suggesting that understanding a new tool can drive interest in its use. Okoro (2019) highlights that awareness is a critical first step toward technology adoption, as it shapes users' readiness and willingness to engage with innovations.

Utilization, in this context, refers to the effective application or use of Self-directed learning (SDL) platforms by learners in their educational pursuits. It encompasses how frequently and effectively students engage with the platforms to support their learning goals. Platforms like ChatGPT, Coursera, Khan Academy, Udemy, and EdX, where AI algorithms track progress and recommend content that best matches the learner's development enable students to engage in a more autonomous, adaptive learning process, which is particularly beneficial for fields like electrical/electronic technology education.

Technology education students require both hands-on practice and theory, these platforms offer an invaluable opportunity to enhance their competencies through simulations, real-time feedback, and interactive modules that replicate real-world technical scenarios. AI enabled self-directed learning platforms have demonstrated transformative potential, particularly in offering personalized feedback, tailoring content to meet individual learning preferences, and providing the flexibility necessary for students to manage their learning experiences autonomously (Zawacki-Richter et al., 2019).

To keep abreast of global reality in technological advancement therefore, students of electrical/electronic technology education students in public universities in Anambra State need to be aware and even use AI self-directed learning platforms, hence the study.

Statement of the Problem

AI-enabled self-directed learning platforms have emerged as a potential solution, offering adaptive and personalized learning experiences that can bridge the gap between classroom instruction and industry demands. Despite the promising capabilities, many students remain unaware of the opportunities these platforms offer, even those who are aware may lack the digital literacy skills or institutional support needed to effectively utilize them.

This study therefore examines how students of electrical/electronic technology education in public universities in Anambra State are using Artificial Intelligence (AI)-enabled self-directed learning platforms.

Theoretical Underpinning

This study is hinged on the Malcolm Knowles' Self-Directed Learning (SDL) theory. This theory, proposed by Knowles in 1975, provides a framework for understanding how learners take control of their own learning processes. The central idea of Knowles' theory is that learning is not merely something delivered by an educator but a process in which learners take ownership and responsibility. Knowles posited that as individuals mature, they transit from being dependent learners to becoming more self-directed, taking greater initiative in diagnosing their learning needs, setting learning goals, identifying resources, and evaluating their progress.

One of the key aspects of Knowles' theory is learner autonomy, where students move away from dependence on instructors and toward self-directed engagement with content. This aligns directly with the use of AI-enabled platforms, which offer a range of resources that students can utilize independently. AI platforms, designed to adapt to individual learners' pace and progress, allow students to take control of their learning journey, which is a hallmark of Knowles' SDL theory. Furthermore, the theory emphasizes intrinsic motivation, where learners are driven by personal satisfaction and achievement, a factor that is vital in ensuring the effective use of AI-enabled platforms. These platforms can provide instant feedback and personalized learning paths, which can enhance motivation as learners see the immediate impact of their efforts.

Another important element of SDL is the ownership of learning, which requires students to actively diagnose their learning needs and organize their learning processes. This is particularly relevant for electrical/electronic technology education students, who need practical and technical skills that often require more hands-on, personalized approaches. AI-enabled platforms provide students with the flexibility to tailor their learning experiences to their specific needs, accessing resources that are most relevant to their fields of study. This form of learning is consistent with Knowles' view that self-directed learners are responsible for selecting learning strategies and resources, making AI platforms a modern embodiment of SDL principles.

Purpose of the Study

The study sought to achieve the following objectives:

1. Assess the level of awareness of AI-enabled self-directed learning platforms among electrical/electronic technology education students in public universities in Anambra State.
2. Assess the level of utilization of AI-enabled self-directed learning platforms among electrical/electronic technology education students in public universities in Anambra State.

Research Questions

The following research questions guided the study:

1. What is the level of awareness of AI-enabled self-directed learning platforms among electrical/electronic technology education students in public universities in Anambra State?
2. What is the level of utilization of AI-enabled self-directed learning platforms among electrical/electronic technology education students in public universities in Anambra State?

Hypothesis

Ho_1: There is no significant difference in the level of utilization of AI-enabled self-directed learning platforms by male and female electrical/electronic technology education students in public universities in Anambra State.

Methods

The design of this study was a descriptive survey. A descriptive survey research design was considered appropriate for the study because the study examined current situations affecting electrical/electronic technology education students and it involved the use of a structured questionnaire to elicit information, which was later analyzed. The population consisted of 126 electrical/electronic technology education students chosen from public universities that offer electrical/electrical technology education in Anambra State. Census sampling technique was used. The male students participated more in the study with 89 representing 70.6% while their female counterpart was 37 representing 29.4%. The instrument for data collection was a structured questionnaire which were adapted from other studies after extensive literature review. The instrument was structured on a five-point Likert rating scale of: Strongly Agree (SA) = 5, Agree (A) = 4, Undecided (U) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1. It was validated by three experts, two experts from the Faculty of Technology and Vocational Education and one expert from Faculty of Education, Nnamdi Azikiwe University, Awka. The Cronbach alpha reliability coefficient was computed and the results obtained values of 0.73 and 0. 74 respectively. Data were collected by the researchers with the help of two research assistants. Data collected were analyzed using descriptive statistics of arithmetic mean to answer the research questions while the hypothesis was tested using z-test.

Results

The results of the statistical data analysis are presented in line with the research questions and corresponding hypothesis as shown in Table 1. 2 and 3.

Research Question 1. What is the level of awareness of AI-enabled self-directed learning platforms among electrical/electronic technology education students in public universities in Anambra State?

Table 1: *Respondents' mean rating on awareness of AI-Enabled self-directed learning platforms*

S/N	Awareness of AI-Enabled Self-Directed Learning Platforms:	Mean	Remarks
1	I am familiar with ChatGPT and the features	4.62	Agree
2	I am aware of Coursera's AI-powered learning paths.	3.48	Agree
3	I understand the features and benefits of edX's AI-driven courses.	3.06	Agree

4	I know how to access Udemy's AI-enabled platform.	3.18	Agree
5	I am familiar with Khan Academy's AI-powered adaptive learning tools.	3.02	Agree
6	I have knowledge of LinkedIn Learning's AI-enabled platform.	3.27	Agree
7	I understand Google Classroom's AI-powered learning environment.	4.51	Agree
8	I am aware of Simulation Studios' AI-driven simulation tools.	4.39	Agree
9	I know about LabXchange's AI-powered virtual labs.	3.42	Agree
10	I understand Pluralsight's AI-enabled platform	3.02	Agree
	Grand Mean	**3.60**	**Agree**

N =126

The result of data analysis presented in Table 1 show that all the 10 items had mean range of 3.02 to 4.62. This implies that students of electrical/electronic technology education in public universities in Anambra State are aware of all the listed AI-enabled self-directed learning platforms.

Research Question 2. What is the level of utilization of AI-enabled self-directed learning platforms among electrical/electronic technology education students in public universities in Anambra State?

Table 2: *Respondents' mean rating on utilization of AI-enabled self-+directed learning platforms.*

S/N	AI-Enabled Self-Directed Learning Platforms.	Mean	Remarks
11	I frequently engage with ChatGPT's AI-powered learning environment.	4.51	Strongly Agree
12	I regularly use Coursera's AI-powered learning paths.	3.90	Agree
13	I frequently access edX's AI-driven courses for technology and creative skills.	3.21	Agree
14	I often utilize Udemy's AI-enabled platform for skill development.	3.19	Agree
15	I consistently use Khan Academy's AI-powered adaptive learning tools.	3.81	Agree
16	I regularly utilize LinkedIn Learning's AI-enabled platform.	3.91	Agree
17	I frequently engage with Google Classroom's AI-powered learning environment.	4.23	Agree
18	I often use Simulation Studios' AI-driven simulation tools.	4.24	Agree
19	I regularly access LabXchange's AI-powered virtual labs.	3.74	Agree
20	I frequently utilize Pluralsight's AI-enabled platform.	3.01	Agree
	Grand Mean	**3.78**	**Agree**

The results of data presented in Table 2 show data of utilization of AI-enabled self-directed learning platforms among electrical/electronic technology education students in public universities in Anambra State. All the 10 items had mean range of 3.05 to 4.51. This implies that students of electrical/electronic technology education in public universities in Anambra State are utilizing all the listed AI-enabled self-directed learning platforms.

Hypothesis 1. There is no significant difference in the level of utilization of AI-enabled self-directed learning platforms by male and female electrical/electronic technology education students in public universities in Anambra State.

Table 3: z-test Summary of Mean Rating of Male and Female Students on level of utilization of AI-enabled self-directed learning platforms.

Group	N	$\overline{X}$	SD	df	z-cal	z-critical	Remark
Male Students	89	3.70	2.80	124	0.23	1.96	Accepted
Female Students	37	3.78	0.99				

Table 3 presented the z-test summary of the mean rating values of male and female students on level of utilization of AI-enabled self-directed learning platforms.
The mean for male students was 3.70 and that of female students was 3.78. The standard deviations were 2.80 and 0.99 respectively. The calculated z-value was 0.23 and the critical z-value was 1.96.
Since the calculated z-value of 0.23 is less than the critical z-value of 1.96 at 0.05 level of significance, the hypothesis is therefore accepted. This means that there exists no significance difference in the mean ratings of male and female students on the level of utilization of AI-enabled self-directed learning platforms in public universities in Anambra State.

Discussion and Implication

The high level of awareness of popular platforms such as ChatGPT, Google Classroom, Simulation Studios and Coursera suggest that students are familiar with widely recognized AI-enabled learning platforms. This is consistent with Das, Poi & Saxena (2025) and Vieriu & Petrea (2025), their studies both reported increase in the awareness of AI-enabled learning platforms among students. However, Pluralsight was the lowest rated AI-enabled self-directed learning platforms. Perhaps it is not as popular as others in public universities in Anambra State. This indicates a need for increased exposure to lesser-known platforms in public universities in Anambra State.
The results of data presented in Table 2 show that students of electrical/electronic technology education in public universities in Anambra State are utilizing all the listed AI-enabled self-directed learning platforms. ChatGPT, Google Classroom and Simulation studio are mostly used with mean ratings of 4.51, 4.24 and 4.23 respectively. This is in consonant with Das, Poi & Saxena (2025) and Vieriu & Petrea (2025) that reported increasing adoption of AI-enabled learning platforms among students. Also, Table 3 revealed that there exists no statistically significant difference at the significance level (a = 0.05) in the mean ratings of male and female electrical/electronic technology education students in the level of utilization of AI-enabled self-directed learning platforms in public universities in Anambra State.

Conclusion

From data analysis and previous literature review, this research paper has established that electrical/electronic education students in public universities in Anambra State are aware and even utilized the listed AI platforms. The study provides valuable insights into the potential of how AI-enabled self-directed learning platforms could engage students of electrical/electronic education in a more individualized, self-directed, and flexible learning in public universities in Anambra State.

Recommendations

Based on the findings of this study, the following recommendations were made:
1. The ICT departments of public universities in Anambra State should organize comprehensive training through workshops and seminars to expose the students to more AI tools for effective delivery of instructions.

2. Lecturers should communicate and utilize some AI tools effectively with their students to create more awareness among them.

References

Abba U. E., Ezekwe E. A. and Anamelechi O. N. (2023). Improving Performance among Academic Staff of Nigerian Universities through Information & Communication Technology (ICT). *Central Asian Journal of Innovations on Tourism Management and Finance,4(9),*150-160. https://cajitmf.centralasianstudies.org/index.php/CAJITMF/article/view/608

Alkhasawneh, S. (2025). AI-Driven Personalized Mathematics Learning Through Interactive Mobile Platforms: Effects on Achievement and Motivation. *International Journal of Interactive Mobile Technologies (IJIM), 19(13),* 33–54.

Ajayi, T. and Ojo, A. (2022). Barriers to Technology Adoption in Nigerian Higher Education: Challenges and Opportunities. *African Journal of Educational Research, 14(2),* 45-58.

Bai, X. (2020). Artificial Intelligence in Education: Exploring the Impact on Personalized Learning. *Journal of Educational Technology & Society, 23* (3), 56-67.

Baidoo-Anu, D. and Owusu Ansah, L. (2023). *Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning*. Available at SSRN: https://ssrn.com/abstract=4337484

Bartneck, C. (2021). *An Introduction to Ethics in Robotics and AI*. In Springer Briefs in Ethics. https://doi.org/10.1007/978-3-030-51110-4_2.

Crompton H, and Burke D (2023). Artificial Intelligence in Higher Education: The State of the Field. *International Journal of Educational Technology in Higher Education. 20(1)*:22. https://doi.org/10.1186/s41239-023-00392-8.

Das, S., Poi, S. and Saxena. (2025). Adoption and Impact of AI-Enhanced Learning Platforms in Education. *Forum for Education Studies. 3(1):1696.* https://doi.org/10.59400/fes1696.

Kaur, M. and Bhardwaj, N. (2017). Understanding Technology Awareness and Adoption. *Journal of Educational Technology, 12*(4), 58-67.

Machii, J., Murumba, J. and Micheni, E. (2021). *Predictive Analytics and Artificial Intelligence in Blended Learning: A new Dawn for Institutions of Higher Learning*. In M. Cunningham & P. Cunningham (Eds.), IST-Africa 2021 Conference Proceedings (pp. 1–14). IST-Africa Institute and IIMC.

Mazin, S. S. J. and Mohammed, J. Y (2024). The Impact of AI Tools on Education: ChatGPT in Focus. *Artificial Intelligence & Robotic Development Journal. 4(3).* 314-336.

Merriam, S. B. and Baumgartner, L. M. (2020). Learning in Adulthood: A Comprehensive Guide (4th ed.). *Jossey-Bass.*

Okoro, A. N. (2019). Technology Awareness as a Predictor of Adoption Behavior. *Nigerian Journal of Educational Research, 15*(2), 112-120.

Shukla, A. K., Janmaijaya, M., Abraham, A. and Muhuri, P. K. (2019). Engineering Applications of Artifitial Intelligence: A Bibliometric Analysis of 30 years (1988-2018). Engineering Application of Artificial Intelligence. 85, 517532. https://doi.org/10.1016/j.engappai.2019.06.010

Vieriu, A. M. and Petrea, G. (2025). The impact of Artificial Intelligence (AI) on Students' Academic Development. *Education Science. 15(3),* 343. https://doi.org/10.3390/edusci15030343.

Zawacki-Richter, O., Marin, V. I., Bond, M. and Gouverneur, F. (2019). Systematic Review of Research on Artificial Intelligence Applications in Higher Education–Where are the Educators? *International Journal of Educational Technology in Higher Education, 16(39).* https://doi.org/10.1186/s41239-019-0176-8