



ASSESSING STUDENTS' USE OF ARTIFICIAL INTELLIGENCE FOR ACADEMIC PURPOSES IN NIGERIAN UNIVERSITIES: IMPLICATIONS FOR EDUCATORS AND POLICY-MAKERS

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Abstract

The use of artificial intelligence (AI) in education is an interesting concept which is meant to revolutionize and improved capabilities of students and educators to carry out their responsibilities more effectively and efficiently. This study assesses the level of awareness, perceptions and use of AI for academic purposes among the students of the Faculty of Education, University of Nigeria, Nsukka. Four research questions and three hypotheses guided the study. Structured questionnaire was developed and administered to a total of 336 students randomly selected from the faculty while adopting cross-sectional survey design. The data were analyzed using frequencies, percentages, means, standard deviation for the research questions while ANOVA and t-test were employed as statistical test of significance for the hypotheses. The awareness of AI tools for education purposes is low among the students and generative AI like ChatGPT is the most used for academic purposes. The perception is positive but with reservations about the impact on the originality of academic outputs, transparency and ethical issues. At 0.05 level of significance, students' perception and use of AI tools is not influenced by year of study while there is significant difference ($p < 0.05$) in AI awareness level due gender. The males have higher level of awareness than the females. Control and censorship structures is needed from educators and policy-makers for effective management of the use of AI for academic purposes.

Keywords: Artificial Intelligence; AI tools, awareness; learning; perception; use of AI

Introduction

Artificial intelligence (AI) has emerged as a pivotal technology with the potential to revolutionize how we live, work and learn. The use of AI in education is an interesting concept and has considerably improved educators' capacities, allowing them to carry out their responsibilities more effectively and efficiently (for example, lesson planning or instruction). One notable area of influence is the provision of curriculum-aligned content that is precisely personalized to fit the specific requirements and competencies of individual learners (Chassignol et al., 2018; Chai et al., 2020). It is amazing to think that what was once considered to be unthinkable some decades ago has now become well accepted in academic institutions all across the globe, and students are now permitted to use technology within the classroom (Popenici, 2017).

AI is a computer science field dedicated to developing computer systems that can learn and perform tasks traditionally requiring human intelligence. According to Russell & Norvig, (2016), Artificial Intelligence (AI) encompasses the development of computer systems capable of executing tasks typically necessitating human intelligence, such as decision-making, visual perception, and language translation. For Buabbas et al. (2023), AI means making machines capable of simulating intelligence by giving computer human-like capabilities, such as understanding, reasoning, and problem solving. Artificial intelligence is the simulation of human intelligence processes by machines, including learning, reasoning, and decision-making for efficient delivery of services geared towards effective development of a society.



However, education serves as a fundamental tool for personal and societal development, fostering critical thinking, creativity, and essential capabilities for individuals to thrive in a continuous evolving world. In the words of Sugata (2021), Education is the process of facilitating self-organized learning environments where students collaboratively solve problems, explore topics of interest, and develop critical thinking skills in an open-ended, inquiry-driven manner. Zhao (2020) defined education as the empowerment of students to take charge of their own learning, fostering an environment where they develop the skills and mind-set to pursue their passions, adapt to changing circumstances, and contribute meaningfully to society. Education operationally is the process that involves the acquisition of knowledge, skills and values through instructional methods within formal institutions or informal settings by individuals known as learners or students.

Students are engaged in the pursuit of knowledge within an educational framework so as to discover themselves and be useful to the society. They actively participate in learning activities, seeking to acquire new information, develop skills, and deepen their understanding of various subjects (Jones, 2020). How students see and experience their education significantly impacts the learning process. Since they are directly involved in the learning process, their opinions matter a lot in shaping how education is taught. By listening to students, educators and those who make educational decisions can create teaching methods that better fit the different needs and goals of each learner.

The perception of students regarding the use of Artificial Intelligence (AI) in education varies considerably. While some students see AI like the ChatGBT, Gemini, and aiBard as valuable tools that can improve their learning experience by providing personalized support and feedback, others express concerns about the potential drawbacks and ethical implications associated with AI in education. In the words of Idroes et al. (2023) students show positive perception on the use of AI on their everyday learning process. For those students, AI is viewed as a beneficial tool that can enhance their learning journey through personalized content and targeted assistance. AI-based systems can analyze individual strengths and weaknesses, offering tailored feedback and recommendations to help students stay engaged and motivated. These students also appreciate how AI can help them manage their time and tasks more effectively, organizing schedules, tracking progress, and improving overall academic performance through better time management skills.

Conversely, other students approach the use of AI in education with skepticism. They worry that AI may replace human teachers and diminish the value of human interaction in learning. According to Gherheş and Obrad (2018), students believe that they had a below-average level of knowledge about AI. There are concerns about potential biases and errors in AI assessments, leading to unfair evaluations and potential educational inequalities. Ethical considerations, such as data privacy and security, are also on the minds of students who fear their personal information could be misused or shared without consent. Additionally, fears exist about the impact of AI on job security within the teaching profession, with some students concerned about possible automation of teaching tasks leading to decreased demand for human educators.

The level of awareness, perception and level of use of AI among the students of the Faculty of Education has not been evaluated to gain insight on the students use and perception of AI in enhancing teaching and learning in a rapidly evolving and technologically revolutionized education purview. Therefore, the aim of this study is to empirically evaluate the level of awareness, use and perceptions about AI among the students of the Faculty of Education, University of Nigeria, Nsukka, Nigeria. The specific objectives of the study include: 1). To ascertain the level of awareness of the students about AI as a tool to enhance teaching and learning; 2). To ascertain the level of use of AI by the students for academic purposes; 3). To determine the students' perceptions about the use of AI in learning and research in the education system; and 4). To ascertain the challenges facing the students in adopting and accessing AI for learning and research. The following hypotheses aided in achieving the objectives of the study: 1). There is no significant difference in the students' awareness of AI as research and learning tool by gender; 2). There is no significant difference in the mean use AI by the students for



academic purposes due to year of study; 3). There is no significant difference in the mean perception of the students about AI for academic purposes due to year of study.

Theoretical Framework

The theory of connectivity was adopted in this study. The theory of connectivity was developed by Carreño (2014) to overcome the limitations of behaviorism, cognitivism and constructivism theories in fast evolving digital age in education. The theory, considering technological advancements in the education, posits that learning occurs distributed within a network, social, technologically enhanced, recognizing and interpreting adaptive patterns. The theory focuses on complex learning, rapid changing cores and diverse knowledge sources. The theory's inclination to technological advancement in learning aligns with the focus of the study on Artificial Intelligence for educational learning and research. The study also adopted the online collaborative learning theory (OCL) proposed by Linda Harasim in 2012 (Harassim, 2012). The online collaborative learning theory focuses on the facilities of the Internet to provide learning environments that foster collaboration and knowledge building (Picciano, 2017). Harassim (2012) described the OCL theory as a new theory of learning that focuses on collaborative learning, knowledge building, and Internet use as a means to reshape formal, non-formal, and informal education for the 'Knowledge Age'. The disposition of the OCL theory to collaborative internet learning which is associated to the AI assisted learning justified its adoption to guide the study.

Materials and Method

The cross-sectional survey design was adopted for the study. The cross-sectional survey design is a type of survey design in which the observation of variables during data collection is performed the same time on participants selected based on inclusion and exclusion criteria (Zangirolami-Raimundo et al., 2018). Cross-sectional survey designs are very useful in population-based and clinical-based survey studies (Cvetkovic-Vega et al., 2021). The study population is made up of all the 9,875 students of the Faculty of Education, University of Nigeria, Nsukka. The total sample size of 388 students for the study was obtained using the G-Power software version 3.1.9.4 for sample size determination with effect size of 0.252, probability of 0.05 and power of 0.951. The students were randomly drawn from the list of students of the faculty available at Academic Planning Unit of the University using systematic sampling method with a random start of 25 and sampling interval of 67. The selected students' contact phone numbers and e-mail addresses were obtained through which they were contacted in informed about the inclusion in the study. Out of the 388 students, 52 declined participating in the study while 336 accepted to participate. Therefore, 336 students made up the final sample for the study.

The instrument for data collection is a well-structured questionnaire. The questionnaire comprised of five components: the socio-demographic questionnaire, the awareness of AI questionnaire, the students' perception of AI questionnaire, students' use of AI questionnaire and challenges in use of AI questionnaire. The demographic characteristics of interest include age, sex (male/female), age, marital status, department, residence (on/off-campus), and number of people in the room. The instrument is divided into five distinct sections, made up of the five distinct questionnaires. Section A is the socio-demographic questionnaire; Section B is the AI awareness questionnaire; Section C contains the AI perception questionnaire; Section D is Use of AI questionnaire and Section E contains Challenges questionnaire. All the questionnaire items that make up Sections B to E have Likert-type response options. Items in Sections B and D are four-point Likert scale items with options as 'very high extent', 'high extent', 'moderate extent' and 'low extent' numerically coded from 4 to 1, respectively. Items in Sections C and E have five-point Likert with options as 'Strongly agree', 'agree', 'undecided', 'disagree', 'strongly disagree' and numerically coded from 5 to 1, respectively. All the questionnaire items were developed by the researcher with in-depth literature reviewed in line with the pertinent objectives of the study. The instrument has a Cronbach's alpha coefficient of 0.89, indicating reliability. The research questionnaires were distributed to the participants through face-to-face data collection to



increase the number of responses, minimize errors and missing data and increase the quality of data. Out of the 336 distributed questionnaires, a total of 333 were retrieved while 3 were lost to unit non-responses. The results of the study, following the analysis of the quantitative data, are presented in this section in line with the objectives of the study.

The participants were duly informed of the reasons for the study, taking time to explain the study objectives, expected outcomes and how the study will impact learning, policy actions and implementation. The participants were informed that participation in the study was completely voluntary and that a participant has the right to withdraw at any stage in the study without attracting any penalty. Assurances were given on the protection of the privacy of the respondents and this was demonstrated by ensuring responses were completely anonymized. To ensure comprehension and voluntary participation, consent was sought from the participants through informed consent form which was distributed to the students, completed, signed and returned by each of the selected participants prior to the administration of the study questionnaire.

The quantitative data obtained for this study were analyzed using frequencies, percentages, means, standard deviation for the research questions while ANOVA and T-test were employed as statistical test of significance for the hypotheses. Items in Sections B and D were graded on a four-point Likert scale and have mean cut-off score of 2.50 such that mean responses from 2.50 and above were considered 'high extent' while mean scores below 2.50 were considered 'low extent'. Likewise, items in Sections C and E which were graded on a five-point Likert scale, having mean cut-off score of 3.00 such that mean responses from 3.00 and above were considered 'agree' while mean responses below 3.00 were considered 'disagree'. All the statistical tests of significance for the three hypotheses were conducted at 0.05 level of significance. A p-value less than 0.05 ($p < 0.05$) implied significant difference, leading to the rejection of the stated null hypothesis. The statistical analysis was facilitated using IBM SPSS version 26.

Results

Demographic Characteristic of Respondents

The summary of the demographic characteristics of the student participants is presented in Table 1. The table revealed that 70.1% of the respondents are at most 25 years and the average age of 23.2 years with 3.88 years standard deviation. Majority (76.3%) of the students are single while only 16.5% are married and 7.2% are in a relationship leading to marriage. There were more female respondents (70.0%) than the males (30.0%) while the majority are in their third academic year. Only 15.9% of the respondents are in their first year while 24.6% are in final year. Most of the respondents were drawn from Arts Education (24.9%), followed by Science Education (21.3%) and Social Science Education (20.4%); Home Economics Education had the least representation (10.5%). Also, 59.8%, which is the majority of the respondents live off-campus while only 40.2% live inside the university (on-campus). Moreover, majority of the students involved in the study lived with more than three roommates in their rooms while 20.6% indicated living with their parents or guardians on-campus or off-campus.

**Table 1:** Distribution of the Demographic Characteristics of the Respondents

Socio-Demographic Factors		Frequency	Percent	Cumulative Percent
Age of respondents	16-20 years	96	28.9	28.9
	21-25 years	137	41.2	70.1
	26-30 years	86	25.8	95.9
	More than 30 years	14	4.1	100.0
	Mean age (Std Dev.)	23.2 years (3.88 years)		
Marital status	Single	254	76.3	76.3
	Married	55	16.5	92.8
	In a relationship leading to marriage	24	7.2	100.0
Gender	Male	100	30.0	30.0
	Female	233	70.0	100.0
Year of study	First year	53	15.9	15.9
	Second year	86	25.8	41.7
	Third year	113	33.9	75.6
	Fourth year	82	24.6	100.0
Department	Educational Foundations	43	12.9	12.9
	Home Economics Education	35	10.5	23.4
	Social Science Education	68	20.4	43.8
	Arts Education	83	24.9	68.7
	Science Education	71	21.3	90.0
	Adult Education	33	10.0	100.0
Place of residence	On-campus	134	40.2	40.2
	Off-campus	199	59.8	100.0
Type of accommodation	Live with parent(s)/guardian	69	20.6	20.6
	Live alone in a room	55	16.5	37.1
	Live with a roommate	58	17.5	54.6
	Live with more than three roommates	151	45.4	100.0

Level of Awareness of AI

The level of awareness of the student respondents of the use of Artificial Intelligence (AI) for educational learning and research were summarized in Table 2. The results show that the students are, to high extent, aware of DALL-E (for image generation, mean = 2.55, SD = 0.94), DeepL (for translation, Mean = 2.67, SD = 1.01), Google bard (chatbot, mean = 2.64, SD = 0.54), Photoshop Beta (for image editor, mean = 2.65, SD = 1.12), Bing AI (AI search, mean = 3.01, SD = 0.91), Grammarly (grammar correction, mean = 3.87, SD = 0.43) and ChatGPT (chatbot, mean = 4.02, SD = 0.33). The overall mean level of awareness is 2.40 with standard deviation of 0.55, which implies that the overall level of awareness of AI tools for academic learning and research is low among the students of Faculty of Education, University of Nigeria, Nsukka.



Table 2: Mean Awareness Level of the Students on Use of Artificial Intelligence for Academic Learning and Research

To what extent are you aware of these AI tools for academic purposes?	Mean	Std. Dev.	Decision
Elevenlabs (text-to-speech generator)	1.47	0.52	Low Extent
DALL-E (image generation)	2.55	0.94	High Extent
PhotoMath (solving maths equations through image recognition)	1.44	0.47	Low Extent
Perplexity (research assistance for summarizing research papers)	1.04	0.11	Low Extent
Whisper (speech-to-text transcription)	2.29	1.03	Low Extent
Wolfram Alpha (knowledge engine for solving maths problems)	1.11	0.21	Low Extent
DeepL (translation of text)	2.67	1.01	High Extent
Google Bard (chatbot)	2.64	0.54	High Extent
Photoshop Beta (AI photo editor)	2.65	1.12	High Extent
Bing AI (AI enhanced search engine)	3.01	0.91	High Extent
Midjourney (image generation and modification)	2.45	0.66	Low Extent
Grammarly (grammar correction and writing enhancement)	3.87	0.43	High Extent
ChatGPT (chatbot)	4.02	0.33	High Extent
Github Copilot (programming assistance)	2.43	1.04	Low Extent
Overall	2.40	0.55	Low Extent

The t-test results for the mean level of awareness of AI tools by the male and female students are presented in Table 3. The t-test is 2.003 with p-value of 0.051. Since the p-value is less than 0.05 ($p < 0.05$), the hypothesis is rejected, which implied that there is significant difference in the mean level of awareness of the male and female students about AI tools. The male students had higher level of awareness of the AI tools than the female students.

Table 3: T-Test Results for Level of Awareness by Gender

Gender	N	Mean	Std Dev	df	T-value	P-value	Decision
Male	100	2.48	0.59	331	2.003	0.049	Not significant
Female	233	2.29	0.71				

Students' Perception of AI

The results of the analysis of the students' perception about the use of AI technology to enhance academic learning and research were presented in Table 3. With the mean values exceeding the 3.00



cut-off mean score, the results indicate that the students agreed that the use of AI tools for academic purposes will make learning stress free and will enhance studies and academic performances. Also, the results show that the students have serious concerns about the adoption of AI tools in learning and research. The students agreed that using AI tools to do assignments will undermine the value of university education (mean = 4.41, SD = 0.52) and will limit the opportunities to interact with others and socialize with others while completing coursework (mean = 4.35, SD = 0.94). There are also concerns that use of AI technologies will hinder development of skills such as teamwork, problem-solving, and leadership skills (mean = 4.41, 0.47) and it will also make students over-reliant on AI for studies, diminishing individual mental and cognitive development (mean = 3.17, SD = 0.52). The students agreed to concerns about accuracy and transparency of research data and research outcomes (mean = 3.29, SD = 0.15) and also issues of data privacy and violation of research ethics (mean = 3.58, SD = 0.17). Furthermore, the students agreed to the concerns about AI hindering students' intellectual development (mean = 4.41, SD = 0.64), and affecting career prospects by reducing chances of getting a job (mean = 3.35, SD = 0.23) However, the students disagreed that AI will not align with human values, becoming a danger to human value system (mean = 2.11, SD = 1.29). With overall mean of 3.72, the perception students agreed to the benefits of AI and the serious concerns about the adoption of AI tools for academic purposes.

Table 4: Mean Perception of Students on Use of AI for Academic Purposes

Perception	Mean	Std. Dev.	Decision
Use of generative AI technologies such as ChatGPT to complete assignments undermines the value of university education.	4.41	0.52	Agree
Generative AI technologies such as ChatGPT will limit my opportunities to interact with others and socialize while completing coursework.	4.35	0.94	Agree
Use of AI technologies such as ChatGPT will hinder my development of generic or transferable skills such as teamwork, problem-solving, and leadership skills.	4.41	0.47	Agree
I can become over-reliant on generative AI technologies for my studies, diminishing individual mental and cognitive development.	3.17	0.52	Agree
The use of AI tools raises concerns about accuracy and transparency of the research data and outcomes.	3.29	0.15	Agree
The use of AI technologies raises concern about privacy and ethical issues in education and research.	3.58	0.17	Agree
I am worried that AI may hinder students' growth, skills, and intellectual development over time.	4.41	0.64	Agree
I am concerned about my career prospects that AI may take over my job in the future.	3.35	0.23	Agree
The use of AI will endanger human value system, will not align with human values and become a danger.	2.11	1.29	Disagree
AI tools will make learning stress-free and enjoyable	4.12	1.33	Agree
I will be confident using AI tools to enhance my studies and academic performances.	3.31	1.40	Agree
Overall	3.72	0.68	Agree



Table 5 presents the results of the one-way ANOVA for the perception of students of different years of study on the use of AI for academic purposes. The results showed that $F = 1.47$ and $p = 0.97$. Since the p -value is greater than 0.05 level of significance ($p > 0.05$), there is no significant difference in mean perceptions of the students from the different years of study on the use of AI tools for academic purposes in the university. This implies that the perception of the students about the adoption of the innovative AI tools for learning and research does not differ from one academic year to the other. The perceptions were the same.

Table 5: Results of One-Way ANOVA for Perception by Year of Study

Source of variation	Sum of Squares	df	Mean Square	F-value	P-value	Decision
Year of study	35.270	3	11.757	1.47	0.93	Not significant
Error	2635.197	329	8.010			
Total	2635.467	332				

Students' Extent of Use of AI

Table 6 shows that extent/level of use of AI tools for academic purposes by the students of the Faculty of Education, University of Nigeria, Nsukka. The results show that only Photoshop Beta (mean = 2.59, SD = 1.06), Bing AI (mean = 2.81, SD = 0.77), DeepL (mean = 2.59, SD = 1.48), Grammarly (mean = 2.66, SD = 0.91), and ChatGPT (mean = 3.71, SD = 0.67) were the AI tools used by the students for academic purposes. The overall mean usage score is 2.05, which clearly shows that the students use AI tools to low extent for academic learning and research.

Table 6: Mean Extent of Students' Use of AI for Academic Purposes

To what extent do you use any these AI tools for academic purposes?	Mean	Std. Dev.	Decision
Elevenlabs (text-to-speech generator)	1.09	0.44	Low Extent
DALL-E (image generation)	2.11	0.24	Low Extent
PhotoMath (solving maths equations through image recognition)	1.23	0.59	Low Extent
Perplexity (research assistance for summarizing research papers)	1.10	0.54	Low Extent
Whisper (speech-to-text transcription)	2.02	0.98	Low Extent
Wolfram Alpha (knowledge engine for solving maths problems)	1.09	0.43	Low Extent
DeepL (translation of text)	2.59	1.48	High Extent
Google Bard (chatbot)	2.49	0.78	Low Extent
Photoshop Beta (AI photo editor)	2.59	1.06	High Extent
Bing AI (AI enhanced search engine)	2.81	0.77	High Extent
Midjourney (image generation and modification)	2.11	0.88	Low Extent
Grammarly (grammar correction and writing enhancement)	2.66	0.91	High Extent
ChatGPT (chatbot)	3.71	0.67	High Extent
Github Copilot (programming assistance)	2.15	1.17	Low Extent
Overall	2.05	0.76	Low Extent



The extent of students' use of AI tools for academic purposes considering their year of study was analyzed using one-way analysis of variance (ANOVA) and the results were summarized in Table 7. From the table, $F = 2.454$ and $p = 0.06$. Since the p -value is greater than the 0.05 level of significance ($p > 0.05$), the null hypothesis was rejected, indicating there are no significant differences in the mean level of use of AI tools according to the students' year of study. This implied that the low level of use of AI tools is consistent across academic levels of the students.

Table 7: One-Way ANOVA for Students' Level of Usage of AI for Academic Purposes

Source of variation	Sum of Squares	df	Mean Square	F-value	P-value	Decision
Between Groups	58.854	3	19.618	2.454	0.06	Not significant
Within Groups	2629.948	329	7.994			
Total	2688.802	332				

Challenges to Students' Use of AI

The challenges faced by the students in adopting AI tools for academic purposes are presented in Table 5. With overall mean score of 3.27, which is greater than the 3.00 cut-off mark, the students agreed that, generally, they face challenges in their adoption of AI tools for academic purposes. The students agreed that they have no assurance about their data privacy and online security (mean = 3.47, SD = 0.52), there is limited accessibility to the AI tools (mean = 3.41, SD = 0.47) and the lecturers are inadequately prepared to cope with the challenges of rapidly evolving AI technological advancements (mean = 3.29, SD = 0.55). The students also agreed that issues of ethics and transparency (mean = 3.88, SD = 1.17) and high cost of accessing AI tools (mean = 3.41, SD = 0.64) are other challenges in adopting AI tools to advance academic purposes.

Table 5: Mean Responses to Challenges of Students to the Use of AI

Challenges to Use of AI	Mean	Std. Dev.	Decision
I have no assurance about my data privacy and online security.	3.47	0.52	Agree
Limited ease of accessibility	3.41	0.47	Agree
Adapting to rapid technological advancements	3.17	0.52	Agree
Inadequate preparedness of lecturers to step up to the technological innovations brought by us of AI.	3.29	0.55	Agree
Issue that border on ethics and transparency in data collection and use.	3.88	1.17	Agree
High cost of adapting to the technological advancement especially in internet data availability.	3.41	0.64	Agree
Overall	3.27	0.68	Agree

Discussion

The results showed that there is generally low level of awareness of Artificial Intelligence (AI) tools for academic purposes among the students. The students were aware of only seven out of the fourteen (representing only 50.0%) of the indicated AI tools for learning and research. The AI tools known to the students include DALL-E, DeepL, Google bard, Photoshop Beta, Bing AI, Grammarly and ChatGPT. The findings by of this study corroborate the findings by Alimi et al. (2021) which showed



that majority of the students of universities in Kwara State, Nigeria, are not aware of AI tools for learning and research. Though Kwara State is in Southwest, Nigeria, the results are consistent with the findings, revealing the prevailing low level of awareness of AI tools for learning among university students. The findings also corroborated the research findings of a study by Balabdaui et al. (2024) which revealed that out of the 14 AI tools, the ETH Zurich university students were only familiar to high extent with Github Copilot, ChatGPT, Grammarly, Midjourney and Bing AI for teaching and learning. These indicate low level of awareness and familiarity with the AI tools for academic purposes.

The hypothesis revealed that there is significant difference ($p < 0.05$) between the mean awareness level among the male and female students of the universities in adopting AI tools for learning and researching. The mean awareness level of the male students was significantly greater than the mean awareness level of the female students, indicating the male students were more aware of the AI tools for learning and research than the female students of the Faculty of Education, University of Nigeria, Nsukka.

Students' perception of the use of AI for academic purposes shows that the students view AI as platform which enhance teaching and learning and also lead to improvement in academic performances. However, the students indicated that they were skeptical about the adoption of the AI tools in academics, expressing concerns on issues which border on data transparency and authenticity as well as issues of research ethics and research privacy. The students also expressed concerns about the AI limiting opportunities and forum for interaction with others, socializing, hindering development of generic skills, teamwork, problem-solving, and leadership skills, and intellectual development. The findings on the students' acknowledgement of the relevance AI tools for learning corroborate with Balabdaui et al. (2024) which revealed that a large number of students used ChatGPT to summarize papers or lecture materials, and they stated that these summaries are frequently better and understandable than the original. This does not rely on pre-trained knowledge, but on the tool's ability to calculate with words. Also, Chan and Hu (2024) corroborates these findings by insisting that the key uses of GenAI in higher education is to enhance students' learning experience through AI's ability to respond to user prompts to generate highly original output. Text-to-text AI generators can provide writing assistance to students, especially non-native English-speaking students. These clearly indicate that the overwhelming importance and usefulness of the AI in teaching and learning are acknowledged by the university students.

The concerns raised by the students about the use of AI to complete assignments, hinder skills development, interaction, teamwork, problem-solving, socializing, development leadership skills, etc. were line with the findings by Chan and Hu (2024). Chan and Hu (2024) revealed that there were significant concerns from university students about being over-reliant on AI, hinderances on skill development, growth, interactions, limitations to intellectual development, mental and cognitive development, etc. Their study further revealed that the students are skeptical about the use of AI as it may affect the values of the university education, which aligned with the findings of this study. Furthermore, the concerns on issues of trust and transparency agreed with the findings of Petricini et al. (2024) which revealed that students may adopt AI tools for use for cheating, plagiarizing, or otherwise practicing "academic misconduct" or "dishonesty, among others.

The results of the one-way ANOVA on the students' perception of use of AI tools for learning in the university according to year of study revealed that there was no significant difference between the mean responses of first year, second year, third year and final year students of Faculty of Education. Irrespective of year of study, the students raised similar concerns and acknowledged the importance of AI in learning in the university system. These indicate year all the students share the same optimism about use of AI tools and revealed the same concern about potential negative implications in the adoption of AI for academic purposes. However, these findings contradicted the findings by Buabbas et al. (2023) who revealed in their study that students' years of study have significant influence on their perceptions about adopting AI for academic purposes. Their study revealed that year three students



showed more concern about the ethical, developmental and the social limiting consequences of adopting AI, followed by year two students.

Analysis of the level of use of AI tools by the students for academic purposes revealed that there is low level of use among the students. The students only use Photoshop Beta for image and photo editing, Bing AI for browsing, DeepL for text translation, Grammarly for text corrections, and generative ChatGPT for coding and code understanding. These are indications of low level of use of AI tools among the students for their academic purposes. These findings contradicted the findings by Quinde et al. (2024) which reported high level of use of AI tools by college students for self-directed learning and self-management of their learning. Also, the findings made by Balabdaoui et al. (2024) are not in agreement the findings of this current study. Balabdaoui et al. (2024) revealed that high level of use of AI tools such as Github, Copilot and ChatGPT in advanced research and learning, pointing out their abilities with computer languages and the impact on basic programming teaching and learning. On the other hand, the findings by Alimi et al. (2021) among university students in Kwara State, Nigeria, revealed low level of use of AI tools for academic purposes among the students, which corroborate the findings of this study. It could be inferred that the low level of use AI tools among the university students has something to do we location. The students from more technologically advanced countries showed higher level of use of AI tools than university students from technologically disadvantaged countries like Nigeria.

The ANOVA results on the students' level of use of AI according to their year of study indicated no significant difference at $p > 0.05$, which shows that the low level of use of AI tools for academic learning and research recorded among the students had nothing to do with their year of study. The students, either in first year or final year, do not effectively use the available AI tools to enhance learning and research. These may be attributed to the challenges and negative perceptions of AI tools reported among the students.

Some of the challenges pointed out by the students in the use of AI for academic purposes include data privacy and safety; limited ease of accessibility; ability to adapt to the rapid technological advancement in learning and research by AI; ethical and integrity issues bordering on the transparency of data collection, use and outcomes and the cost. These show that the students face these challenges in their efforts to adopt AI tools for learning and research in academic. The findings of this study agreed with the findings by Quinde et al. (2024) who revealed the existence of challenges face by the college students in the use of AI tools for learning and self-directed research.

Conclusions

The students were aware of AI tools such as DALL-E, DeepL, Google bard, Photoshop Beta, Bing AI, Grammarly and ChatGPT. The male students showed higher level of awareness of the AI tools for academic purposes than the female students of the faculty. There is generally low level of awareness of AI tools for academic learning and research among the students of the Faculty of Education, University of Nigeria, Nsukka. The low level of awareness of the AI tools among the students is irrespective of year of study. There was no significant difference in their mean level of use of AI tools for academic purposes according to year of study. The students perceive AI to be vital in enhancing academic learning and research. the students view AI as technological innovation to make teaching and learning easier. However, the students have reservations about the long-term impact of AI on generic skill development, interaction and knowledge sharing among peers, over-reliant on AI, limitations to intellectual development, mental and cognitive development, etc. The students are skeptical about the use of AI as it may affect the values of the university education, diminish chances of job availability, compromise data transparency, research ethics and online security of users.

In general, this study has provided empirical evidence that the students' ability to explore digital resources such as AI tools for academic purposes is dependent on their awareness and perception of the AI innovative technologies. AI has shown capabilities to provide unique knowledge and information that are required to enhance teaching, learning and research in a highly technologically



evolving sophisticated intellectual sphere. Without adequate awareness and technological skill acquisition, low level of use and overwhelming negative perceptions and concerns about the AI technology will persist.

Implications for Educators and Policy-Makers

The education system globally has been revolutionized by the emergency of AI technologies to enhance teaching and learning in the university system. Educators are expected to put in place technological enhancement skill acquisition programmes which will enable the lecturers to acquire the requisite skills and knowledge to align with the current trend of technological revolutions brought about by AI. It is important that the university lecturers are up-to-date with modern technological innovations like the AI technologies in order not to play catch-up to their students.

There are obvious negative perceptions and worries about the adoption of AI tools for academic purposes in the university by the students. These worries are genuine and justified and require policy actions and implementations. There are worries about transparency, privacy, authenticity, intellectual property right and ethical issues. These findings emphasize the to foster ethical awareness and critical thinking skills among staff and students to responsibly navigate the ethical challenges associated with AI technologies. The findings of this study can inform the development of AI literacy curriculum which will be aimed at equipping students with the knowledge, skills, and ethical awareness needed to navigate AI-driven educational environments effectively. Policy-makers can use the findings of this study to make informed policies related to responsible integration of AI in education, ensuring equitable access to AI-driven educational tools and opportunities while addressing related concerns on ethics, privacy, and bias, as recommended by Santos et al. (2024). The findings of this study should be a springboard for further and future research, exploring students' evolving attitudes, perceptions, and knowledge with regards to AI in university education. Hence, longitudinal studies, qualitative interviews, and mixed-methods approaches may provide deeper insights into the dynamics of AI integration in academic settings.

References

1. Alimi, A.E., Buraimoh, O.F., Aladesusi, G.A., Babalola, E.O. (2021). University Students' Awareness of, Access to, and use of Artificial Intelligence for Learning in Kwara State, *Indonesian Journal of Teaching in Science*, 1(2), 91 – 104. <https://doi.org/10.17509/ijotis.v1i2.38014>.
2. Balabdaoui, F., Dittmann-Domenichini, N., Grosse, H., Schlienger, C. and Kortemeyer, G. (2024). A survey on students' use of AI at a technical university, *Discover Education*, 3, 51. <https://doi.org/10.1007/s44217-024-00136-4>.
3. Buabbas, A.J., Miskin, B., Alnaqi, A.A., Ayed, A.K., Shehab, A.A., Syed-Abdul, S. & Uddin, M. (2023). Investigating Students' Perceptions towards Artificial Intelligence in Medical Education. *Healthcare*, 11, pp. 1-16. <https://doi.org/10.3390/healthcare 11091298>.
4. Carreño, I.D.V.G. (2014). Theory of Connectivity as an Emergent Solution to Innovative Learning Strategies, *American Journal of Educational Research*, 2(2), 107-116. DOI:10.12691/education-2-2-7.
5. Chai, C.S., Wang, X. and Xu, C. (2020). An Extended Theory of Planned Behavior for the Modelling of Chinese Secondary School Students' Intention to Learn Artificial Intelligence. *Mathematics*, 8(11), pp. 1-18. <https://doi.org/10.3390/math8112089>.
6. Chan, C.K.Y. and Hu, W. (2023). Students' voices on generative AI: perceptions, benefits, and challenges in higher education, *International Journal of Educational Technology in Higher Education*, 20:43. <https://doi.org/10.1186/s41239-023-00411-8>.
7. Chassignol, M.; Khoroshavin, A.; Klimova, A. and Bilyatdinova, A. (2018). Artificial Intelligence trends in education: a narrative overview. 7th International Young Scientist Conference on Computational Science, *Procedia Computer Science*, 136:16–24.



8. Cvetkovic-Vega, A., Maguiña, J.A., Soto, A., Lama-Valdivia, j. and López, L.E.C. (2021). Cross-Sectional Studies, *Facultad de Medicina Humana*, 21(1), 179 – 185. DOI: 10.25176/RFMH.v21i1.3069.
9. Gherheş, V. and Obrad, C. (2018). Technical and Humanities Students' Perspectives on the Development and Sustainability of Artificial Intelligence (AI). *Sustainability*, 10(9), article no. 3066. <https://doi.org/10.3390/su10093066>.
10. Harassim, L. (2012). *Learning theory and online technologies*, Routledge/Taylor & Francis, New York.
11. Jones, A. (2020). The Role of Students in the Educational Environment. *Journal of Education Studies*.
12. Picciano, A.G. (2017). Theories and Frameworks for Online Education: Seeking an Integrated Model, *Online Learning*, 21(3), 166-190. DOI: 10.24059/olj.v21i3.1225.
13. Popenici, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education, Popenici and Kerr *Research and Practice in Technology Enhanced Learning*. DOI :10.1186/s41039-017-0062-8.
14. Quinde, G.A.L., Muñoz, M.Y.T., Suárez, J.M.R., Villarreal, R.E.P., Vélez, W.A.Z. and Láinez, A.A.D.P. (2024). Perception of university students on the use of artificial intelligence (ai) tools for the development of autonomous learning, *Revista de Gestão Social e Ambiental*, 18(2), 1 – 20. <https://doi.org/10.24857/rgsa.v18n2-136>.
15. Russell, S. J., & Norvig, P. (2016). *Artificial Intelligence: A Modern Approach*, (3rd ed.). Pearson.
16. Santos, R., Villaceran, R., Rioflorido, J. and Paguiligan, D. (2024). Initial Development and Validation of a Questionnaire for Students' Artificial Intelligence Knowledge in Education, *Cognizance Journal of Multidisciplinary Studies*, Vol.4(5), 32-41. DOI: 10.47760/cognizance.2024.v04i05.003.
17. Sugata, M. (2021). *The school in the cloud: The emerging future of learning*. Corwin Press.
18. Zangirolami-Raimundo, J., Echeimberg, J.O. and Leone, C. (2018). Research methodology topics: Cross-sectional studies, *Journal of Human Growth and Development*, 28(3), 356-360. <http://dx.doi.org/10.7322/jhgd.152198>.
19. Zhao, Y. (2020). *Teaching students to become self-determined learners*. Solution Tree Press.