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# Awareness and Challenges of Artificial Intelligence in Students' Assessment in Nigerian Technical Colleges

by

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**Abstract**

The use of Artificial Intelligence (AI) in Assessment in the education sector has become a concern to many observers. AI is a computer system which performs tasks that are typically associated with human intelligence. The use of AI in assessment potentially involves threats and benefits that are worth investigating. This paper aimed to investigate the awareness of AI in assessment, the extent of its use in technical colleges in Nigeria and to establish threats that impede its usage. Four research questions guided the study and one hypothesis was tested. The study utilized mixed-research method, employing quantitative and qualitative data. The population comprised all technical college teachers across the country's six geo-political zones. A random sample of 600 teachers was selected. Data was collected using one validated instrument: Questionnaire on Teachers' Awareness, Use and Challenges of Artificial Intelligence in Assessment (QTAUCAIA) with a Cronbach Alpha reliability coefficient of 0.89. The quantitative data were analyzed using one sample t-test statistics. While the qualitative data were analyzed thematically. The results of the findings revealed that the teachers are aware of the existence of AI tools and technologies and were used in the assessment to a small extent. The results further established threats that impede the application of AI in assessment to include: inadequate ICT facilities and lack of training on AI. The researcher therefore, recommended that there should be adequate provision of ICT facilities and regular in-service training for the teachers by the government.

*Keywords: Artificial Intelligence, assessment, awareness, technological skills, threats*

# Awareness and Challenges of Artificial Intelligence in Students' Assessment in Nigerian Technical Colleges

Man's quest to live a much better and less- tasking life has led to a rapidly evolving technology that involves the development of intelligent machines that can perform tasks that typically require human intelligence such as understanding, natural language, recognising patterns, and making decisions based on data. Such technological inventions include those driven by Artificial Intelligence (AI). AI is the ability of machines to adapt to new and emerging situations, problem-solving, create plans, answer questions, and perform other intelligent functions typically associated with human beings. Naqvi (2020) refers to AI as the field of Computer Science that involves creating computer programmes capable of imitating intelligent behaviour and ideals, enhancing human-like abilities.

According to Wardat, Tashtoush, AlAli, and Jarrah (2023), AI is a swiftly expanding discipline, which encompasses the development of intelligent robots capable of emulating human thought, processes and actions, finding utility in diverse areas such as medical diagnosis, self – driven cars, and education. AI-powered tools and applications are now being used in the industries and education sector to enhance the quality of services provided (Suh & Ahn, 2022). Vasconcelos and dos Santos (2023), reported that, AI tools such as Bing and ChatGPT are referred to as objects individuals can think with, especially in the teaching-learning situation for learners to enhance their ability to think critically and reflectively, foster creativity, acquire problem – solving skills and grasp concepts effectively. Garrel and Mayer (2023) reported that two- third of the students surveyed across Germany had used or were using AI-based tools, with the major one being ChatGPT. Essel, Vlachopoulos, Essuman and Amankwa (2023) stated that ChatGPT can be incorporated into learning to influence students' critical thinking skills. Jose-Maria, Maria-Soledad, Mariana and Fernando (2023) opined that, sex does not stand as a determinant factor to perception or facilitating condition in the motivation and behavioural intention to use ChatGPT. Zawacki-Richter, Marín, Bond, and Gouverneur (2019) reported that students' gender has a significant impact on all educational actors in general and in particular on artificial learning

intelligence. Popenici and Kerr (2017) stated that the realm of learning in higher education presents a very different set of challenges for students, as the ability to explore AI solutions will potentially restructure the learning process for students.

Huang (2018) asserted that the integration of AI in teaching makes learner-centered learning more effective. The use of AI-powered tools improves educational measurement, including testing, assessment and evaluation. These tools can provide educators with valuable insights into students' performance, learning outcomes, and instructional effectiveness. For example, AI-powered assessment tools can analyse students' responses to assignments and provide personalized feedback to help students identify areas of weaknesses and strength (Nazaretsky, Ariely, Cukurova & Alexandron, 2022).

AI-powered tools can help teachers to improve their instructions, identify new areas and adapt to modern teaching strategies. AI-powered tools can also help automate several aspects of the assessment processes; saving time and reducing teachers' burden. For instance, AI-powered grading tools can analyse student's essays and provide feedback on grammar, structure, and content, therefore, reducing teachers' time for grading assignments (Huang, Lu & Yang (2023). Artificial Intelligence is part of our normal lives now. Through automatic parking systems, smart sensors for taking amazing pictures, and personal assistance, we are overwhelmed by this technology. Likewise, in schools, artificial intelligence is sensed, and traditional methods are drastically changing (Meyer & Norman, 2020). Artificial Intelligence is incorporated invisibly by computer applications that can help us improve our understanding, and reasoning and communicate with others. Immersive systems have become more ubiquitous, those that use technology to bring us to a separate version of reality (Southgate, Blackmore, Pieschi, Grimes, et al., 2019). Artificial Intelligence is not just a part of Computer Science; it is so vast that it requires many other factors that can contribute to it. First, we should know how intelligence is composed to create the AI, so intelligence is an intangible part of our brain, that is, a combination of reasoning, learning, perception problem-solving, understanding language, and so on (Mikalef & Gupta, 2021).

Ikedinachi, Misra, Assibong, Olu-Owolabi, et al. (2019) asserted that with the application of AI in education, the teacher can be freed from certain routine tasks and can concentrate on establishing links with students, getting to know them, and mastering skills that will accompany them on their journey towards their human development. The development and adoption of new learning and teaching technologies have grown steadily over the past 30 years. Artificial Intelligence (AI) can better achieve and manage educational goals. By using AI teachers, students in a class can be evaluated and identified as slow learners to understand the topics. If students have some deficiencies in some areas or fail to understand a few subjects, then AI analysis should present this report to lecturers or parents, so that appropriate action can be taken by lecturers for scaffolding learning (Bharati, 2017). The AI program helps to explain courses and ensure that all students develop the same conceptual foundation (Elsayed, Thomas, Marriott, Piantadosi, et al., 2015).

Bingimlas, (2009) asserted that the lack of access to technical tools is a major barrier to the effective use of technology in education. Most colleges and teachers do not have access to technical devices such as smart whiteboards and projectors that can be used in classroom visual representations. Some colleges do not have enough computers and even lack internet access which is needed in academic research and remote learning. The global world has recognised advanced digital technology development and benefits derived from information and communication technology in a variety of industries, such as banking systems, industry, transportation, communications, and so on. Therefore, the education sector cannot be left out. For technical colleges out-turn, to compete favorably with the global trend in modern education, technological innovation, such as AI is needed. Hence, there is a strong need to digitise the teaching, learning and assessment processes in the education sector. The use of technology in Nigerian Technical Colleges is still to a little extent, which means that education is lagging as new technologies, especially for learning, are not adequately embraced (Osadebe, 2014).

Wijaya and Utami (2021), reported that the educational system in Nigeria lacks adequate digital technologies and hence does not adequately use them in learning, teaching and assessment.

Olelewe and Okwor (2017), noted a low level of use of digital technologies in teaching and assessment. Isiugo-Abanihe, Iluobe and Ipogah (2023) reported inadequate computers, lack of computer literacy, inadequate funding, intermittent power disruption, poor internet services and time consumption as challenges hindering the use of digital technologies in teaching, learning and assessment of students in Nigerian Technical Colleges. Lack of adequate remuneration and rewards from the government, reduces the enthusiasm and commitment of teachers to the usage of modern instructional facilities (Eze, 2013).

By introducing AI in education, the teacher can be liberated from certain routine tasks and can focus on building ties with students, getting to know them, and leading them to learn skills that will accompany them on their journey towards their human development (Ikedinach, et al., 2019). AI, which is built on on-line platforms, offers learners the ability to get extra help from AI tutors. AI-driven systems provide the students on the platform with almost immediate helpful feedback. However, while there are some incredible advantages of AI, there are also some disadvantages relating to cyber security and ethical issues. This indicates that a well-balanced and holistic approach to technological advancement and ethics will be required to maximize the benefits of AI while mitigating the risks. Hence this study is focused on awareness of AI in assessment, the extent of its application in Nigerian Technical Colleges and the establishment of threats that impede its usage.

The objectives of this study were to determine the extent of: awareness of AI among teachers of Technical Colleges in Nigeria, the use of AI in students' assessment, and identify the challenges and prospects associated with its usage.

Four research questions guided this study:

1. What is the extent of awareness of AI among teachers of Technical Colleges in Nigeria?
2. To what extent is AI used among teachers of Technical Colleges in the assessment of students?
3. What are the challenges associated with the use of AI among teachers of Technical Colleges in the assessment of students?
4. What are the prospects associated with AI usage?

One hypothesis was tested at 0.05 significant level: There is no significant difference between male and female teachers in the use of AI in the assessment of students in Nigerian technical colleges.

## Method

The study adopted a survey research design, since surveys measure the attitudes, opinions, and perceptions of a population of interest. It employed quantitative and qualitative approaches. The population comprised all Technical College teachers across the country's six geo-political zones. A random sampling technique was used to select 600 (six hundred) teachers. One validated instrument was used: Questionnaire on Teachers Awareness, Use and Challenges of Artificial Intelligence in Assessment (QTAUCAIA) with a Cronbach Alpha reliability coefficient of 0.89. Section A of the questionnaire comprised nine (9) items on bio-data; Section B comprised six (6) items that addressed the awareness of AI among teachers. Section C contains ten (10) items that addressed the application of AI among teachers in the assessment of students. Teachers were required to tick in any column that best describes the extent to which they agree with each statement on a four-point scale of Very Great Extent (**VGE**), Great Extent (**GE**), Small Extent (**SE**), Very Little Extent (**VLE**) and Strongly Agree **(SA),** Agree **(A),** Disagree **(D),** Strongly Disagree **(SD) for** Section D which comprised seventeen (17) items that addressed the challenges associated with the application of AI in assessment of students. Section D contains four (4) semi-structured open-ended questions on teachers' knowledge of AI, prospects and remedies to the challenges confronting the application of AI in assessment. The responses were coded and subjected to SPSS Statistical software version 23. Percentages, Mean, Standard deviation and Independent sample t-test statistics were used to analyze the quantitative data, while the qualitative data were analyzed thematically using direct quotations.

The study adopted a Likert-type scale adapted from Nwankwo's (2013) study: acceptance of 0-01 VLE, 1.01 -2.0 SE, 2.01 – 3.0 GE, 3.01 – and above VGE mean values for decision.

## Results

Research Question 1: What is the extent of awareness of AI among teachers of technical colleges in Nigeria?

**Table 1**

*The Level of Awareness of AI Among Teachers of Technical Colleges in Nigeria*

| S/N | Items | N | | Mean | | Std | |
|---|---|---|---|---|---|---|---|
| | | M | F | M | F | M | F |
| 1.1 | I am aware of AI-powered tool to source for information online with my PC. | 352 | 248 | 3.52 | 3.40 | .039 | .036 |
| 1.2 | I am aware of the ChatGPT to develop questions for students. | 352 | 248 | 3.11 | 3.35 | .808 | .578 |
| 1.3 | I am aware of AI socrative tool to solve Mathematical problems. | 352 | 248 | 2.93 | 3.11 | .796 | .739 |
| 1.4 | I am aware of AI lisa tool to select best media to illustrate my teaching. | 352 | 248 | 2.76 | 3.04 | .804 | .687 |
| 1.5 | I am familiar with AI astro tool to interact with my email inbox efficiently. | 352 | 248 | 2.86 | 2.92 | .842 | .803 |
| 1.6 | I am familiar with AI replica tool to interact on my day-to-day online activities. | 352 | 248 | 2.90 | 3.07 | .876 | .738 |
| Total | | | | 18.08 | 18.89 | | |
| Grand | Mean | | | 3.01 | 3.15 | | |

Note: Male is M and Female is F

Table 1 shows that the grand mean of teachers (male and female) 3.01 and 3.15) respectively which indicate very great extent, using the criteria mean values. This reveals that teachers' awareness level of AI is to a very great extent.

Research Question 2: To what extent is AI used among teachers of Technical Colleges in the assessment of students?

**Table 2**

*The Extent to Which AI Is Used Among Teachers of Technical Colleges in The Assessment of Students in Nigeria*

| S/N | Items | N | | Mean | | Std | |
|---|---|---|---|---|---|---|---|
| | | Male (M) | Female (F) | M | F | M | F |
| 2.1 | Setting examination questions | 352 | 248 | 1.74 | 1.79 | .956 | .870 |
| 2.3 | Marking examination questions | 352 | 248 | 1.76 | 1.81 | .874 | .786 |
| 2.3 | Scoring | 352 | 248 | 1.73 | 1.85 | .860 | .888 |
| 2.4 | Grading | 352 | 248 | 1.80 | 1.88 | .857 | .862 |
| 2.5 | Scanning | 352 | 248 | 1.80 | 1.79 | .846 | .791 |
| 2.6 | Generating definitions for key-terms | 352 | 248 | 1.80 | 1.92 | .849 | .951 |
| 2.7 | Production of quizzes with model answers | 352 | 248 | 1.83 | 1.90 | .924 | 1.005 |
| 2.8 | To automate and support administrative tasks | 352 | 248 | 1.81 | 1.82 | .869 | 902 |
| 2.9 | To access e-mail services | 352 | 248 | 1.80 | 1.75 | .913 | .882 |
| 2.10 | Storage of examination questions | 352 | 248 | 1.81 | 1.72 | .913 | .862 |
| Total | | | | 17.88 | 18.23 | | |
| Grand Mean | | | | 1.79 | 1.82 | | |

Table 2 reveals the grand mean values of teachers (male and female) 1.79 and 1.82 respectively which indicate low extent, using the criteria mean values. This shows a small extent of usage of AI among teachers of technical colleges in the assessment of students in Nigeria.

**Table 3**

*The Challenges Associated with The Use of AI Among Teachers of Technical Colleges In the Assessment of Student*

| S/N | Items | N | | Mean | | Std | |
|---|---|---|---|---|---|---|---|
| | | M | F | M | F | M | F |
| 3.1 | Irregular power supply | 352 | 248 | 3.25 | 3.20 | .125 | .060 |
| 3.2 | Inadequate ICT facilities | 352 | 248 | 3.07 | 3.22 | .805 | .965 |
| 3.3 | Privacy issues | 352 | 248 | 2.95 | 3.10 | .854 | .839 |
| 3.4 | Lack of funds | 352 | 248 | 2.86 | 3.08 | .879 | .892 |
| 3.5 | Lack of AI literate teachers | 352 | 248 | 2.95 | 3.26 | .839 | .828 |
| 3.6 | Issues of fairness | 352 | 248 | 2.92 | 2.94 | .798 | .888 |
| 3.7 | time consuming | 352 | 248 | 2.75 | 3.01 | .913 | .879 |
| 3.8 | Can expose learners' to inappropriate content | 352 | 248 | 2.76 | 2.87 | .946 | 1.030 |
| 3.9 | Could diminish educator – learner relationship | 352 | 248 | 2.69 | 2.94 | .855 | .856 |
| 3.10 | Safety of personal data | 352 | 248 | 2.78 | 3.19 | .823 | .877 |
| 3.11 | Poor internet connectivity | 352 | 248 | 2.99 | 2.99 | .904 | .942 |
| 3.12 | Potential negative impact on leaners' writing skills | 352 | 248 | 2.84 | 3.03 | .894 | .921 |
| 3.13 | Potential negative impact on leaners' critical thinking skills | 352 | 248 | 2.69 | 2.99 | .951 | .872 |
| 3.14 | lack of training on AI, | 352 | 248 | 2.97 | 3.29 | .825 | .733 |
| 3.15 | high fees subscription to some AI tools, | 352 | 248 | 2.98 | 3.17 | .840 | .833 |
| 3.16 | Low technological skills | 352 | 248 | 2.83 | 3.12 | .891 | .809 |
| 3.17 | Lack of AI policy. | 352 | 248 | 2.84 | 3.00 | 906 | .922 |
| Total | | | | 49.12 | 52.4 | | |
| Grand Mean | | | | 2.89 | 3.08 | | |

Table 3 shows that Irregular power supply, Inadequate ICT facilities, Privacy issues, Lack of funds, Lack of AI literate teachers, Issues of fairness, time consuming, exposure of learners' to inappropriate content, educator – learner relationship could be diminished, Safety of personal data, Poor internet connectivity, Potential negative impact on leaners' writing skills, lack of training on AI, high fees subscription to some AI tools, Low technological skills and Lack of AI policy have grand mean values of teachers (male and female) 2.89 and 3. 08 respectively which indicate great extent, using the criteria mean values. This revealed that Irregular power supply, Inadequate ICT facilities, Privacy issues, Lack of funds, Lack of AI literate teachers, Issues of fairness, time consuming, expose of learners' to inappropriate content, educator – learner relationship could be diminish, Safety of personal data, Poor internet connectivity, Potential negative impact on leaners' writing skills, lack of training on AI, high fees subscription to some AI tools, Low technological skills and Lack of AI policy, are challenges that are strongly associated with the use of AI among teachers of technical colleges in the assessment of students in Nigeria.

Research Question 4: What are the prospects associated with AI usage?

*The teachers also expressed their opinions that AI makes assessment of students more convenient and easy when it comes to grading the students.*

From the responses of the teachers on the prospects associated with the use of AI, the following were identified:

- *Saves labour;*
- *Increases productivity;*
- *Detects fraud;*
- *Delivers consistent results;*
- *Encourages personalized learning;*
- *Real-time feedback;*
- *Job creation;*

- *Networking opportunities;*
- *Innovative teaching and assessment.*

Hypothesis: There is no significant difference between male and female teachers in the use of AI in the assessment of students in technical colleges in Nigeria.

Table 4

*Independent Sample t -test on the Responses of the male and female teachers on the extent to which AI is used in the assessment of students in technical colleges in Nigeria.*

| Teachers | N | Mean | Std | F | Sig. | T | Df | Decision |
|---|---|---|---|---|---|---|---|---|
| Male | 362 | 18.62 | 7.93 | 15.522 | .000 | 1.568 | 598 | Rejected |
| Female | 238 | 17.63 | 6.79 | | | 1.619 | | |

Note: Alpha level = 0. 05

The mean value for male teachers shown in table 4 is 18.62 with a standard deviation of 7.93, with 598 degrees of freedom. While the mean value for female teachers is17.63 with a standard deviation of 6.79 with 598 degrees of freedom. The calculated t value of 1.619 is at a .000 level of significance ($p \leq 0.05$). This means that there is a significant difference in the responses of male and female teachers on the extent to which AI is used in the assessment of students in technical colleges in Nigeria. Hence the null hypothesis that states there is no significant difference between male and female teachers in the use of AI in the assessment of students in technical colleges in Nigeria was rejected.

## Discussion

The findings of this study revealed that teachers of Technical Colleges in Nigeria are aware of the existence of AI-powered tools to a great extent. This might be due to their vast knowledge of technological innovations around the global world. This can be aligned with the study of Garrel

and Mayer (2023) who reported that two-thirds of the students surveyed across Germany had used or were using AI-based tools, with the major one being ChatGPT.

The study also showed a small extent of application of AI among teachers of Technical Colleges in the assessment of students in Nigeria. This might be due to their lack of training on how to engage AI and their inability to access funds to set up ICT facilities. This study is consistent with Osadebe (2014) who opined that the use of technology in Nigerian technical colleges is still to a small extent, which means that the knowledge of AI in education is low, as new technologies in learning, are not adequately embraced. This finding supported Wijaya and Umami (2021) who stated that the educational system in Nigeria lacks adequate technologies hence does not adequately apply them in learning, teaching and assessment.

The study further identified the challenges inhibiting the utilization of AI among teachers of Technical Colleges in the assessment of students in Nigeria to include: Irregular power supply, inadequate ICT facilities, privacy issues, lack of funds, lack of AI literate teachers, issues of fairness, time-consuming, exposure of learners' to inappropriate content, educator-learner relationship could diminish, the safety of personal data, poor internet connectivity, potential negative impact on leaners' writing skills, lack of training on AI, high fees subscription to some AI tools, low technological skills and lack of AI policy. These findings are consistent with Isiugo-Abanihe, Iluobe and Ipogah (2023) who reported inadequate computers, lack of computer literacy, inadequate funding, intermittent power disruption, poor internet services and time consumption as challenges hindering the use of digital technologies in teaching, learning and assessment of students in Nigerian Technical Colleges. The finding also supported Eze (2013) who stated that, lack of adequate remuneration and rewards from government reduce the enthusiasm of teachers in the usage of modern instructional facilities. Also the study is in agreement with Bingimlas (2009) who revealed that, the lack of access to technical tools is as a major barrier to the effective application of technology in education.

Furthermore, the study revealed that the use of AI in assessment, is associated with prospects such as, convenience and easy grading of the students, saving labour, increase in

productivity, detection of fraud, delivery of consistent results, encourages personalized learning experience, gives real – time feedback, job creation; networking opportunities; innovative teaching and assessment. This finding is in consonant with Ikedinachi, Misra, Assibong, Olu-Owolabi, et al. (2019), who opined that application of AI in education, the teacher can be freed from certain routine tasks and can concentrate on establishing links with students, getting to know them, and mastering skills that will accompany them on their journeys toward human development. Also, the study is in agreement with Huang, Lu and Yang (2023) who reported that AI-powered grading tools can analyze student's essays and provide feedback on grammar, structure, and content, therefore, reducing teachers' time for grading assignments. The finding also aligned with Nazaretsky, Ariely, Cukurova and Alexandron (2022) who stated that, AI- powered assessment tools can analyze student responses to assignments and provide personalized feedback to help students identify areas of weaknesses and strengths.

Finally, the findings showed that, there is a significant difference in the responses of male and female teachers on the extent to which AI is used in the assessment of students in Technical Colleges in Nigeria. This is consistent with Zawacki-Richter, Marín, Bond, and Gouverneur (2019), who reported that students' gender has a significant impact on all educational actors in general and in particular on artificial learning intelligence.

## Conclusion and Recommendations

The findings of the study revealed that the teachers of Technical Colleges in Nigeria are aware of the existence of AI-powered tools, ChatGPT, AI socratic tools, AI lisa tool, AI astro tools, and AI replicas to interact on day-to-day online activities. However, its level of application in the assessment of students in technical colleges in Nigeria is to a small extent. This was due to challenges of Irregular power supply, inadequate ICT facilities, privacy issues, lack of funds, lack of AI literate teachers, issues of fairness, time-consuming, exposure of learners' to inappropriate content, educator – learner relationship could diminish, the safety of personal data, poor internet connectivity, potential negative impact on leaners' writing skills, lack of training on AI, high fees subscription to some AI tools, low technological skills and lack of AI policy. The

findings statistically showed that there is a significant difference in the application of AI among the male and female teachers in the assessment of students in Technical Colleges in Nigeria. This study established these facts beyond doubts. However, despite the challenges associated with the use of AI in the assessment of students in technical colleges in Nigeria, the following prospects were identified such as, convenience and easy grading of the students, saves labour, increase in productivity, detection of fraud, delivery of consistent results, encourages personalized learning experience, gives real-time feedback, job creation; networking opportunities; innovative teaching and assessment. It suffices to say that AI awareness among the teachers of Technical Colleges in Nigeria is to a great extent while its usage in assessment is to a small extent and faced with many challenges though associated with numerous prospects.

Based on the findings, the researchers therefore recommended that there should be adequate provision of ICT facilities, adequate funding, uninterrupted internet services, AI- policy, and regular in-service training for teachers to acquire AI technological skills to be able to compete favourably in the world of work.

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