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# Perception as A Predictor of Undergraduates' Readiness to Use Artificial Intelligence Tools for Their Learning And Enhanced Achievement in North-Central Nigeria

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## Abstract

Artificial Intelligence (AI) as one of the major technologies in the fourth educational revolution, it is an innovative technology used by undergraduates' for learning. Despite the importance of artificial intelligence (AI) tools in learning and achievement , undergraduate need to be repositioned in their use AI tools for their learning and achievement in North-Central Nigeria. Hence, this study investigated predictors of undergraduates' readiness to use AI tools for learning and enhancing achievement in North-Central Nigeria. This study adopted a correlation research approach comprising of quantitative and qualitative research design using an explanatory sequential research design. The population for the study were all undergraduate students in North Central Nigeria. The target population consisted of all undergraduate students in the selected universities with an estimated population of 500,000 undergraduate students. Three states were purposively selected because of their large population size. Multistage sampling technique was used in the study comprising of purposive sampling, simple random sampling and proportional sampling techniques to select 1,065 undergraduate students from the population and 15 participants for interview. A researcher-designed questionnaire wand semi-structured interviews were used for data collection. The instruments were validated by six experts and a pilot test was conducted on 40 undergraduate students, the data obtained were analyzed using Cronbach alpha and a reliability index of 0.80 and 0.85 were obtained for perception and readiness respectively. Mean, standard deviation and scatter plot were used to answer the research questions. Research hypotheses were analyzed using linear regression at 0.05 level of significance. The qualitative data were organized, transcribed and analyzed. Findings of the study revealed: r (1,972) = 5817.061, p (0.000) < 0.05 implying that Undergraduate perception is significantly predictive of readiness to use artificial intelligence tools for learning and enhanced achievement in North-Central Nigeria. Based on the findings

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of this study, it was recommended among others that conferences, seminars and workshops should be organized for undergraduate to increase their level of awareness on the available AI tools that can enhance their learning.

**Keywords:** Perception, Undergraduates, Readiness, Artificial Intelligence Tools

### Introduction

Today's students face unprecedented challenges as rapid advances in technology constantly create new information systems and reshape the way we interact with the world. The relentless pace of technological innovation has led to the emergence of complex, interconnected digital ecosystems that permeate almost every aspect of modern life. Information and Communication Technologies have brought into education facilities for virtual learning, integration of digital media in teaching and learning which will continue to enhance the development of 21st-century learning skills (Ezugwua *et al.,* 2016). The advancement of ICTs has set the pace for the fourth educational revolution (Education 4.0). In this Education 4.0, innovations are becoming faster, more efficient and more widely accessible than before, thus advancing abilities, skills and technologies in education. In this 21st century, innovative technologies have revolutionized how students learn and teachers teach. These innovative technologies offer personalized learning experiences, increase engagement, and provide access to educational resources anytime and anywhere as they have the potential to make education more accessible, engaging, and effective for learners of all ages. Examples of these technologies are: Virtual Reality, Augmented Reality, Adaptive Learning Platforms, Internet of Things (IoT), Cloud Computing, and Artificial Intelligence (AI). Furthermore, these technology innovations are fundamentally changing the way education is delivered and the skills needed for success in the 21st century. Examples of these technology innovations are but not limited to; Internet of Things (IoT), Cloud Computing, and Artificial Intelligence (AI).

Artificial intelligence (AI) is the process of making computer programs and machines to solve complex problems same as humans could solve the problems in acting, identifying, recognizing and reasoning (Verma, 2018). The present progressive rate of AI has already impacted the profound nature of services within education (Popenici & Kerr, 2017). With the effective integration of AI tools into education, students are actively involved in the learning process as AI offers them unlimited access to knowledge, lifelong learning, inclusion of digital learning in school curricula and enhancing of 21st-century learning. AI tools can assist students with different learning styles around the world as it fosters personalised learning. Therefore, students should take advantage of AI tools as it can motivate them to be more engaged in the learning process. It will also enable them to perform more tasks and activities without stress and also improve learning outcomes. In addition, games learning platforms powered by AI make lessons fun, motivate the students and sustain their interest during instructional delivery. Artificial intelligence (AI) has been rapidly integrated into various aspects of education, promising to revolutionize the academic learning experience. Understanding student perceptions of AI in academic learning is crucial for optimizing its implementation and addressing potential concerns (Sumakul, *et al,* 2022). The integration of AI in academic learning raises concerns about data privacy and security. AI-powered systems collect extensive data on students' learning behaviours and preferences to provide personalized experiences. Keleş and Aydın, (2021), opined those students expressed reservations about the potential misuse of their data. Transparency in data collection and adherence to stringent privacy protocols emerged as critical factors in ensuring student trust and confidence in AI-driven educational tools. A critical factor affecting students' perception of AI for learning is its influence on academic achievement .

In this digital age, Artificial Intelligence plays a significant role in the educational success of students by offering them new innovative ways of learning, acquiring skills, communicating, sharing, creating, analysing and interacting with learning materials. Artificial Intelligence when effectively integrated and used optimally in learning process will enhance the development of digital literacy and informed citizenship in the digital age. Despite the benefits of utilising AI to improve the quality and effectiveness of learning. Students must be ready to use AI tool before they can reap its benefits since, they are the utilizers of AI tools for learning. The investigation of the readiness of students to use AI tools is paramount since they are the key players in the successful utilisation of Artificial Intelligence tool for learning. Olayemi *et al*. (2021) study discovered that students use of online learning depends on the availability of functional ICT facilities, technical-know how (skills) and students'

readiness. Similarly, Ali (2023) opined that AI is rarely adopted in the field of education for a variety of reasons, one of which is AI readiness. Students who have positive perception towards the use of AI will likely use AI in the future than those with negative perception.

Chen *et al.* (2021) stated that students' perception of AI as a supportive learning tool is positively correlated with academic achievements. While AI offers numerous benefits, students have expressed concerns about the potential displacement of teachers by AI-driven tools. Nicholl (2023) highlighted that student valued the unique human connection with educators, perceiving teachers as mentors and role models. The emotional support and personalized guidance provided by teachers were irreplaceable, and students emphasized the need for a balanced approach where AI complements, rather than replaces, the role of teachers in the learning process. Similar study conducted by Liang and Rogers (2022) on students' preferences for human interaction compared to AI-driven interactions. The study revealed that while AI systems are perceived as useful for certain tasks, students still value human guidance and emotional support in their learning journey.

More so, students' perception of AI can be influenced by the perceptions of their instructor competence in using AI tools. Ravi and Raman, (2022) reported that students are more receptive to AI when instructors demonstrate proficiency and explain how AI complements their teaching strategies. Perception is the inner disposition towards an object with an outcome that is either positive or negative. When the use of AI tool for learning rightfully appeals to the sensory organs of undergraduate students' base on their knowledge and experience of it, they will have positive perception towards its usage and might be ready to use it for learning. However, when blended learning does not rightfully appeal to the sensory organs of pre-service teachers' base on their knowledge and experience of it, they will have a negative perception of its usage and might not be ready to use it for learning. This was affirmed by Ayanwalem et al. (2022) who discovered that teachers' perception of AI as a relevant instruction predict their readiness to teach AI. However, Lua and Ibrahim (2015) stated that there was no significant associations between perception and readiness of AI. The gap exist in this literature review that studies on predictors of undergraduates' readiness to use artificial intelligence tools for learning in Nigeria is scarce. Hence, this study expand the body of knowledge by investigating perception as a predictor of undergraduates' readiness to use artificial intelligence tools for learning in North-Central Nigeria.

**Statement of the Problem**

Despite the importance of artificial intelligence (AI) tools for university students to thrive in their academic pursuit and future workplace, the problem gap in readiness to use AI tools for learning in North-Central Nigeria stems from challenges identified from studies such as inadequate availability of AI-chatbot technology for learning in universities , underutilization of web-based tools in Nigerian universities for learning, and the need to address existing gaps in basic education through mobile learning integration (Afonughe et al., 2020; Eloho et al., 2018). Additionally, a deficiency in digital literacy skills among students poses a hindrance to navigating and maximizing the potential of AI tools for learning. Insufficient awareness of the benefits offered by AI technologies and a lack of prioritization in seeking out such resources further contribute to the issue. Moreover, educational institutions in Nigeria often lack the necessary resources and support to integrate AI technologies into the learning environment. The high cost of technology, outdated curricula, power outages disrupting online learning sessions, disparities in access between urban and rural areas, and inadequate infrastructure further exacerbate the difficulties students face in leveraging AI technologies for learning. These gaps highlight the necessity for comprehensive strategies to enhance AI tool adoption and technological readiness in the educational sector of Nigeria. While there is existing literature on AI in education and technology adoption, there is a lack of specific studies focusing on predictors of undergraduates' readiness to use AI tools in the North-Central region of Nigeria. Hence this study fill in the gap and assessed perception as a predictor of undergraduates' readiness to use AI tools in the North-Central region of Nigeria.

**Purpose of the Study**

The main purpose of this study was to investigate the perception as a predictor of undergraduates' readiness to use AI tools for learning and achievement in North-Central Nigeria. The study would specifically:

1.examine undergraduates' perceptions as predictor of their readiness to use AI tools for learning in North-Central, Nigeria.

2.Determibe undergraduates' perceptions as predictor of their readiness to use AI tools for achievement in North-Central, Nigeria.

**Research Questions**

This study answered the following research questions:

1. How does the undergraduates' perception of AI tools for learning predict their readiness to use AI tools for learning in North-Central, Nigeria?
2. How does the undergraduates' perception of AI tools for learning predict their readiness to use AI tools for achievement in North-Central, Nigeria?

**Research Hypothesis**

An hypothesis was formulated and be tested at a 0.05 level of significance:

$H_{01}$: Undergraduates' perception is not significantly predictive of readiness to use artificial intelligence tools for learning in North-Central Nigeria.

$H_{02}$: Undergraduates' perception is not significantly predictive of readiness to use artificial intelligence tools for achievement in North-Central Nigeria.

## RESEARCH METHODOLOGY

**Research Design**

This study adopted a correlation research design . The population for this study were undergraduate students in North Central Nigeria, consisting of six states and the FCT, Abuja: Benue, Kogi, Kwara, Nasarawa, Niger, Plateau and the Federal Capital Territory, Abuja. The target population consisted of all undergraduate students in the selected universities with an estimated population of 500,000 undergraduate students. Three states; Kwara, Nasarawa, and the Federal Capital Territory would be purposively selected because of their large population size. The study used a multistage sampling technique to ensure a diverse and representative sample. Purposive sampling was used to select schools. Simple random sampling was used to select respondents from the identified schools. Proportional sampling techniques was used to allocate the number of respondents in each school. The sample size was determined using Cohen, (2018) at a 95% confidence level to select 1,065 undergraduate students from the population for this study and 15 participants was selected for the qualitative.

Structured questionnaire used in the study. The questionnaire consist of two sections. Section A deals items to elicit undergraduates readiness to use artificial intelligence tools for learning, while Section B elicited information to elicit undergraduates readiness to use artificial intelligence tools for enhancing achievement. The questionnaire would be rated on 4-likert scale with options scale of Strongly Agree, Agree, Disagree, and Strongly Disagree. The questionnaire was first checked for face validity and content validity by four professors from the Department of Educational Technology and two senior lecturers from the Department of Computer Science. In line with their recommendations and suggestions, the questionnaire items were revised and the final draft was prepared. The reliability of the questionnaire was pilot tested using an independent sampling technique on 40 students randomly selected from a different university from the study population. The data obtained from the pilot test was analysed to check the internal consistency of the reliability and Cronbach's alpha index of 0.80 was obtained for perception and readiness.

## Results:

**Research question one:**

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Research Question 1: How does the undergraduates' perception of AI tools for learning predict their readiness to use AI tools for learning in North-Central, Nigeria?

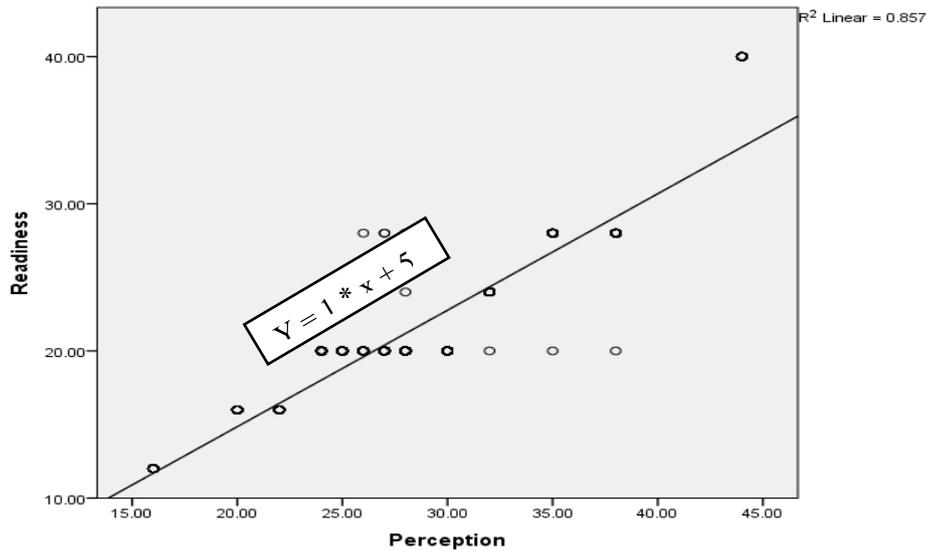Scattered plot was used to answer research question two as shown in Figure 1



**Figure 1: Scattered plot on how perception among undergraduates predict their readiness to use AI tools for learning in North-Central, Nigeria**

Figure 1 shows a scattered plot on how of perception among undergraduates predict their readiness to use AI tools for learning in North-Central, Nigeria. The scattered plot indicates that there is a positive relationship between undergraduate perception and their readiness to use AI tools for learning in North-Central, Nigeria as indicated by the regression line. This implies that undergraduate's perception positively predicts their readiness to use AI tools for learning in North-Central, Nigeria. The mean and standard deviation of undergraduate perception and their readiness to use AI tools for learning in North-Central, Nigeria is presented in Table 1.

**Table 1: Mean and standard deviation of undergraduate perception and their readiness to use AI tools for learning in North-Central, Nigeria**

| Variables | N | Mean | Std. Deviation | Mean Difference |
|---|---|---|---|---|
| Perception | 974 | 29.17 | 5.52 | |
| | | | | 7.06 |
| Readiness to Use AI Tools for learning | 974 | 22.11 | 4.72 | |

Table 1, shows the mean and standard deviation of undergraduate perception and their readiness to use AI tools for learning in North-Central, Nigeria. From the result, the mean with standard deviation of undergraduate perception of AI tools for learning are $\bar{X} = 29.17$ and SD = 5.52. While, the mean with standard deviation of undergraduate readiness to use AI tools for learning are $\bar{X} = 22.11$ and SD = 4.72 with a mean difference of 7.06 in favour of undergraduate perception on the use AI tools for learning. This shows that undergraduate perception on the use AI tools for learning is higher than their readiness to use AI tools for learning in North-Central, Nigeria.

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Research Question 2 :How does the undergraduates' perception of AI tools for learning predict their readiness to use AI tools for enhanced  achievement  in North-Central, Nigeria?

**Table 2: Mean and standard deviation of undergraduate perception and their readiness to use AI tools for Enhanced Achievement in North-Central, Nigeria**

| Variables | N | Mean | Std. Deviation | Mean Difference |
|---|---|---|---|---|
| Perception | 974 | 31.22 | 5.59 | 6.08 |
| Readiness to  Use  AI  Tools Enhanced Achievement | 974 | 25.14 | 5.01 | |

Table 2, shows the mean and standard deviation of undergraduate perception and their readiness to use AI tools for enhanced achievement  in North-Central, Nigeria. From the result, the mean with standard deviation of undergraduate perception of AI tools for learning are $\bar{X}$ = 31.22 and SD = 5.59. While, the mean with standard deviation of undergraduate readiness to use AI tools for learning are $\bar{X}$ = 25.14 and SD = 5.01 with a mean difference of 6.08  in favour of undergraduate perception on the use AI tools for learning. This shows that undergraduate perception on the use AI tools for enhanced achievement  is higher than their readiness to use AI tools for  enhanced  achievement  in North-Central, Nigeria.

The formulated hypothesis was analysed at 0.05 level of significance thus:

**H01:**     Undergraduate perception is not significantly predictive of readiness to use artificial intelligence tools for learning in North-Central Nigeria.

 In testing the hypothesis, linear regression was used as presented in Table 2a.

**Table 2a: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .926ᵃ | .857 | .857 | 1.78684 |

a. Predictors: (Constant), Perception

Table 2a shows the model summary of the regression coefficient for the predictor variable Undergraduate perception of AI tools for learning and criterion variable readiness to use artificial intelligence tools for learning. The result shows r (1,972) = .926, $r^2$ = .857. Indicating that 85.7% of the variance in Undergraduate readiness to use AI is accounted for by their perception of AI tools for learning in North-Central Nigeria. To determine whether the model was a good predictor, regression Analysis of Variance (ANOVA) result is presented in Table 2b

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**Table 2b: Regression ANOVA testing of overall model fitness**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| | Regression | 18572.636 | 1 | 18572.636 | | |
| 1 | | | | | 5817.061 | .000[b] |
| | Residual | 3103.389 | 972 | 3.193 | | |
| | Total | 21676.025 | 973 | | | |

a. Dependent Variable: Readiness

b. Predictors: (Constant), Perception

Table 2b shows the regression ANOVA testing of overall model fitness between Undergraduate perception and their readiness to use artificial intelligence tools for learning in North-Central Nigeria. The result shows r (1,972) = 5817.061, p (0.000) < 0.05. Hence, hypothesis two was rejected, this implies that; Undergraduate perception is significantly predictive of readiness to use artificial intelligence tools for learning in North-Central Nigeria. The regression coefficient is presented in Table 2c.

**Table 2c: Regression coefficient for Undergraduate perception and readiness to use artificial intelligence tools for learning**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -.973 | .308 | | -3.159 | .002 |
| | Perception | .791 | .010 | .926 | 76.270 | .000 |

Table 2c indicates the regression coefficient for Undergraduate perception and readiness to use artificial intelligence tools for learning. The result shows that Undergraduate perception is significantly predictive of readiness to use artificial intelligence tools for learning (B = .926, t = 76.270, p (0.000) < 0.05). The regression coefficient indicates that for any increase in one unit of Undergraduate perception will cause an increase of 92.6-unit readiness to use artificial intelligence tools for learning (when all other factors are constant) in North-Central Nigeria.

$H_{02}$: Undergraduate perception is not significantly predictive of readiness to use artificial intelligence tools for enhanced achievement in North-Central Nigeria.

**Table 3a: Regression ANOVA testing of overall model fitness**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .920 | .846 | .846 | 1.74384 |

a. Predictors: (Constant), Perception

Table 3a shows the model summary of the regression coefficient for the predictor variable Undergraduate perception of AI tools for learning and criterion variable readiness to use artificial intelligence tools for enhanced achieve. The result shows r (1,972) = .920, $r^2$ = .846 indicating that 85.7% of the variance in Undergraduate readiness to use AI is accounted for by their perception of AI tools for learning in North-Central Nigeria. To determine whether the model was a good predictor, regression Analysis of Variance (ANOVA) result is presented in Table 3b

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**Table 3b: Regression ANOVA testing of overall model fitness**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| | Regression | 18534.601 | 1 | 18534.601 | | |
| 1 | | | | | 5925.600 | .000[b] |
| | Residual | 3402.369 | 972 | 3.500 | | |
| | Total | 21636.97 | 973 | | | |

Dependent Variable: Readiness


b. Predictors: (Constant), Perception

Table 3b shows the regression ANOVA testing of overall model fitness between Undergraduate perception and their readiness to use artificial intelligence tools for learning in North-Central Nigeria. The result shows r (1,972) = 5925.600, p (0.000) < 0.05. Hence, hypothesis two was rejected, this implies that; Undergraduate perception is significantly predictive of readiness to use artificial intelligence tools for enhanced achievement in North-Central Nigeria. The regression coefficient is presented in Table 3b.

**Table 3c: Regression coefficient for Undergraduate perception and readiness to use artificial intelligence tools for enhanced achievement**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -.970 | .306 | | -3.157 | .001 |
| | Perception | .769 | .011 | .924 | 75.213 | .000 |

Table 2c indicates the regression coefficient for Undergraduate perception and readiness to use artificial intelligence tools for learning. The result shows that Undergraduate perception is significantly predictive of readiness to use artificial intelligence tools for enhanced achievement  (B = .924, t = 75.213, p (0.000) < 0.05). The regression coefficient indicates that for any increase in one unit of Undergraduate perception will cause an increase of 92.4-unit readiness to use artificial intelligence tools for enhanced achievement. (when all other factors are constant) in North-Central Nigeria.

**Discussion of Finding**

Finding of the study revealed that Undergraduate perception is significantly predictive of readiness to use artificial intelligence tools for learning in North-Central Nigeria. Hence, it can be concluded that increase in the perception of undergraduate students will results to their increased readiness to use AI tools for learning and vice versa. In the same vein, Wai _et al._ (2018) in their  study offered a contemporary perspective on the usage of mobile apps in higher education, delving into undergraduate students' perceptions of incorporating mobile apps for educational purposes. This finding is also in accordance with the finding of Chan and Hu (2023) whose study revealed that various benefits associated with AI influence readiness to use AI. However, study by Lua and Ibrahim (2015) disagrees with this finding whose study revealed that no significant associations between perception and readiness was detected.

findings on hypothesis indicated that undergraduate perception is significantly predictive of readiness to use artificial intelligence tools for enhanced achievement in North-Central Nigeria.

In agreement , Chen _et al._ (2021) stated that students' perception of AI as a supportive learning tool is positively correlated with academic achievements.

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**Recommendations**

Based on the findings of this study, the following recommendations are made:

i.  Undergraduate perception should be enhanced by enlightening them on the numerous opportunities of using AI tools for learning;

ii.  University management should provide enabling environment with adequate Internet and ICT facilities to enhance undergraduate access to AI tools for enhancing achievement.;

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