

## **Lecturers' Perception on The Uses of Artificial Intelligence Tools (AI) for Teaching in faculty of Education, Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State**

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DOI: 10.56201/wjimt.v9.no3.2025.pg34.46

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### **Abstract**

*This study investigated Lecturers' Perception on the Uses of Artificial Intelligence Tools (AI) for Teaching in Faculty of Education, Alex Ekwueme Federal University Ndufu-Alike, Ebonyi state. Case study research design was employed for this study and lecturers in Faculty of Education were used as research respondents. The sample size used was 60 lecturers. Three research questions were answered while three null hypotheses were tested in the study. 30 items questionnaire was used as instrument for data collection. The questionnaire was validated by experts in science education and educational technology. Reliability coefficient of 0.89 and 0.87 were obtained for the perception and usage respectively. Data collected from the administration of the research instrument were analyzed using mean and standard deviation for research questions and Levene test for the research hypotheses. Findings from this study revealed that the lecturers perceived artificial intelligence tools as vital in teaching and learning at Alex Ekwueme Federal University, Ndufu-Alike, Ebonyi State; The artificial intelligence tools for teaching are very scarce at AEFUNAI.; The problems of implementation of artificial intelligence tools in teaching at AEFUNAI, include; lack of time for planning and implementation of AI tools, lack of awareness or enthusiasm on the part of the students on AI tools. Based on this finding it was recommended among others that Lectures in the University should be encouraged in the use of artificial intelligence (AI) tools and tertiary institution should provide stable power supply and adequate information and communication technology facilities for lecturers which will aid teaching.*

**Keywords: Artificial Intelligence Tools (AI), Lecturers' Perception**

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## Introduction

In this 21st century, when the world is moving at speed beyond imagination, everything needs a massive update to be in the race. Starting from industries, organizations and schools, everything is getting updated with the advancement of technologies and getting profited like never before. Artificial intelligence (AI) is such a tool of modern technologies which is helping everything to advance faster than ever before. We are edging towards a world where robots will play an important role with hand in hand with humans. For this advancement, artificial intelligence (AI) can be thought of as a "Brahmastra" as in the 'Hindu Shastra' 'weapon'. Artificial intelligence (AI) has impacted almost every sector of our world, starting from technological advancements to business administration, security agencies to navigation, research, and resulted in massive improvement and growth (Chatterjee *et al.*, 2021). These are also profitable to education, various studies have highlighted that AI has helped a lot to improve the education sector (Jiang, *et al.*, 2017; Subrahmanyam & Swathi, 2018; Davenport & Kalakota, 2019; Chen *et al.*, 2020).

It is an indisputable fact that artificial intelligence (AI) has increasingly penetrated into the educational environment and teaching process of schools. In the process of development, more and more people pay attention to the importance of this technology in the field of education. Artificial intelligence (AI) has been widely used in the education field and has shown substantial application advantages, which has a profound impact on the teaching process and classroom management (Chassignolet *et al.*, 2018; Roll & Wylie, 2016). Artificial intelligence (AI) can continuously optimize and improve the learning environment, stimulate the enthusiasm, initiative and creativity of students (Colchester *et al.*, 2017; learning which also provide an opportunity for the reform of teaching and learning. More and more research on artificial intelligence (AI) and education mainly focus on applying artificial intelligence (AI) technology to assist teaching, build a smart campus, and realize intelligent learning, teaching, and management. adaptive learning and other artificial intelligence (AI) technologies are applied to the education field (Kuo, 2020), and students' learning experience (Cui *et al.*, 2019). In addition, AI technology and big data are combined to dig and analyze teaching data in-depth, it can also promote teaching reform and improve teaching quality (Williamson, 2018).

Education is the backbone of every society, and when we think of the human race in the world, it is nothing but a bigger society. When one talk about the development or growth of the human race in every field, education cannot be left behind. Adaptive artificial intelligence (AI) has become a new normal phenomenon.

Adaptive learning or adaptive teaching is the delivery of custom learning experiences that address the unique needs of individual through just-in-time feedback, pathways, and resources (Gartner (2019). People learn in many different ways. Adaptive learning has sought to address differences in ability by targeting teaching practices. The use of adaptive models, ranging from technological programs to intelligent systems, can be used in the traditional classroom environment. The use of these programs is expected to grow exponentially in the near future. Teachers have been working to utilize technology in education since its conception. Adaptive learning allows the course material to be customized to the learner, which creates a unique experience not available in traditional classes (van den Bergheet *et al.*, 2019). Technology-based adaptive learning systems or e-learning systems can provide students with immediate

assistance, resources specific to their learning needs, and relevant feedback that students may need.

A virtual classroom is an online learning environment that allows for live interaction between the tutor and the learners as they are participating in learning activities. In other words, the virtual classroom is a shared online space where the learners and the tutor work together simultaneously (van den Bergheet *et al.*, 2019). Usually, these interactions take place through videoconferencing. The participants have tools to present learning content in different formats, as well as to implement collaborative and individual activities. In this type of interaction, the teacher has the particularly important role of the moderator who guides the learning process and supports group activities and discussions (van den Bergheet *et al.*, 2019).

A smart campus uses advanced network infrastructure and internet-connected devices to provide supportive and engaging experiences (Gartner (2019). It joins people, devices, and applications and allows universities to make insight-driven decisions to improve security and maximize resources. Gartner (2019), identified intelligent campuses as one of the top 10 strategic technologies impacting higher education. The organization defines a smart campus as “a physical or digital environment in which humans and technology-enabled systems interact to create more immersive and automated experiences for university stakeholders.

Robots are recognized as an innovative learning tool. Many researchers have indicated that this new technique could change the current educational approaches and facilitate students' learning in different learning environments (Anwar *et al.*, 2019; Evripidouet *et al.*, 2020; Lin *et al.*, 2022). Evripidouet *et al.*, (2020) pointed out that educational robots can enhance a variety of student skills such as problem-solving, self-efficacy creating, creativity, collaboration/cooperative skills, as well as computational thinking (Chevalier *et al.*, 2020). In addition, robots have been applied in various disciplines such as languages (Lin *et al.*, 2022; van den Bergheet *et al.*, 2019), Mathematics and Science (Zhong& Xia, 2020), and interdisciplinary STEAM (Benitti&Spola^or, 2017; Sullivan & Bers, 2018). In addition, various artificial intelligence (AI) tools, such as recommendation systems (Yadav *et al.*, 2016), educational gaming apps (Zirawagaet *et al.*, 2017), helps the learner to learn in a much better scope and makes education easy and interesting for all.

Perception is conceptualized as a process by which individuals organize and interpret their sensory impressions in order to give meaning to their environment. According to Joseph (2019), Perception includes all those processes by which an individual receives information about his environment by seeing, hearing, feeling, tasting and smelling. The study of these perpetual processes shows that their functioning is affected by three classes of variables. The objects or events being perceived, the environment in which perception occurs and the individual doing the perceiving. Continuously, that perception is the act of seeing what is there to be seen. But what is seen is influenced by the perceiver, the object and its environment.

Gender is an idea and an analytical device used to explain and recognize the family members and variation between men and women in society. Gender is socially and culturally constructed difference among males and females. Therefore, the manner gender works varies from place to place and time to time. so, understanding gender, that women and men, boys and ladies (Gambari *et al.*, 2015). Gender refers to the socially constructed characteristics of men and women, such as; norm, relationship of and between groups of men and women. Several

researches have stated that there are differences in the activities and attitude between male and female lecturers (Gambari *et al.*, 2015). Therefore, this study tends to investigate male and female lecturers' perception on the uses of artificial intelligence (AI) tools for teaching in Faculty of Education, Alex Ekwueme Federal University Ndufu- Alike.

### **Purpose of the Study**

The purpose of this study was to investigate lecturers' perception on the uses of artificial intelligence (AI) tools for teaching in Faculty of Education, Alex Ekwueme Federal University Ndufu-Alike. Specifically, the study investigated the following:

1. The male and female lecturers' perceptions on the uses of artificial intelligence (AI) tools for teaching in Faculty of Education, Alex Ekwueme Federal University Ndufu-Alike.
2. The male and female lecturers' responses to the availability of artificial intelligence tools for teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State
3. The male and female lecturers' responses to the problems of implementation of artificial intelligence tools in teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State

### **Research Questions**

The following research questions guided the study:

1. What are the male and female lecturers' perceptions on using artificial intelligence tools for teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State?
2. What are the male and female lecturers' responses to the availability of artificial intelligence tools for teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State?
3. What are the male and female lecturers' responses to the problems of implementation of artificial intelligence tools in teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State?

### **Research Hypotheses**

The following null hypotheses were formulated and was tested at 0.05 level of significance

**H0<sub>1</sub>:** There is no significant difference between the male and female lecturers' perceptions of Using artificial intelligence tools in teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State.

**H0<sub>2</sub>:** There is no significant difference between the male and female lecturers' responses to the availability of artificial intelligence tools for teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State.

### **Significance of the Study**

Findings of this research study might be of great benefits to Students, Lecturers, School administrators, Parents, Researchers, Government, and Non-governmental Organizations.

Student would benefit from this research, because it would also help them to realize that artificial intelligence (AI) tools can be used for educational purpose, in understanding the application and benefits of artificial intelligence (AI) to enhance productivity and effectiveness of the teaching and learning.

The findings of this research would also prompt the lecturers to maximize the utilization of artificial intelligence (AI) tools which could make them to be more effective and efficient in their teaching process.

School administrators and policy makers will benefit from this study in the sense that they would be enlightened on the artificial intelligence (AI) tools, thereby making policy that would be of assistance for the school to benefit from their usage.

Parents would also benefit from this research as it would enable them to use their technological tools such as phones and their personal computers to help their children download relevant materials in their field of study which would also help them spend less on buying of textbooks.

Findings of this research could also be of great help and a reference point to upcoming Researchers who would like to embark on related work in the future.

Conclusively, the outcome of this study could prompt government, Non-governmental organizations and other relevant stakeholders in the field of education to provide and emphasize the use of digital technologies in schools.

### **Scope of the Study**

This study was carried out in Alex Ekwueme Federal University Ndufu-Alike, Nigeria. Ebonyi state is located in South East zone in Nigeria. The study investigated lecturers' perception on the uses of artificial intelligence (AI) tools for teaching in Faculty of Education, Alex Ekwueme Federal University Ndufu-Alike. The respondents sampled for this study were lecturers in Faculty of Education, Alex Ekwueme Federal University Ndufu-Alike.

### **Research Design**

The study employed case study research design to give an opportunity for one aspect of the problem to be studied in depth within a group of people within a limited time (Okite, 2021). Case study refers to intensive non-experimental examination of a single unit such as an organisation. Qualitative data provided an in-depth analysis and explanations of information on the lecturers' perception on the uses of artificial intelligence (AI) tools for teaching in Faculty of Education, Alex Ekwueme Federal University Ndufu-Alike.

### **Sample and Sampling Techniques**

A sample of sixty (60) (28 males and 32 females) lecturers in Faculty of Education was sampled for the study, based on the number of lecturers who responded to the questionnaire.

### **Instrument for Data Collection**

The research instrument that was used in this study to collect the data was a nineteen (19) itemed questionnaire structured in 4-point Likert scale of strongly agree (SA), Agree (A),

Undecided (U), Disagree (DA), and Strongly Disagree (SD). The questionnaire was titled “lecturers’ perception on the uses of AI tools for teaching in Faculty of Education, Alex Ekwueme Federal University Ndufu-Alike. In constructing the questionnaire, effort was made to see that the instructions were precise and clear to the respondents. The questionnaire was divided into two sections; Section A, consists of demographic information about the respondents (gender, years of experience, age, qualification). Section B, consists of lecturers’ perception on the uses of artificial intelligence (AI) tools for teaching in Faculty of Education, Alex Ekwueme Federal University Ndufu-Alike. Section B has two clusters. Cluster A consists of eleven (10) items on lecturers’ attitude towards the use of AI tools in teaching, while cluster B consists of eight (10) items on Availability and implementation of AI resources for teaching.

### **Validity of the Instrument**

The instrument was validated by three lecturers, all from the Department of Science Education Alex Ekwueme Federal University Ndufu-Alike, for face and content validity in terms of clarity, suitability, use of language, logical arrangement of the items among others. Based on their suggestions and recommendation, some items were modified while some items were also added and some were removed completely.

### **Reliability of the Instrument**

A Pilot test was conducted to test the reliability of the instrument. The questionnaire was administered to the 30 lecturers in Alex Ekwueme Federal University Ndufu- alike. A total number of fifteen (15) lecturers from Faculty of Agriculture and fifteen (15) lecturers from the Faculty of Science, who were not part of the targeted sample for this study were selected for the pilot test since they share related characteristics. administration was done once and a reliability coefficient of 0.89 and 0,87 from the variable was obtained using Cronbach Alpha formula to measure the internal consistency and how closely related a set of items are as a group. Based on the coefficient obtained, the instrument was considered reliable.

### **Data Collection Procedures**

An approval was gotten from the Dean, faculty of Education and the Head of Department, Science Education Department to sample the lecturers, the respondents thereafter were briefed on the objectives of the study by the researcher. Then the softcopy of the questionnaire was uploaded to the Faculty WhatsApp platform for the lecturers to respond using the link:- <https://doc.google.com/forms/d/1PyZZU9dOBRtjNy-8HCK3ARHhA-7ytjDuSIAQiZJO/edit?usp=sharing-eil-se-dm&ts=65c22d8c>. The respondent responses were collected electronically and used for the data analysis.

### **Procedures for Data Analysis**

The data collected from the sampled lecturers were analyzed using descriptive and inferential statistics, the descriptive statistics were used to provide answers to the research questions using mean and standard deviation. T-test analysis was used to test research hypotheses; the significant difference was ascertained at alpha level of 0.05. The Statistical Package for Social Science (SPSS Version 23) was used for the analysis. The decision rule was based on the values of the calculated mean of the response options numerical values. Therefore, any item of mean



score which is 3.0 and above were taken as positive influencing the questionnaire items, while any point that below 3.0 were taken as negative.

**Research question 1:** What are the male and female lecturers' perceptions on using artificial intelligence tools for teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State?

**Table 1: Mean and Standard Deviation Scores of Male and Female Lecturers' Perceptions of Using Artificial Intelligence Tools in Teaching at AEFUNAI**

| Group Statistics     |  |        |    |      |      |          |
|----------------------|--|--------|----|------|------|----------|
| S/N                  | Items  | Gender | N  | Mean | SD   | Decision |
| 1                    | Incorporating adaptive learning encourages learners to learn       | Male   | 28 | 4.46 | 1.04 | A        |
|                      |  | Female | 32 | 4.00 | 0.92 | A        |
| 2                    | Virtual classroom inspires students                                | Male   | 28 | 3.79 | 1.07 | A        |
|                      |  | Female | 32 | 3.94 | 1.01 | A        |
| 3                    | Incorporated Intelligent tutorial robots enrich materials          | Male   | 28 | 3.71 | 1.18 | A        |
|                      |  | Female | 32 | 4.03 | 0.97 | A        |
| 4                    | Smart campus increases the standard of teaching                    | Male   | 28 | 3.79 | 1.29 | A        |
|                      |  | Female | 32 | 3.78 | 0.83 | A        |
| 5                    | Intelligent tutorial robot offers a range of real-world experience | Male   | 28 | 3.86 | 1.21 | A        |
|                      |  | Female | 32 | 3.50 | 0.95 | A        |
| 6                    | Teaching evaluators can assess students' academic performance      | Male   | 28 | 4.25 | 1.01 | A        |
|                      |  | Female | 32 | 3.66 | 1.23 | A        |
| 7                    | Virtual classroom overwhelms the disadvantages of lecturing        | Male   | 28 | 3.64 | 1.19 | A        |
|                      |  | Female | 32 | 3.91 | 0.86 | A        |
| 8                    | AI tools aid students' self-directed learning                      | Male   | 28 | 4.11 | 0.96 | A        |
|                      |  | Female | 32 | 3.91 | 0.78 | A        |
| 9                    | Use of AI tools is fundamental in teaching and learning            | Male   | 28 | 3.57 | 1.07 | A        |
|                      |  | Female | 32 | 3.56 | 1.24 | A        |
| 10                   | AI tools are necessary for Lecturers to be relevant                | Male   | 28 | 3.00 | 1.02 | A        |
|                      |  | Female | 32 | 3.13 | 1.13 | A        |
| Total mean responses |  | Male   | 28 | 3.82 | 1.05 | A        |
|                      |  | Female | 32 | 3.74 | 0.93 | A        |

Table 1 shows the mean and standard deviation scores of the male and female lecturers' responses to the perceptions of using artificial intelligence tools in teaching at AEFUNAI Ebonyi State. The table shows further that the male and female lecturers generally agreed to the items that describe their perceptions of using artificial intelligence tools in teaching. The finding indicated that artificial intelligence tools are essential for teaching at AEFUNAI. This was premised on the fact that the overall mean and standard deviation of the male and female lecturers were  $3.82 \pm 1.05$  and  $3.74 \pm 0.93$  respectively. These mean responses of the lecturers were above the mean benchmark of 3.0 set for the study. These results have shown specifically that incorporating adaptive learning encourages learners to learn, virtual classroom inspires students, incorporating intelligent tutorial robots enriches materials, smart campus increases the standard of teaching, intelligent tutorial robots offer a range of real-world experiences, teaching evaluators can assess students' academic performance, virtual classrooms overwhelm the disadvantages of lecturing, AI tools aid students' self-directed learning, the use of AI tools

is fundamental in teaching and learning, and AI tools are necessary for Lecturers to be relevant in the various fields of study. Meanwhile, the overall mean response of the male lecturers was slightly higher than that of their female counterparts with a numerical value of 0.08. However, the table could not show whether the slight difference was statistically significant or could be attributed to sampling error. The result was, therefore, subjected to inferential testing of the null hypothesis 1 with the independent sample t-test as shown in Table 4 below. Furthermore, the overall standard deviation of the female lecturers was lower than that of their male counterparts. This shows that the female lecturers' responses were more clustered around their overall mean than that of their male counterparts.

**Research question 2:** What are the male and female lecturers' responses to the availability of artificial intelligence tools for teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State?

**Table 2: Mean and Standard Deviation Scores of Male and Female Lecturers' Responses to the Availability of Artificial Intelligence Tools for Teaching at AEFUNAI**

| Group Statistics     |   |        |    |      |      |          |
|----------------------|---|--------|----|------|------|----------|
| S/<br>N              | Items   | Gender | N  | Mean | SD   | Decision |
| 11                   | There is a shortage of administrative help for AI               | Male   | 28 | 3.00 | 1.33 | A        |
|                      |   | Female | 32 | 2.81 | 1.31 | A        |
| 12                   | There is a scarcity of virtual classrooms in AEFUNAI            | Male   | 28 | 3.79 | 1.29 | A        |
|                      |   | Female | 32 | 4.22 | 0.66 | A        |
| 13                   | There is a shortage of intelligent tutorial robots for training | Male   | 28 | 4.32 | 1.02 | A        |
|                      |   | Female | 32 | 4.31 | 1.03 | A        |
| 14                   | AI tools are very scarce in AEFUNAI                             | Male   | 28 | 3.64 | 1.25 | A        |
|                      |   | Female | 32 | 3.75 | 1.22 | A        |
| Total mean responses |   | Male   | 28 | 3.69 | 1.15 | A        |
|                      |   | Female | 32 | 3.77 | 0.96 | A        |

Table 2 shows the mean and standard deviation scores of the male and female lecturers' responses to the availability of artificial intelligence tools in teaching at AEFUNAI Ebonyi State. The table shows further that the male and female lecturers generally agreed that artificial intelligence tools for teaching are very scarce at AEFUNAI. This was premised on the fact that the overall mean and standard deviation of the male and female lecturers were  $3.69 \pm 1.15$  and  $3.77 \pm 0.96$  respectively. These mean responses of the lecturers were above the mean benchmark of 3.0 set for the study. These results have shown specifically that there is a shortage of administrative help for AI tools, there is a scarcity of virtual classrooms in AEFUNAI, there is a shortage of intelligent tutorial robots for training the lecturers, and AI tools are very scarce in AEFUNAI, Ebonyi State. Meanwhile, the overall mean response of the female lecturers was slightly higher than that of their male counterparts with a numerical value of 0.08. However, the table could not establish whether the slight difference was statistically significant or could be attributed to error variance. The result was, therefore, subjected to inferential testing of the null hypothesis 2 with the independent sample t-test as shown in Table 5 below. Furthermore, the overall standard deviation of the female lecturers was lower than that of their male counterparts. This shows that the female lecturers' responses were more clustered around their overall mean than that of their male counterparts.



**Research question 3:** What are the male and female lecturers' responses to the problems of implementation of artificial intelligence tools in teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State?

**Table 3: Mean and Standard Deviation Scores of Male and Female Lecturers' Responses to the Problems of Implementation of Artificial Intelligence Tools in Teaching at AEFUNAI**

| Group Statistics     |  |        |    |      |      |          |
|----------------------|--|--------|----|------|------|----------|
| S/<br>N              | Items  | Gender | N  | Mean | SD   | Decision |
| 15                   | Lack of time for planning and implementation of AI tools       | Male   | 28 | 4.11 | 1.03 | A        |
|                      |  | Female | 32 | 3.88 | 1.13 | A        |
| 16                   | Lack of awareness or enthusiasm among students about AI tools. | Male   | 28 | 3.57 | 1.32 | A        |
|                      |  | Female | 32 | 3.88 | 1.13 | A        |
| 17                   | Lack of awareness of lecturers about AI tools in teaching      | Male   | 28 | 4.93 | 5.37 | A        |
|                      |  | Female | 32 | 3.31 | 1.28 | A        |
| 18                   | Lack of computer-skilled expertise to handle AI tools          | Male   | 28 | 3.86 | 1.21 | A        |
|                      |  | Female | 32 | 3.19 | 1.26 | A        |
| Total mean responses |  | Male   | 28 | 4.12 | 1.51 | A        |
|                      |  | Female | 32 | 3.56 | 1.15 | A        |

Table 3 shows the mean and standard deviation scores of the male and female lecturers' responses to the problems of implementation of artificial intelligence tools in teaching at AEFUNAI, Ebonyi State. The table shows further that the male and female lecturers generally agreed that the items stated are the problems hindering the implementation of artificial intelligence tools in teaching at AEFUNAI. This was premised on the fact that the overall mean and standard deviation of the male and female lecturers were  $4.12 \pm 1.51$  and  $3.56 \pm 1.15$  respectively. These mean responses of the lecturers were above the mean benchmark of 3.0 set for the study. These results have shown specifically that lack of time for planning and implementation of AI tools, lack of awareness or enthusiasm on the part of the students on AI tools, lack of awareness of lecturers on AI tools in teaching, and lack of computer-skilled expertise to handle AI tools incorporation in teaching are the problems of implementation of AI tools in teaching in AEFUNAI, Ebonyi State. Meanwhile, the overall mean response of the male lecturers was higher than that of their female counterparts with a numerical value of 0.56. However, the table could not establish whether the observed difference was statistically significant or could be attributed to error variance. The result was, therefore, subjected to inferential testing of the null hypothesis 3 with the independent sample t-test as shown in Table 6 below. Furthermore, the overall standard deviation of the female lecturers was lower than that of their male counterparts. This shows that the female lecturers' responses were more clustered around their overall mean than that of their male counterparts.

## TESTING OF THE NULL HYPOTHESES

**Null hypothesis 1:** There is no significant difference between the male and female lecturers' perceptions of using artificial intelligence tools in teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State.

**Table 3: Independent sample t-test on Male and Female Lecturers' Perceptions of Using Artificial Intelligence Tools in Teaching at AEFUNAI**

|                             | Levene's Test |       | t-test for Equality of Means |       |       |       |       |         |       |
|-----------------------------|---------------|-------|------------------------------|-------|-------|-------|-------|---------|-------|
|                             | F             | Sig.  | T                            | df    | P     | MD    | SED   | 95% CID |       |
| Equal variances assumed     | 0.576         | 0.451 | 0.303                        | 58    | 0.763 | 0.077 | 0.255 | -0.432  | 0.587 |
| Equal variances not assumed |               |       | 0.301                        | 54.50 | 0.765 | 0.077 | 0.257 | -0.437  | 0.592 |

MD = mean difference; SED = standard error difference; CID = confidence interval difference

Table 4 shows the independent sample t-test conducted on the male and female lecturers' responses to test the null hypothesis 1. The table shows that Sig. value ( $p = 0.451$ ) obtained in Levene's test was greater than 0.05. This implies that the variances are assumed equal. The results in the equal variances assumed section of the table show a t-value of 0.303 and a p-value of 0.763,  $p > 0.05$  at 58 degrees of freedom. Therefore, the null hypothesis 1 which states that there is no significant difference between the male and female lecturers' perceptions of using artificial intelligence tools in teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State was accepted. This shows that the slight numerical difference observed in Table 1 could probably be attributed to sampling error. Specifically, the table shows that the probability that the mean difference observed in Table 1 was due to sampling error and not a real difference between the male and female lecturers' responses was 76.3% which was greater than the 5% set for the study. This study, therefore, found no statistically significant difference between the responses of the male and female lecturers.

**Null hypothesis 2:** There is no significant difference between the male and female lecturers' responses to the availability of artificial intelligence tools for teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State.

**Table 5: Independent sample t-test on Male and Female Lecturers' Responses to the Availability of Artificial Intelligence Tools for Teaching at AEFUNAI**

|                             | Levene's Test |       | t-test for Equality of Means |       |       |        |       |         |       |
|-----------------------------|---------------|-------|------------------------------|-------|-------|--------|-------|---------|-------|
|                             | F             | Sig.  | T                            | df    | P     | MD     | SED   | 95% CID |       |
| Equal variances assumed     | 1.437         | 0.235 | -0.315                       | 58    | 0.754 | -0.086 | 0.273 | -0.632  | 0.460 |
| Equal variances not assumed |               |       | -0.311                       | 52.85 | 0.757 | -0.086 | 0.276 | -0.640  | 0.468 |

Table 5 shows the independent sample t-test conducted on the male and female lecturers' responses to test the null hypothesis 2. The table shows that Sig. value ( $p = 0.235$ ) obtained in Levene's test was greater than 0.05. This implies that the variances are assumed equal. The results in the equal variances assumed section of the table show a t-value of -0.315 and a p-value of 0.754,  $p > 0.05$  at 58 degrees of freedom. Therefore, the null hypothesis 2 which states

that there is no significant difference between the male and female lecturers' responses to the availability of artificial intelligence tools for teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State was accepted. This shows that the slight numerical difference observed in Table 2 could probably be attributed to error variance. Specifically, the table shows that the probability that the mean difference observed in Table 2 was due to error variance and not a real difference between the male and female lecturers' responses was 75.4% which was greater than the 5% set for the study. This study, therefore, found no statistically significant difference between the responses of the male and female lecturers.

**Null hypothesis 3:** There is no significant difference between the male and female lecturers' responses to the problems of implementation of artificial intelligence tools in teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State.

**Table 6: Independent sample t-test on Male and Female Lecturers' Responses to the Problems of Implementation of Artificial Intelligence Tools in Teaching at AEFUNAI**

|                             | Levene's Test |       | t-test for Equality of Means |       |       |       |       |                  |       |
|-----------------------------|---------------|-------|------------------------------|-------|-------|-------|-------|------------------|-------|
|                             | F             | Sig.  | T                            | df    | P     | MD    | SED   | 95% CID<br>Lower | Upper |
| Equal variances assumed     | 0.005         | 0.947 | 1.611                        | 58    | 0.113 | 0.554 | 0.344 | -0.134           | 1.242 |
| Equal variances not assumed |               |       | 1.581                        | 49.95 | 0.120 | 0.554 | 0.350 | -0.150           | 1.257 |

Table 6 contains the independent sample t-test conducted on the male and female lecturers' responses to test the null hypothesis 3. The table shows that Sig. value ( $p = 0.947$ ) obtained in Levene's test was greater than 0.05. This implies that the variances are assumed equal. The results in the equal variances assumed section of the table show a t-value of 1.611 and a p-value of 0.113,  $p > 0.05$  at 58 degrees of freedom. Therefore, the null hypothesis 3 which states that there is no significant difference between the male and female lecturers' responses to the problems of implementation of artificial intelligence tools in teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State was accepted. This shows that the numerical difference observed in Table 3 could probably be attributed to error variance. Specifically, the table shows that the probability that the mean difference observed in Table 3 was due to error variance and not a real difference between the male and female lecturers' responses was 11.3% which was greater than the 5% set for the study. This study, therefore, found no statistically significant difference between the responses of the male and female lecturers.

### Summary of the major findings

1. The lecturers perceived artificial intelligence tools as vital in teaching and learning at Alex Ekwueme Federal University, Ndufu-Alike, Ebonyi State. Specifically, the lecturers indicated that incorporating adaptive learning encourages learners to learn, virtual classroom inspires students, incorporating intelligent tutorial robots enriches materials, smart campus increases the standard of teaching, intelligent tutorial robots offer a range of real-world experiences,

teaching evaluators can assess students' academic performance, virtual classrooms overwhelm the disadvantages of lecturing, AI tools aid students' self-directed learning, the use of AI tools is fundamental in teaching and learning, and AI tools are necessary for Lecturers to be relevant in their fields of study;

2. The artificial intelligence tools for teaching are very scarce at AEFUNAI. Specifically, there is a shortage of administrative help for AI tools, there is a scarcity of virtual classrooms in AEFUNAI, there is a shortage of intelligent tutorial robots for training the lecturers, and AI tools are very scarce in AEFUNAI, Ebonyi State; and

3. The problems of implementation of artificial intelligence tools in teaching at AEFUNAI, include; lack of time for planning and implementation of AI tools, lack of awareness or enthusiasm on the part of the students on AI tools, lack of awareness of lecturers on AI tools in teaching, and lack of computer-skilled expertise to handle AI tools incorporation in teaching.

## **Discussion of Findings**

### **Lecturers perceived artificial intelligence tools as vital in teaching and learning at Alex Ekwueme Federal University, Ndufu-Alike, Ebonyi State.**

The high positive perception was because they have been exposed to computer and mobile technology usage which have helped them to learn the use of digital technologies knowingly or unknowingly. The lecturers indicated that incorporating adaptive learning encourages learners to learn, virtual classroom inspires students, incorporating intelligent tutorial robots enriches materials, smart campus increases the standard of teaching. The finding is in line with that of Victor et al., (2021) Jiahui et al., (2021).

### **The male and female lecturers' responses to the availability of artificial intelligence tools for teaching at Alex Ekwueme Federal University Ndufu-Alike.**

The artificial intelligence tools for teaching are very scarce at AEFUNAI. Specifically, there is a shortage of administrative help for AI tools, there is a scarcity of virtual classrooms in AEFUNAI, there is a shortage of intelligent tutorial robots for training the lecturers, and AI tools are very scarce in AEFUNAI, Ebonyi State. The finding is in line with that of Balqis et al., (2021) who stated that today, AI has proliferated to reach almost every wing of daily life, education but there is low availability of the AI facilities.

### **The male and female lecturers' responses to the problems of implementation of artificial intelligence tools in teaching at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State**

The problems of implementation of artificial intelligence tools in teaching at AEFUNAI, include; lack of time for planning and implementation of AI tools, lack of awareness or enthusiasm on the part of the students on AI tools, lack of awareness of lecturers on AI tools in teaching, and lack of computer-skilled expertise to handle AI tools incorporation in teaching. This finding is in agreements with Placidius (2014), and Bindu (2017), Oussama et al., (2022). who found out that lack of time for planning and implementation of AI tools, lack of awareness or enthusiasm on the part of the students on AI tools, lack of awareness of lecturers on AI tools in teaching, and lack of computer-skilled expertise to handle AI tools incorporation in teaching are the problems of implementation of AI make teachers not to implement AI in classrooms.

## Conclusion

The lecturers perceived artificial intelligence tools as vital in teaching and learning at Alex Ekwueme Federal University, Ndufu-Alike, Ebonyi State. Incorporating adaptive learning encourages learners to learn, virtual classroom inspires students, incorporating intelligent tutorial robots enriches materials, smart campus increases the standard of teaching, intelligent tutorial robots offer a range of real-world experiences; the artificial intelligence tools for teaching are very scarce at AEFUNAI. There is a shortage of administrative help for AI tools, there is a scarcity of virtual classrooms in AEFUNAI, there is a shortage of intelligent tutorial robots for training the lecturers, and AI tools are very scarce in AEFUNAI, Ebonyi State; and the problems of implementation of artificial intelligence tools in teaching at AEFUNAI, include; lack of time for planning and implementation of AI tools, lack of awareness or enthusiasm on the part of the students on AI tools, lack of awareness of lecturers on AI tools in teaching.

## Recommendations

Based on the findings that emanated from this study, the following recommendation were made.

- Lectures in Alex Ekwueme Federal University Ndufu-Alike, should be encouraged in the use of digital technology. This will enhance the teaching and even in the practical aspect.
- Tertiary institution should provide stable power supply, information and communication technology facilities for lecturers' which will aid their teaching.
- Government should make provision for continuous sensitization training and workshop for lecturers' in tertiary institution. This will further encourage them to engage in the usage of artificial intelligence (AI) tools for teaching
- Government and school administrators should make provision of internet service in the offices of lecturers', this will encourage and enable lecturers to communicate and rapport with other scholars from different part of the world which will give them opportunity to share and access open educational resources materials.