

Awareness, Willingness and Readiness of Pre-Service Teachers to Deploy Artificial Intelligence in Education in Ebonyi State

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Abstract

The study investigated the awareness of artificial intelligence in education among pre-service teachers in Ebonyi State. A descriptive survey research design was adopted. The study samples comprised 100 pre-service teachers who are students from the Departments of Science Education and Arts and Languages Education from AE-FUNAI and EBSU. Three research questions guided the study. The instrument for data collection was a structured questionnaire. Descriptive statistics of simple percentage and mean were used to answer the research questions. Findings of the study revealed that the pre-service teachers are aware of the existence of artificial intelligence in education and are also willing and ready to deploy artificial intelligence to teaching and learning. Consequently, it is recommended that more awareness on the availability of artificial intelligence tools be made to pre-service teachers, curriculum planners should review the curriculum with the view of incorporating artificial intelligence into the curriculum for schools' government and other stakeholders should provide artificial intelligence tools in schools.

Keywords: Artificial intelligence, Pre-Service teachers, Awareness, Willingness, Readiness

Introduction

Higher education is fundamentally associated with advances in innovative technologies and high computational capacities of intelligent machines. The advances in innovative technologies have continued to evolve over the years in man's quest to seek a better and more effective medium of instruction. The developments in the field of artificial intelligence provides new opportunities and challenges for teaching and learning in the context of higher education (Mehrnaz & Sedigheh, 2018).

Artificial intelligence (AI) is defined as computing systems, which engages human-like processes such as learning, adapting, synthesizing, self-correction and the use of data for complex processing tasks (Mehrnaz & Sedigheh, 2018). Artificial intelligence is currently progressing at an accelerated pace, and this already impacts the profound nature of services within higher education. Artificial intelligence that everyone faces in everyday life, is the complicated set of software in the iPhone's Siri (Shulman & Bostrom, 2012). Nowadays, AI can be used by Google for its search engines. Moreover, AI is used in the engine, breaks, and navigation systems of all new cars. Self-driving technology is a top priority for development in some well-known companies like Volvo, Google, and Mercedes (Beam & Kohane, 2016). This technology was first used on trial in Australia in 2015. Noticeably, self-driving technologies are used in mining corporation. In addition, self-driving trucks

are used for different main reasons in Australia (Hillier, 2015).

In higher institutions, students are placed in the center of challenges for learning and teaching. Human-AI interaction is considered as a kind of solution or collaboration that can assist the disabled people around the world. Therefore, these technologies can inspire people to take advantage of AI in higher education (Kelley, Knowles, Abell, Lederman, Bandura & Williams, 2016). It can motivate learners and teachers to be more engaged in the learning and teaching process. In his Encyclopedia of Science, Technology and Ethics, AI is referred to as "a crossbreed of a human and a machine". (Desarrollo, 2015). They include complex-computing systems that use the machine learning algorithms which are able to help individuals with different kinds of abilities. AI has revolutionized education by enhancing teaching methods, course content, and other materials, learning is not limited to classrooms anymore (Ahmad, 2020). In education, AI could be applied in several ways. It can support teachers, predict student performance, evaluate and grade students and improve course contents. The field of artificial intelligence is an area that is competed by some giant technologies such as Apple, Google, Microsoft, and Facebook, and they invest a lot on its new applications and research. According to a report by Google in December 2015, a new model of computer that was called D-Wave 2X is able to do the complex

operations of AI (Caplar, Tacchella, & Birrer, 2017). This model of computer is faster than the current computers. To Google researchers, it is a leap ahead and a significant breakthrough in the area of AI. “We hope it helps researchers construct more efficient and more accurate models for everything from speech recognition, to web search, and protein folding” (Elsayed, Thomas, Marriott, Piantadosi, & Smith, 2015). Investing in AI can influence academic settings. Perhaps the economic problems for students of higher education are good reasons for seeking AI solutions. The combination of a machine and human brain is feasible, and this issue poses a challenge for the teachers to look for new dimensions, functions, and pedagogies in many different contexts for learning and teaching. For instance, the interface of brain and computer has drawn the attentions of researchers in all around the world. By taking the analysis methods and brain signals together with some approaches in new computing systems, the professionals in the field of computer have provided some solutions in order to manage the software with an interface of brain and computer (Kena, Musu-Gillette, Wang, Rathbun, Zhang & Veelez 2015). The brain-computer interface can take and decode brain activity. In addition, it can make the communication easier among those have disabilities associated with motor function (Pandarinath, Nuyujukian, Blabe, Sorice, Saab, Willett & Henderson 2017).

Our skills and abilities are enhanced by the quick expansion of technology to use AI functions. Innovation in education is not just a matter of putting more technology into more classrooms; it is about changing approaches to teaching so that students acquire the skills they need to thrive in competitive global economies (Schleicher, 2012).

Studies on the impact, potential, awareness and deployment of artificial intelligence in education have revealed that AI imparts positively on education, the potential is high, the level of awareness varies as some teachers who employ the use of AI are not even aware of it and most instructors are willing to deploy AI in education (The Fernández, Fernández and Aburto, 2019; Ma and Keng, 2018; Khare, Stewart and Canada, 2018; Gamoura, 2018; Fahimirad & Kotamjani 2018; Al-Saud, 2016; Abu Hasanein, 2018; Alqattan, 2012).

In view of the realities outlined, this research found out the Awareness, willingness and readiness to deploy artificial intelligence in education among pre-service teachers in Ebonyi State.

Statement of the Problem

The entire world was adversely affected by the impact of the lockdown due to the recent COVID-19 pandemic, with the education sector most hit where schools were shut down and students had no access to formal education. Several institutions opted for virtual learning using different online platforms where artificial intelligence was employed. The benefits of AI in the education sector are astounding. Artificial Intelligence can automate grading in an Educational Context grading homework and tests usually take a significant amount of time. This time could be used to work on professional development, interact with students and prepare for class (Khare, Stewart & Khare, A. 2018). This AI system contributes to providing explanation of courses, and to ensure that all students are building the same conceptual basis. Hence, lecturers with the ability to employ technology for their teaching strategy can gain the advantages of automatic data created from students’ engagement. The application of AI technologies assists lecturers to manage their classes appropriately and they can spend less time on paperwork and spend more time on obtaining invaluable insights from AI tools to deliver higher quality research-informed teaching (Pandarinath, Nuyujukian, Blabe, Sorice, Saab, Willett, & Henderson, 2017). As a result of the benefits and positive effects derived from the use of these AI technologies, the research investigated the level of awareness, willingness and readiness to employ artificial intelligence in education among pre-service teachers in Ebonyi state.

Objectives of the Study

The objective of this study was to investigate the degree of awareness, willingness and readiness to deploy artificial intelligence in education among pre-service teachers in Ebonyi state. Specifically, the study was able to:

1. Determine the pre-service teachers’ awareness of the use of Artificial Intelligence (AI) in education in Ebonyi State.
2. Determine the willingness of the pre-service teachers to deploy artificial intelligence in teaching processes in Ebonyi State.
3. Determine the pre-service teachers’ readiness to deploy the use of artificial intelligence in teaching in Ebonyi State.

Research Questions

The following questions were raised to guide the study:

1. What are the pre-service teachers' levels of awareness of the use of Artificial Intelligence (AI) in education in Ebonyi State University and Alex Ekwueme Federal University?
2. Are pre-service teachers willing to deploy artificial intelligence in teaching processes in Ebonyi State University and Alex Ekwueme Federal University?
3. Are pre-service teachers ready to deploy artificial intelligence in teaching in Ebonyi State University and Alex Ekwueme Federal University?

Methodology

The study adopted a descriptive type of survey research which entails the use of questionnaire to elicit needed information from pre-service teachers based on their opinions and views regarding the awareness level, willingness and readiness to deploy artificial intelligence in education. The study was conducted in two universities in Ebonyi state: Alex Ekwueme Federal University, Ndufu Alike Ikwo (AE-FUNAI) and Ebonyi State University, Abakiliki (EBSU). The sample for this study was determined by using proportionate sampling techniques which allows respondents to be selected proportionally from the given stratum of the population. For the purpose of this research, 100 pre-service teachers were randomly selected from from a total population of three hundred and thirty-one (331) 300 level pre-service teachers based on the suggestion of Krejcie and Morgan (1970) and Sambo (2008). The selection of the pre-service teachers was on percentage to

avoid error where 50 pre-service represents 30% of the population from Alex Ekwueme Federal University and Ebonyi State University respectively. Pre-service Teachers Awareness, Willingness and Readiness (PTAWR) questionnaire was used for data collection. It consists of four sections (Section A, B, C and D). Section A was designed to collect respondents' demography, Sections B, C and D were respectively designed to collect data regarding the awareness level, willingness and readiness attributes of the respondents. There were 30 items in all, with the awareness level, willingness and readiness having 10 items each. A 4-point scale was used in weighing expert responses in which Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) were awarded 4, 3, 2 and 1 points respectively. A decision rule was set, in which mean score of 2.50 above was considered Agreed while a mean score below 2.50 was considered Disagreed. The face and content validity of the questionnaire was done by two ICT experts and a measurement and evaluation experts to provide their judgments on the items. Positive feedbacks were received and some minor revisions were made to the instrument according to their suggestions. The reliability of the constructs (the extent to which the items in the questionnaire were related to each other were examined using Cronbach's alpha formula, reliable coefficients ranging from 0.70 – 0.85 were obtained. The duly completed questionnaire were collated and analyzed to answer the three research questions. Specifically, descriptive statistics of simple percentage and mean were used for the analyses which are presented in Tables 1, 2 and 3 with their findings and discussion following.

Results

Table 1: Pre-service Teachers' Responses on Awareness of the Use of Artificial Intelligence in Education

S/N.	STATEMENT	Institution	SA	A	D	SD	X
	I am aware that:						
1.	Artificial Intelligence (AI) is in existence	AE-FUNAI	22 (44.00%)	15 (30.00%)	6 (12.00%)	7 (14.00%)	3.04
		EBSU	23 (46.00%)	19 (38.00%)	5 (10.00%)	3 (6.00%)	3.24
2.	AI tools like computers, smart phones, speech recognition software, Virtual monitors, Online assistance, self-driving cars etc. can be used in schools	AE-FUNAI	15 (30.00%)	20 (40.00%)	12 (24.00%)	3 (6.00%)	2.94
		EBSU	20 (40.00%)	25 (50.00%)	3 (6.00%)	2 (4.00%)	3.26
3.	AI tools are readily available for use, reuse and research	AE-FUNAI	19 (38.00%)	16 (32.00%)	8 (16.00%)	7 (14.00%)	2.94
		EBSU	17 (34.00%)	21 (42.00%)	9 (18.00%)	3 (6.00%)	3.04
4.	AI provides assistance and quality free materials for teaching	AE-FUNAI	16 (32.00%)	22 (44.00%)	7 (14.00%)	5 (10.00%)	2.98



	EBSU	12 (24.00%)	25 (50.00%)	7 (14.00%)	6 (12.00%)	2.86
5. AI can be used for teaching	AE-FUNAI	13 (26.00%)	27 (54.00%)	6 (12.00%)	4 (8.00%)	2.98
	EBSU	20 (40.00%)	20 (40.00%)	7 (13.90%)	3 (6.00%)	3.14
6. AI could be used to complement normal class teaching	AE-FUNAI	14 (28.00%)	14 (28.00%)	15 (30.00%)	7 (14.00%)	2.70
	EBSU	15 (30.00%)	12 (24.00%)	18 (36.00%)	5 (10.00%)	2.74
7. AI can provide feedbacks to teaching and learning activities	AE-FUNAI	12 (24.00%)	16 (32.00%)	19 (38.00%)	3 (6.00%)	2.74
	EBSU	18 (36.00%)	18 (36.00%)	12 (24.00%)	2 (4.00%)	3.04
8. AI encourage globalization of teaching curriculum	AE-FUNAI	10 (20.00%)	13 (26.00%)	22 (44.00%)	5 (10.00%)	2.56
	EBSU	8 (16.00%)	21 (42.00%)	13 (26.00%)	8 (16.00%)	2.58
9. Adoption of AI can advance openness and sharing of intellectual properties	AE-FUNAI	14 (28.00%)	15 (30.00%)	14 (28.00%)	7 (14.00%)	2.72
	EBSU	14 (28.00%)	23 (46.00%)	9 (18.00%)	4 (8.00%)	2.94
10. AI fosters collaboration and innovation among teachers.	AE-FUNAI	10 (20.00%)	19 (38.00%)	16 (32.00%)	5 (10.00%)	2.68
	EBSU	9 (18.00%)	20 (40.00%)	13 (26.00%)	8 (16.00%)	2.60
Average Percentage and Mean		32.00%	37.00%	22.00%	9.00%	2.88
		69.00%		31.00%		

The results in Table 1 show that 69.00% of surveyed pre-service teachers are aware of the existence of artificial intelligence. The mean score of this factor is 2.88 which is above the benchmark of 2.5 set for

this study shows that majority of the pre-service teachers are significantly aware of the existence and application of Artificial Intelligence in education.

Table 2: Pre-service Teachers' Responses on their Willingness to Deploy Artificial Intelligence in Teaching Processes

S/N.	STATEMENT	Institution	SA	A	D	SD	X
I am willing to:							
11.	Use AI tools in text, audio or video format for teaching.	AE-FUNAI	17 (34.00%)	31 (62.00%)	1 (2.00%)	1 (2.00%)	3.38
		EBSU	24 (48.00%)	22 (44.00%)	3 (6.00%)	1 (2.00%)	3.28
12.	Adopt AI tools for teaching to be in tune with global academic trend.	AE-FUNAI	11 (22.00%)	35 (70.00%)	4 (8.00%)	0 (0.00%)	3.36
		EBSU	19 (38.00%)	30 (60.00%)	1 (2.00%)	0 (0.00%)	3.14
13.	Use the knowledge of ICT for accessing AI materials for teaching and learning.	AE-FUNAI	18 (36.00%)	28 (56.00%)	4 (8.00%)	0 (0.00%)	2.98
		EBSU	12 (24.00%)	30 (60.00%)	3 (6.00%)	5 (10.00%)	3.28
14.	Learn about effectiveness and efficiency of AI tools for my teaching.	AE-FUNAI	14 (28.00%)	32 (62.00%)	4 (8.00%)	0 (0.00%)	3.30
		EBSU	22 (44.00%)	21 (42.00%)	7 (14.00%)	0 (0.00%)	3.20
15.	Share educational resources and AI tools for others to use.	AE-FUNAI	19 (38.00%)	23 (46.00%)	5 (10.00%)	3 (6.00%)	3.16
		EBSU	21 (42.00%)	16 (32.00%)	13 (26.00%)	0 (0.00%)	3.16



			(42.00%)	(32.00%)	(26.00%)	(0.00%)	
16.	Use AI tools because they are available at reduced cost.	AE-FUNAI	17	21	5	7	3.18
		EBSU	18	24	7	1	2.98
			(34.00%)	(42.00%)	(10.00%)	(14.00%)	
17.	Use AI tools because they can be reused at minimal or no cost.	AE-FUNAI	17	18	11	4	3.08
		EBSU	15	24	11	0	2.96
			(36.00%)	(48.00%)	(14.00%)	(2.00%)	
18.	Use AI equipment and portals related to my discipline and specialization.	AE-FUNAI	18	28	2	2	3.30
		EBSU	20	25	5	0	3.24
			(36.00%)	(56.00%)	(4.00%)	(4.00%)	
19.	Interact with other AI users in the teaching profession.	AE-FUNAI	19	29	2	0	3.36
		EBSU	23	22	5	0	3.34
			(38.00%)	(58.00%)	(4.00%)	(0.00%)	
20.	Use AI to enhance my teaching skills and pedagogy.	AE-FUNAI	16	26	0	8	3.36
		EBSU	22	26	0	2	3.00
			(32.00%)	(52.00%)	(0%)	(16.00%)	
			(44.00%)	(52.00%)	(0%)	(4.00%)	
Average Percentage and Mean			36.30%	51.00%	9.30%	3.40%	3.20
			87.30%	12.70%			

It can be observed from the data in Table 2 that the mean scores of all items are above the set bench mark of 2.5 on a 4-point scale, the average mean score of the factors is 3.20. The table also revealed that majority (87.30%) of the surveyed pre-service

teachers are willing to deploy artificial intelligence in education to enhance their teaching skills, collaborate with other teachers, share educational resources among others to effect better instruction.

Table 3: Pre-service Teachers' Responses on their Readiness to Deploy Artificial Intelligence in Teaching Processes

S/N.	STATEMENT	Institution	SA	A	D	SD	X
21.	I can use computers, smart phones and other AI tools effectively	AE-FUNAI	28	12	0	10	3.32
		EBSU	28	14	4	4	3.16
			(56.00%)	(28.00%)	(8.00%)	(8.00%)	
22.	I know how to solve my own problems when using technology	AE-FUNAI	17	11	8	14	2.98
		EBSU	16	21	9	4	2.62
			(32.00%)	(42.00%)	(18.00%)	(8.00%)	
23.	I am abreast of new AI technologies	AE-FUNAI	11	19	5	15	3.00
		EBSU	14	22	14	0	2.52
			(22.00%)	(38.00%)	(10.00%)	(30.00%)	
24.	I can easily learn technologies	AE-FUNAI	11	21	6	12	3.12
		EBSU	18	23	6	3	2.62
			(22.00%)	(42.00%)	(12.00%)	(24.00%)	
			(36.00%)	(46.00%)	(12.00%)	(6.00%)	
25.	I can create blogs and web pages	AE-FUNAI	9	17	12	12	2.64
		EBSU	14	15	10	11	2.46
			(18.00%)	(34.00%)	(24.00%)	(24.00%)	
			(28.00%)	(30.00%)	(20.00%)	(22.00%)	
26.	I can use the software that are created specifically for my teaching subject.	AE-FUNAI	18	16	6	10	2.90
		EBSU	14	22	9	5	2.84
			(36.00%)	(32.00%)	(12.00%)	(20.00%)	
			(28.00%)	(44.00%)	(18.00%)	(10.00%)	

27.	I know about the technologies that I can use for the research of content of teaching subject.	AE-	11	23	6	10	2.82
		FUNAI	(22.00%)	(46.00%)	(12.00%)	(20.00%)	
		EBSU	10	26	9	5	2.70
			(20.00%)	(52.00%)	(18.00%)	(10.00%)	
28.	I can use appropriate technologies (e.g simulation, multimedia resources) to present the content of my teaching subject.	AE-	14	20	7	9	2.86
		FUNAI	(28.00%)	(40.00%)	(14.00%)	(18.00%)	
		EBSU	13	22	10	5	2.80
			(26.00%)	(44.00%)	(20.00%)	(10.00%)	
29.	I can easily access AI tools to be used in teaching and learning.	AE-	13	22	9	7	2.78
		FUNAI	(26.00%)	(44.00%)	(18.00%)	(14.00%)	
		EBSU	11	26	10	3	2.90
			(22.00%)	(52.00%)	(20.00%)	(6.00%)	
30.	Most of the AI tools available are affordable by the teacher and are provided by schools.	AE-	12	17	9	12	2.73
		FUNAI	(24.00%)	(34.00%)	(18.00%)	(24.00%)	
		EBSU	11	22	13	4	2.80
			(22.00%)	(44.00%)	(26.00%)	(8.00%)	
Average Percentage and Mean			29.30%	39.10%	16.20%	15.40%	2.83
			68.40%	31.60%			

The results in Table 3 reveals that almost all the items are above 2.50 on a 4-point scale. The average mean score of the factors is 2.83; with the lowest and highest mean scores of 2.46 and 3.32 respectively. It is clear from the table that majority (68.40%) of the respondents are ready to deploy artificial intelligence in education.

Findings

The findings in the research revealed that pre-service teachers Ebonyi State have a high level of awareness of the existence of Artificial Intelligence (AI); the use of AI tools like computers, smart phones, etc. in schools; available AI tools readily for use, reuse and research; provision of AI for assistance and quality free materials for teaching; the use of AI for teaching and to complement normal class teaching; free sharing of AI and provision of feedbacks to AI for fostering of collaboration and innovation among teachers teaching and learning activities; and the use of AI to encourage globalization of teaching curriculum. This finding is in agreement with that of Gamoura (2018) whose research gave the foundations of artificial intelligence and characteristics and some of its living models to shed light on the reality of its developments and aspirations between what it actually reached and what it hopes to reach with positive feedback from the selected respondents on their knowledge of the concept.

The research also revealed that pre-service teachers of the Ebonyi State University and Alex Ekwueme Federal University are generally willing to deploy/use AI tools to enhance their teaching skills and pedagogy. This is in tune with Alqattan (2012) study which showed that there is an effective interest towards adopting artificial intelligence in the

managerial leadership of the organizations participating in the study.

It was also found out from the study that pre-service teachers in Ebonyi State have shown readiness to deploy artificial intelligence in education. These finding agrees with that of Fernández, Fernández, and Aburto (2019) who revealed from their studies that the coming period will witness the transition from the traditional roles of universities to new ones such as replacing the traditional language with the digital language, and the development of teaching methods in a new way.

Conclusion

This study investigated the awareness of artificial intelligence among pre-service teachers in Ebonyi state. From the results it was found out that the pre-service teachers of Ebonyi State are aware of artificial intelligence tools used for learning and they are also ready and willing to deploy artificial intelligence to teaching and learning if taught on how to effectively use the tools to improve teaching and learning. It is hoped therefore that artificial intelligence is included in the pre-service teacher's curriculum and experts who knows how to use them for effective teaching are employed to guide the pre-service for some time. And this will make pre-service teachers to present and envisaged changes in teaching and learning. Consequently, the students can be also taught how to use artificial intelligence to learn at their own pace and improve their learning skills.

Recommendations

Based on the findings from the study, the following recommendations are made:

1. More awareness on the availability of artificial intelligence tools should be made to pre-service teachers.

2. The National Educational Research and Developmental Council (NERDC) should review the pre-service teacher's curriculum with the view of incorporating artificial intelligence into the curriculum of the pre-service teachers.
3. Government and other stakeholders should provide artificial intelligence tools in schools.
4. Education boards and administrators should organize conferences for the in-service teachers to sensitize them about artificial intelligence and its impact to education.

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