Integration of Artificial Intelligence Tool (Ai-Chatbot) into Teaching and Learning: A Panacea for Improving Universities` Educational and Administrative Duties in South-South, Nigeria

Afonughe Endurance, Onah Eunice N, Uzoma Anthonia C, Andor Sebastine E, and Orisakwe Christiana U

Department of Computer and Robotic Education, Science Education, Faculty of Vocational and Technical Education University of Nigeria, Nigeria

Abstract

Recent innovations in the field of Artificial intelligence (AI) has led to diverse influx of newer technologies, such as expert systems, intelligence tutoring systems (ITS) and conversation technologies among others. Conversational technologies such as AI-chatbot is capable of sharing and reducing the multiple-task which the 21st century school administrators and lecturers are saddled with. Since this hectic tasks; instructional delivery of contents, assessment and grading of students learning outcome, career guardian/counseling services are enormous. It is on this premise that the present study is necessitated, to investigate the integration of AI-chatbot into teaching and learning: A panacea for improving educational and administrative duties among universities in South-South geopolitical zone, Nigeria. The study adopted a descriptive survey research design. Three objectives with corresponding research questions guided the study. Three hypotheses were also tested at 0.05 alpha significant levels. The population of the study is 252,000 public universities students in South-South (Delta state, Edo State and Bayelsa). The sample size used was 399 respondents (274 students, 67 lecturers and 58 admin staffs) in the state and federal universities in the states. The instrument used for data collection was AICHATBOTSQ (AI-chatbot structured questionnaire) consisting of 20 items. Data gathered were analyzed using mean, standard deviation and analysis of variance (ANOVA). The study found that there is no significant difference in the mean rating of respondents on the need for AI-chatbot in teaching and learning as well as performing administrative tasks among universities in South-South; there is little availability of AI-chatbot technology in handling universities` administrative duties; and, the findings shows that poor internet facilities, instabilities in governance, inadequate funding, poor electricity supply among others are factors inhibiting implementation of AI-chatbot towards administrative duties among universities in South-South, Nigeria. Therefore, this study recommends full integration of artificial intelligence tool (AI-chatbot) into teaching and learning as a means for improving universities` educational and administrative duties in in south-south, Nigeria. Also, federal government should provide internet services for proper integration of AI-chatbot into education in universities in South-South geopolitical zone and Nigeria in general.

Keywords: Artificial intelligence • Chatbot • Administrative duty • Panacea • Education

Introduction

Education being a hub connecting other nations` sector of economy, paving way for desired prosperities via human and capacity development, has played enormous role by redefining how best to learn in this present dispensation. Perhaps this is why the renowned Professor Blaike opined that education is the biggest industry that touches on every fabric of our human endeavor, whose footings lies in educational activities [1]. These Educational activities (teaching, learning, and administrative duties) are being pioneered by her key stakeholder (lecturers/instructors, administrators), whom are engaged in diver's pedagogical practices. Practices like instructional delivery of contents, assessment and grading of students learning outcome, career guardian/counseling services among others [2]. Aiming to get these multiple task done by this school stakeholders, in a fewer time is termed overworked [3], since the work exceeds the normal size of task needed in that office at particular time. Thus, this multiple task characterizes the present administrative duty of most university course lecturer/instructors, which has consequently had a negative effect like; emotional exhaustion [4], stress, and burnout [5] and, sometimes, even 'Karoshi' (Japanese terms for death from overwork).

*****Address for Correspondence:** *Afonughe Endurance, Department of Computer and Robotic Education, Science Education, Faculty of Vocational and Technical Education University of Nigeria, Nigeria, Tel: +2347052855295, E-mail: afonugheendurance360@gmail.com*

In the light of the above, the administrative task of the lecturer if not shared or reduced, could be catastrophe to universities in South-South geopolitical zone and Nigeria educational system in general, by implicatively leading to decline on students` academic achievement during teaching and learning process [6]. Nevertheless, measures has been employed in time past by school administrators and lecturers, by designing time table at which they can attend to teaching, and to also meet the administrative needs of the students and other school activities on weekly basis. However, this has yielded little or less positive result. As this multi-task only make some of the lecturers/administrators vulnerable to sickness, decline in health. Hence, it is on this backdrop the present study, call for the need to leverage on the prospect of information and communication technology (ICT) tools, emerging innovative technologies like computer aided instruction (CAI), internet of things (IoT), artificial intelligence (AI) and other AI technologies, such as the AI-chatbot [7] into teaching and learning among universities in South-South (Delta, Bayelsa and Edo) geopolitical zone, Nigeria. Artificial intelligence (AI) being in a class of the fifth generation of computer development, refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions [8]. Nevertheless, resent advancement in the field of (AI) has led to the birth of newer artificial intelligence tool called AI-chatbots.

AI-chatbots (artificial intelligence-enabled chatbots) is a conversational tool or a developed software application that operates with highly programmed algorithm and intelligence that runs on social network Apps/ platform such as facebook messenger, WhatsApp among others. The optimal goal of AI-chatbots is to explore the key AI functions (mimic human natural language, senses and perception in solving complex problem) to hold a conversation with the end user by giving directions and guidance to the individual who sought for these service. A review of literatures has shown that as new as AI-chatbot might be, its application has been seen in different aspect of economy (banking,

business, transportation, Aviation, education) sector in the developed countries. However, very little impact has been seen in transportation. A lagos-based AI-chatbot that operate via Google map to give direction and guides to commuters/passengers which is foundly called "Larang or road preppers", makes it easier to move around Lagos State easily [9].

Similarly, another area that has witnessed AI application in Nigeria economy, is the business/banking sector. The most prominent AI-tool that has helped in transforming the business world is the "Kudi AI". Kudi is a chatbot powered by artificial intelligence (AI), which uses an everyday conversational AI system to communicate to her client. She helps you transfer money, keep track of your account details, buy airtime, pay recurrent bills such as GOTV, DSTV And PHCN and she also reminds you when some of this bills are due (Figure 1) [10].

Ironically, as helpful as this AI-powered conversational technology has been in the mentioned aspect of the economy, little or none has been felt in the education sector for teaching and handling of administrative duties. As none of the reviewed literatures has call for AI-chatbots integration into teaching and learning and administrative duties among the universities in South-South, Nigeria. Therefore, the present study x-rayed the need for integration of artificial intelligence tool (AI-chatbots) into teaching and learning: a panacea for improving universities` educational and administrative duties in south-south, Nigeria.

This technology is not to replace of the school administrators and lecturer as many feared, but to support and ease off some tasks. When administrators and lecturers are relieved of some tasks like; provision admission guidelines, accommodation issues, scheduling of lecture time table, assessment, grading of student learning experience and responding to other frequently asked questions (FAQs) to students and prospective student, it will undoubtedly affords these lecturers needed rest [11]. This could enable them channel their spare time to other important aspect of education.

Statement of the problem

Education has been a veritable tool at which any nations` economy cannot ignore. The success of this educational attainment is hinged on the effectiveness of key stakeholder like the course lecturers and administrative staffs of the school. Most of these lecturers as well as the administrative staffs performed relatively well and even far beyond their respective job specification, which is termed overworked. These overwork/multiple tasks resting on the single shoulder of these school stakeholders, most time causes tiredness, sickness, social withdrawer among others, which might consequently lead to death. Recent studies have shown that most universities in the south-south geopolitical zone, have lost most of their lecturers as well as their administrative task to different form of ailment ranging from; emotional exhaustion, stress, just to mention a few.

When these lecturers /administrative staff are down to these ailments, they could find it difficult to teach and give adequate attention in meeting the learning, administrative and guardian needs of the student. Thus, leading to decline on students` academic achievement as well as poor information link. Therefore, it is on this premise that the present study call for leverage on the AI-conversation technology (AI-chatbots), to help share, reduce their excessive workload saddled with these stakeholders. When the AI-chatbots handles some of the task (allocation of lecture time table, scoring and grading of students test or results, updating students when hostel accommodation portal will open, giving direction and rendering of counseling services to academically challenged students etc.,) will undoubtedly afford lecturers and administrative staffs, to channel their spare time aside lecturing, into a more fruitful courses; extra curricula activities (field trips, excursion) that will enhance learning and to possibly have a good time with their immediate family and friends. It is on this backdrop that the present recommend the integration of artificial intelligence tool (AI-chatbot) into teaching and learning: a panacea for improving universities` educational and administrative duties in south-south, Nigeria.

Purpose of the study

1. Determining the extent of availability of AI-chatbot technology for enhancing teaching/learning and administrative tasks in Universities in South-South, Nigeria.
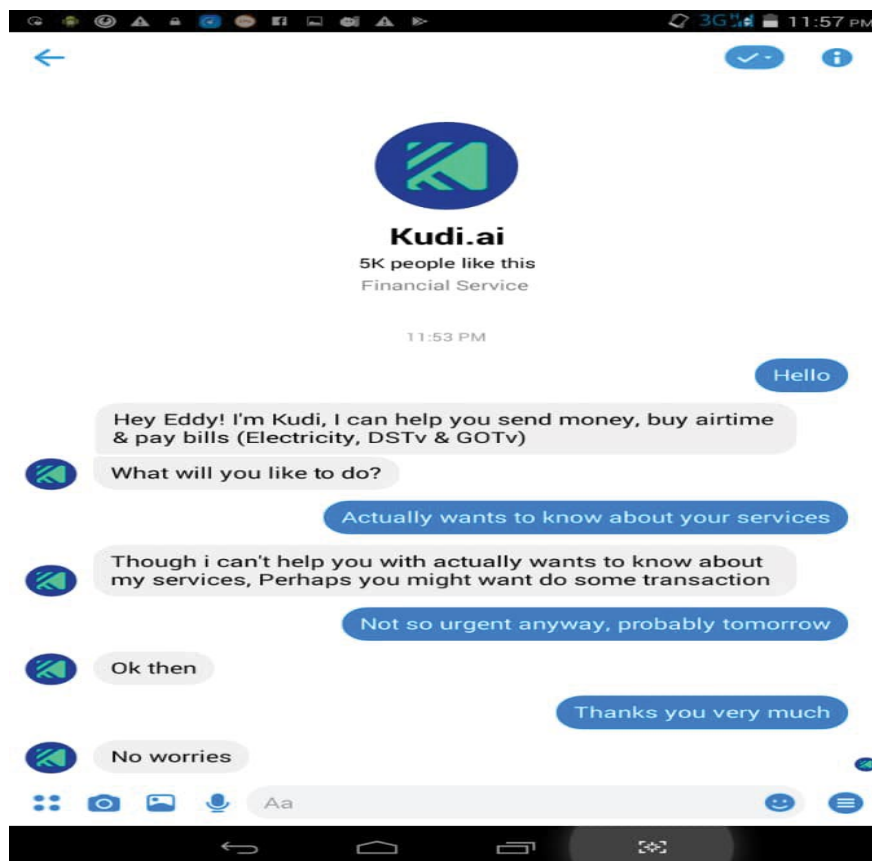

Figure 1. Screen-shot of conversation between the present researcher and AI-Chatbot (Kudi.Ai).

2. Determining the extent to which integration of AI-chatbot in education can enhance teaching/learning and administrative tasks in Universities in South-South, Nigeria.

3. Determining the factors inhibiting implementation of AI-chatbot in handling administrative duties universities in South-South, Nigeria.

Research questions

1. What is extent of availability of AI-chatbot technology for enhancing teaching/learning and administrative tasks in Universities in South-South, Nigeria?

2. What is the extent to which integration of AI-chatbot in education can enhance teaching/learning and administrative tasks in Universities in South-South, Nigeria?

3. What are the factors inhibiting implementation of AI-chatbot in handling teaching/learning and administrative duties among universities in South-South, Nigeria?

Research hypothesis

H_{01}: There is no significant difference in the mean rating of respondents in Federal and State Universities on the extent of availability of AI-chatbot technology for enhancing Teaching/learning and administrative tasks in Public Universities in South-South, Nigeria.

H_{02}: There is no significant difference in the mean rating of respondents in Federal and State Universities on the extent to which integration of AI-chatbot in education can enhance Teaching/learning and administrative tasks in Public Universities in South-South, Nigeria.

H_{03}: There is no significant difference in the mean rating of respondents in Federal and State Universities on the factors inhibiting the integration of AI-chatbot in teaching/learning and administrative tasks in Public Universities in South-South, Nigeria.

Research Methodology

The study adopted descriptive survey research design. According to Osuala, Olelewe et al. [12,13] this research design involves the collection of detailed description of public opinion on the existing phenomena with the intent to justify conditions and practices to make better current conditions and practice to make better plans for improving phenomena. The study was conducted in three randomly selected (Delta, Bayelsa and Edo state) public universities in South-South geopolitical zone, Nigeria. The population of the study is 252,000 public universities students in South-South. And a sample

of 399 students was drawn from the selected institutions. Cluster sampling technique was used in selecting the sample.

The instrument used for data collection was AICHATBOTSQ (AI-chatbots structured questionnaire) consisting of 20 items. Section `A` sought the demographic data of the respondents, while section `B` had three (3) cluster with 20 items. The respondents were requested to indicate their opinions on the first cluster; on a 4-point scale of strongly agreed=4 point, agreed=3, disagreed=2, strongly disagreed=1 and very high extent (VHE)=4, high extent (HE)=3, low extent (LE)=2, very low extent (VLE)=1 respectively. More so, the respondents are requested to indicate their views on the three cluster; on same 4-point scale of; VHE=4, HE=3, LE=2, VLE=1. Furthermore, AICHATBOTSQ was validated by three experts; two from faculty of vocational technical education and one from faculty of education, all from university of Nigeria, Nsukka. The AICHATBOTSQ was personally administered by the researchers. Data gathered were analyzed using mean, standard deviation and analysis of variance (ANOVA). However, for the three clusters, any item with the mean score of 2.50 and above was accepted and deduced high availability and high extent; while item with mean score below 2.50 is rejected, thus regarded as no usage of AI-chatbots respectively.

Results

Results in Table 1 shows that all the items (1-5) had mean ratings within the range of 1.50-2.49 set as criterion for low extent. Furthermore, the grand mean rating of ($\bar{x}$=2.30, SD=0.46) is also within the same range for low extent. This therefore implies that the availability of AI-chatbot technology for enhancing teaching/learning and administrative tasks in Universities in South-South, Nigeria is to a low extent.

Result in Table 2 shows that a t-value of 0.76 with a degree of freedom of 397 and a significant value of 0.45 were obtained. Since the significant value of 0.45 is greater than 0.05 set as level of significance for testing the hypothesis, this implies that the result is not significant. Therefore, the null hypothesis one (H_{01}) is not reject. The conclusion drawn is that there is no significant difference in the mean rating of respondents in Federal and State universities on the extent of availability of AI-chatbot technology for enhancing teaching/learning and administrative tasks in Public Universities in South-South, Nigeria. This implies that the low extent of availability of AI-chatbot technology for enhancing teaching/learning and administrative tasks in Universities does not differ significantly among Federal and State universities in South-South, Nigeria.

Results in Table 3 shows that the mean ratings for all the items (6-15) are within the range of 2.50-3.49 set as criterion for high extent. Likewise, the grand mean rating of ($\bar{x}$=3.10, SD=0.30) is also within the same range for high extent. This is an indication that the integration of AI-chatbot in education can

Table 1. Mean ratings and standard deviation of respondents on extent of availability of AI-chatbot technology for enhancing teaching/learning and administrative tasks in Universities in South-South, Nigeria.

S. No.	Items	N	Mean	Std. Deviation	Decision
1	Availability of source of electricity	399	2.27	0.51	LE
2	Availability of source of alternative power supply	399	2.24	0.55	LE
3	Availability of ICT devices (laptops, tablets, smart phones etc.)	399	2.27	0.57	LE
4	Availability of internet services	399	2.39	0.64	LE
5	Availability of manpower for managing AI-Chatbot	399	2.34	0.66	LE
	Grand Mean	**399**	**2.3**	**0.46**	**LE**

Key: N=Number of Respondents, Std=Standard Deviation, Very High Extent (VHE) equals 3.50-4.00, High Extent (HE) equals 2.50-3.49, Low Extent (LE) equals 1.50-2.49 while Very Low Extent (VLE) equals 1.00-1.49.

Table 2. t-test Analysis of the significant difference in the mean rating of respondents in Federal and State universities on the extent of availability of AI-chatbot technology for enhancing teaching/learning and administrative tasks in Public Universities in South-South, Nigeria.

Universities	N	$\bar{X}$	SD	t-value	df	Sig.	Dec.
Federal	269	2.31	0.44	0.76	397	0.45	NS
State	130	2.28	0.49	-	-	-	-

Note: NS=Not Significant.

enhance teaching/learning and administrative tasks in Universities in South-South, Nigeria to a high extent.

Result in Table 4 reveals that a t-value of -0.45 with a degree of freedom of 397 and a significant value of 0.65 were obtained. Given that the significant value of 0.65 is greater than 0.05 set as level of significance for testing the hypothesis, this shows that the result is not significant. Thus, the null hypothesis two (H_{02}) is not reject. Consequently, the conclusion drawn is that there is no significant difference in the mean rating of respondents in Federal and State universities on the extent to which integration of AI-chatbot in education can enhance teaching/learning and administrative tasks in Public Universities in South-South, Nigeria. This shows that respondents from both Federal and State Universities do not differ significantly in their views that on the extent to which integration of AI-chatbot in education can enhance teaching/learning and administrative tasks in Public Universities in South-South, Nigeria.

Results in Table 5 shows that the mean ratings for all the items (1-5) are within the range of 2.50-3.49 set as criterion for high extent. Furthermore, the grand mean rating of ($\bar{x}$=3.30, SD=0.28) is also within the same range for high extent. This therefore implies that all the items in Table 5 are some of the factors inhibiting the integration of AI-chatbot in teaching/learning and administrative tasks in Universities in South-South, Nigeria to a high extent.

Result in Table 6 shows that a t-value of -1.65 with a degree of freedom of 397 and a significant value of 0.10 were obtained. Since the significant value of 0.10 is greater than 0.05 set as level of significance for testing the hypothesis,

this implies that the result is not significant. Therefore, the null hypothesis three (H_{03}) is upheld. Thus, the conclusion drawn is that there is no significant difference in the mean rating of respondents in Federal and State universities on the factors inhibiting the integration of AI-chatbot in teaching/learning and administrative tasks in Public Universities in South-South, Nigeria. In essence, respondents from both Federal and State Universities do not differ significantly in their views that on the factors inhibiting the integration of AI-chatbot in teaching/learning and administrative tasks in Public Universities in South-South, Nigeria.

Discussion

Based on the analysis of data, some findings were made which is now discussed.

The findings on extent of availability of AI-chatbot technology for enhancing teaching/learning and administrative tasks in Universities in South-South, Nigeria, provide support to the claim of Söllner et al. [14], who share in the view that though the extent of AI-chatbots availability is low, schools who have integrated it into their educational system have witnessed improved learning as well as administrative needs. AI-chatbot if made available could enhance teaching and learning as well as undergo administrative functions in institution of learning. The chatbot-mediated learning process quality can have a remarkable impact on learning outcomes [15].

Table 3. Mean ratings and standard deviation of respondents on the extent to which integration of AI-chatbot in education can enhance teaching/learning and administrative tasks in Universities in South-South, Nigeria.

S No.	Items	N	Mean	Std. Deviation	Decision
1	AI-chatbots can help students understand difficult concepts in a way that feels as if they are being taught by another person	399	3.42	0.55	HE
2	AI-chatbot could help complement lecturers instruction delivery classroom task	399	3.3	0.66	HE
3	AI-chatbots could enables lecturers to reach, teach and address students queries on-the-go	399	3.43	0.58	HE
4	Students with academic challenges could get counseling services through the AI-chatbot	399	3.39	0.6	HE
5	Prospective students could be guided by the chatbot with their FAQ functions	399	3.26	0.67	HE
6	AI-chatbots helps lecturers in carrying out multiple tasks with ease	399	2.84	0.74	HE
7	Chatbot administrative prowess enhance students learning engagement	399	2.73	0.76	HE
8	AI-chatbot administrative function reduces the workload/tasks of administrative staff and lecturers	399	2.85	0.71	HE
9	AI-chatbots facilitates the processes involved in admission of students	399	2.97	0.64	HE
10	AI-chatbots enhances students' payment of fees/other charges	399	2.79	0.71	HE
	Grand Mean	**399**	**3.1**	**0.3**	**HE**

Key: N=Number of Respondents, Std=Standard Deviation, Very High Extent (VHE) equals 3.50-4.00, High Extent (HE) equals 2.50-3.49, Low Extent (LE) equals 1.50-2.49 while Very Low Extent (VLE) equals 1.00-1.49

Table 4. t-test Analysis of the significant difference in the mean rating of respondents in Federal and State universities on the extent to which integration of AI-chatbot in education can enhance teaching/learning and administrative tasks in Public Universities in South-South, Nigeria.

Universities	N	$\bar{X}$	SD	t-value	df	Sig.	Dec.
Federal	269	3.09	0.32	-0.45	397	0.65	NS
State	130	3.11	0.28	-	-	-	-

Note: NS=Not Significant.

Table 5. Mean ratings and standard deviation of respondents on the factors inhibiting the integration of AI-chatbot in teaching/learning and administrative tasks in Universities in South-South, Nigeria.

S No.	Items	N	Mean	Std. Deviation	Decision
1	Instability in government administration hinder AI-chatbot integration in universities	399	3.16	0.62	HE
2	Education policies hinder integration of AI-chatbot into education.	399	3.19	0.44	HE
3	The school academic programme hinders AI-chatbot usage in administrative duties	399	3.32	0.55	HE
4	Inadequate budget allocation in education impedes full integration of AI-chatbot into the teaching and learning process	399	3.43	0.52	HE
5	Inadequate power supply hampers AI-chatbot integration in teaching and learning process	399	3.4	0.51	HE
	Grand Mean	**399**	**3.3**	**0.28**	**HE**

Key: N=Number of Respondents, Std=Standard Deviation, Very High Extent (VHE) equals 3.50-4.00, High Extent (HE) equals 2.50-3.49, Low Extent (LE) equals 1.50-2.49 while Very Low Extent (VLE) equals 1.00-1.49.

Table 6. t-test Analysis of the significant difference in the mean rating of respondents in Federal and State universities on the factors inhibiting the integration of AI-chatbot in teaching/learning and administrative tasks in Public Universities in South-South, Nigeria.

Universities	N	$\overline{X}$	SD	t-value	df	Sig.	Dec.
Federal	269	3.29	0.28	-1.65	397	0.1	NS
State	130	3.33	0.26	-	-	-	-

Note: NS=Not Significant.

Moreover, findings in hypothesis two, which sought to determine the extent to which integration of AI-chatbot in education, can enhance teaching/learning and administrative tasks in Universities in South-South, Nigeria. The result shows that there is no significant difference in the mean rating of respondents in Federal and State universities on the extent to which integration of AI-chatbot in education can enhance teaching/learning and administrative tasks in Public Universities in South-South, Nigeria. The view of the present study in agreement to the review work [15-18]. The reviewed study hinted that integration and implementation of AI-chatbot in handling teaching and learning as well as administrative functions in educational institutions has been rather scarce.

Finally, the result of hypothesis three, Shows that there is no significant difference in the mean rating of respondents in Federal and State universities on the factors inhibiting the integration of AI-chatbot in teaching/learning and administrative tasks in Public Universities in South-South, Nigeria. In essence, respondents from both Federal and State Universities do not differ significantly in their views that on the factors inhibiting the integration of AI-chatbot in teaching/learning and administrative tasks in Public Universities in South-South, Nigeria. The view of the present study in agreement to the view [19]. The reviewed study hinted that that there exist some factors that could inhibits AI-chatbots integration in teaching and learning as well as administrative functions. The investigation carried out by Sandu et al. [19], outlined the inhibiting factors such as; privacy issue, preference to deal with assistance/admin staff, worries about receiving incorrect advice among others.

Conclusion

With regards to the result of the findings of the paper, integration of artificial intelligence tool (AI-chatbot) into teaching and learning: a panacea for improving universities` educational and administrative duties in south-south, Nigeria, it is obvious this conversational technology AI-chatbots, that ought to improve universities education and administrative task, has not been accrued the needed attention. Tertiary institutions have failed to integrate AI-chatbots fully into her educational system in universities in south-south in particular, and Nigeria educational system in general. As several investigations has shown that south-south universities and other tertiary institutions in Nigeria is still faced with the traditional approach in rendering administrative duties as well as delivery of learning contents in a conventional face-to-face setting. This has placed excessive workload on the single shoulder of the lecturers and the administrative staff. Since, the consistent engagement with this excessive workload could weigh them down, living them stressed-up, prone to diverse ailment/sickness and probably lead to loss of lives (lecturers/admin staffs). More so, the deterioration in health among these university stakeholders, could undoubtedly lead to decline on students learning outcome and as well deny students appropriate guidance, which would have help them in settling down in course of their tertiary education journey. It is on this premise that this present study embarked on this investigation, integration of artificial intelligence tool (AI-chatbot) into teaching and learning: a panacea for improving universities` educational and administrative duties in south-south, Nigeria. Since, the AI-Enabled chatbot, has the capability to harness a set of highly programmed big data/algorithm that replicates the intelligence of human by providing; useful information, answers, responses, guide/direction to individual.

AI-chatbots operates conveniently on social networking platform (facebook messenger, WhatsApp or specially design App), students having internet-enabled computer system, mobile device (smart phone, tablet PC, PDAs) seeking for direction, relevant information about a course as well learning material among others, could get answers by having an interaction with the chatbot. Thus, helping in reducing the excessive workload of university lecturers and administrative staff, and enabling them channel their spare time into other extracurricular activities for an improved educational practice.

Recommendations

Base on the result of the study, the following recommendations are made:

1. AI-chatbot should be deployed into the south-south educational system, so as to support teaching and learning among the South-South universities, and Nigeria educational system in general.

2. Federal government should allocate AI its own sector (since it is a huge capital project that can influence other sector of the economy), reason being that, funds allocated to educational sector is not enough to build artificial intelligence technologies that serve the entire nation.

3. Non-governmental organization (NGO) and well-meaning philanthropist should help to fund AI-chatbot project in our six geopolitical zones, Nigeria.

4. AI and Machine learning being a broad knowledge area should be study as a full-fledged subject/course from the post primary to tertiary level of Nigeria education. As this could enhance awareness level among students, and spur them innovatively.

5. The federal ministry of education, National university commission (NUC) and curriculum developers should harmoniously agree for deployment of AI-chatbot into Nigeria universities, to ease the administrative duties of the conventional school administrator.

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