PUPIL: International Journal of Teaching, Education and Learning
ISSN 2457-0648

Eucharia Chinwe Igbafe, 2022

Volume 6 Issue 1, pp. 174-191

Received: 25th August 2021

Revised: 3rd December 2021, 30th December 2021, 29th March 2022

Accepted: 1st April 2022

Date of Publication: 06th April 2022

DOI- https://doi.org/10.20319/pijtel.2022.61.174191

This paper can be cited as: Igbafe, E. C. (2022). The Place And Role Of Artificial Intelligence Chatbots In Adult Education And Training Of Adult Educators. PUPIL: International Journal of Teaching, Education and Learning, 6 (1), 174-191.

THE PLACE AND ROLE OF ARTIFICIAL INTELLIGENCE CHATBOTS IN ADULT EDUCATION AND TRAINING OF ADULT EDUCATORS

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Abstract

Artificial intelligence chatbots are becoming the new trend of technology in the education sector and competitively changing teaching and learning environments with innovations. Artificial intelligence is a field of science studying and producing machines that think, behave, and solve specific human problems. The study explained the place and role of artificial intelligence chatbots in adult education and the training of adult educators in Nigeria. The article also explored the likely challenges to limiting the successful implementation of artificial intelligence chatbots in adult education. The study concludes with recommendations for policy, practice, and future studies on artificial intelligence chatbots in adult education and the training of adult educators.

Keywords

Adult Education, Artificial Intelligence Chatbots, Nigeria, Students Support Trust Theory

1. Introduction and Review of Literature

Worldwide artificial intelligence is becoming the new trend of technology in the education sector and competitively changing learning environments (Marr, 2021). Artificial intelligence is a field of science studying and producing machines that think, behave, and solve specific human problems (Plitnichenko, 2020:1). Artificial intelligence is a computer system designed to interact with the world through capabilities (for example, visual perception and speech recognition) and intelligent behaviours (for example, assessing the available information and then taking intelligent action to achieve a stated goal) that we would think of as essentially human (Luckin, Holmes, Griffiths, & Forcier, 2016:14). Artificial intelligence functions with human language or words to propose an intelligent solution with automatic imaginative answers to the questions provided by the user (Faith, 2018; Kose & Arslan, 2015; Ziaaddini & Tahmasb, 2014). This ability to propose quick responses has made artificial intelligence the ultimate breakthrough technology because it imitates human cognition (Sathya, Pavithra & Girubaa, 2017). Artificial intelligence increases the chances of early identification of signs before students drop out to permit directed solutions (Plitnichenko, 2020). Artificial intelligence can also accelerate the sustainable growth of educational services with virtual counsellors, a set of courses, and improved participation, quick feedback, and results (Ibaraki, 2017). Artificial intelligence is more beneficial and solution-focused when linked to chatbots (Artificial Intelligence Board America [ARTiBA], 2021; Sahota & Ashley, 2019).

Chatbots are software applications used for engaging in meaningful conversations online. A chatbot is an automated inanimate device that provides support by responding to the users' (students) questions depending on the content (subject matter) and context (setting) (Plitnichenko, 2020). Chatbots promotes engaging conversations with students using individual information when connected to chatbot-friendly gadgets (Cheng, Hwang & Lai, 2020; Muniasamy & Alasiry, 2020; Yamada, Goda, Matsukawa et al., 2016). Chatbots enhances learning effectiveness because the support function saves service costs and predicts difficulties (Ferrell & Ferrell, 2020; Hill, Ford & Farreras, 2015; Winkler & Soellner, 2018; Wu, Lin, Ou, Liu, Wang & Chao, 2020). A chatbot is available 24 hours a day and can respond in different languages with limited bias (Snigdha, 2019).

Consequently, an artificial intelligence chatbot is a software application that uses natural language processing to help students interact with web services or apps through text, graphics, or speech (ARTiBA, 2021). Artificial intelligence chatbots use programmed human languages to emulate humans in chats and perform automated tasks (Jingyun Wang et al., 2021; ARTiBA, 2021; Plitnichenko, 2020). Artificial intelligence chatbots' ability to employ web services and apps help adult learners to develop new skills, enrich existing knowledge to improve technical or professional qualifications and bring about changes in lives (UNESCO,1996:1). In this way, artificial intelligence chatbots become a pathway to achieving sustainable development of all aspects of adult learners' lives in a planned strategy that incorporates new standards, approaches, and technologies (Graham, 2015; United Nations Educational Scientific and Cultural Organization [UNESCO] Recommendation on Adult, 2015).

Artificial intelligence chatbots' has a simple application process that ensures more directed learning content and adequate support for adult learners when needed (Igbafe & Silinda, 2021). The application process of AI chatbots is in three ways. First, the user enters a message into an artificial intelligence chatbot with an application, website, and text message or speak on the mobile phone. An entered query can be like a command or an interrogation. Second, an artificial intelligence chatbot receives the content of the message through a network, and intents are determined immediately. Thirdly, an artificial intelligence chatbot determines the appropriate response to the user. The three processes are repeated in each conservation with speed to respond to students' queries and produce a better experience (Luckin, Holmes, Griffiths, & Forcier, 2016; Microsoft/ power virtual agents, 2021).

However, there is evidence that the application of artificial intelligence is limited in higher education institutions (HolonIQ, 2021). According to World Bank (2020), the world is experiencing insurgency in educational technology, while institutions are not harnessing the benefits to augment and support teaching and learning. The World Bank (2021) add that educational institutions consider technological relevance and reimagine how it would change the delivery and services. The World Bank suggestion reinforces the necessity for an adequate understanding of the place and role of artificial intelligence chatbots as it enables improved delivery and quality of services (ARTIBA, 2021). The global artificial intelligence strategy landscape reported that South Africa is a country that is gradually investing and harnessing the

benefits of artificial intelligence, while Nigeria's investment and implementation of artificial intelligence chatbots are barely significant (HolonIQ, 2021).

The insignificant investment in artificial intelligence chatbots is an act that negates Nigerian national policy on education that supports the adoption of innovative technologies to promote skills, enrich knowledge, and change attitudes to improve the quality of life for adult learners and society (Federal Government of Nigeria, 2004). In many Nigerian educational institutions, there is limited knowledge of the place and role of artificial intelligence chatbots in adult education and the training of adult educators. Based on a need to understand artificial intelligence chatbots in the Nigerian adult education system, the paper explored available literature to establish the place and role of artificial intelligence chatbots in adult education and the training of adult educators.

2. Research Methodology

An exploratory research design guided the gathering of information from existing literature because of the paucity of papers on artificial intelligence chatbots in Nigerian education systems. The exploring approaches permit the investigation of a problem understudied or a concept with limited knowledge and awareness (Schutt, 2014; Stebbins, 2001). An exploratory research approach provided increased insight and new ideas (Bhat, 2020). The philosophy behind the secondary data approach motivated the internet [Google, Twitter, LinkedIn] to search for information on artificial intelligence, chatbots, and artificial intelligence chatbots groups and associations] to draw information to discuss the place and role of artificial intelligence chatbots in adult education.

Consequently, the exploratory approach provided secondary data, like journals, articles, and papers, to build on thoughts and new ideas rather than gather, analyse and report findings (Bhat, 2020). The information provided by another user is secondary data. This source of information summarised previous research on the phenomenon under investigation and revealed the gaps in the researcher's knowledge. This secondary information covers topics (Sileyew, 2019). A literature search employed internet resources such as Google, Twitter, and LinkedIn publications. In google (literature on artificial intelligence and chatbots); Twitter (publications on artificial intelligence by groups, individuals, and associations); and LinkedIn (publications on artificial intelligence by groups, individuals, and associations). The search strategy concentrated

on articles and publications on the role of artificial intelligence and chatbots in business and education.

As a result, this paper extracted and developed themes that align with the place and role of artificial intelligence chatbots in adult education and adult learner training. The four themes are a) learning environment, b) learning preferences, and c) learning supports, d) possible challenges likely to thwart the effective implementation of artificial intelligence chatbots.

2.1. Defining The Place Of Artificial Intelligence Chatbots In Adult Education

Research reports that artificial intelligence chatbots contribute to the development and strengthening of services provided by an institution to the clients (ARTiBA, 2021; Plitnichenko, 2020). A study by Mattews (2018) states that artificial intelligence chatbots improve the service relationship through availability for unlimited conversation, dialogue, and responses to queries irrespective of the nature, time, and day. Plitnichenko (2020) explain that the place of artificial intelligence chatbots is in helping the administrators to sustain clientele's interest by providing constant feedback on needed information. Khan (2020) described artificial intelligence chatbots' service pattern as engaging, short, and snappy with teaching content using text, video, or audio presentations, which helps in providing a dedicated learning environment to study.

2.2. The Learning Environment

The learning environment is vital for adult learners as it builds interest, determination and commitment to goals. The learning environment is a setting that tries to accommodate physical facilities, context and values in which adults learn. The learning environment is driven by quality communication, teaching content, approaches and reciprocal interaction (Arpan, Arthur & Zivnuska, 2003; Paden & Stell, 2006; Sung & Yang, 2009). A reciprocal interactive learning environment depends on quality relationships (Eames et al., 2010; Hens et al., 2009). Reciprocity in interaction entails two-way communication between the adult learners and all the activities that promote active listening, teamwork, limited delay in solving the problem, providing feedback, and obtaining support (Burns, 2020; Chaudhary & Aanya, 2020; Dawit, 2020; Lerner, 2005; Montgomery, 2020).

With artificial intelligence chatbots, the learning environment becomes interesting as communication skills promote reciprocal interaction (ARTiBA, 2021; Baker & Smith, 2019; Plitnichenko, 2020; Zawacki-Richter et al., 2019) through the use of resources such as video, text, and audio (Kaur, 2019). Artificial intelligence chatbots resources like "text" features (have natural

language processing and sentiment analysis), audio (voice emotion AI), and video (facial movement analysis, gait analysis, and physiological signals) or combinations thereof (Gossett, 2021, p.1). Audio features can read communication problems, identify negative emotions that can alter learning and use video or text to encourage calmness and adjustment jokes(Gossett, 2021) to shift the mood to positive emotions. By this act, artificial intelligence chatbots create an emotion-literate environment for conversation, engage in intelligent reasoning, thereby improving cognitive and linguistics ability, furthering adaptability and self-sustenance in the learning environment (Zwiers, 2019).

An emotion literate learning environment recognises, respect and acknowledge that adult learners value a stable setting to achieve goals on time (Igbafe, 2021). An emotion-literate environment encourages nurturing support that supersedes discouragement to ensure individuals make progress (Igbafe, 2021). In an emotion literate artificial intelligent chatbots environment, individual emotions are evaluated and consistently shifted from negative to positive to enable transformative growth of adult learners (Igbafe, 2021). Artificial intelligence chatbots reduce distraction in learning and increase feedback from the departments, faculty, or university (Berk, 2000). With artificial intelligence chatbots, adult education has the opportunity to recreate a learning environment to meet the learning preferences of their learners.

2.3. The Learning Preferences

Learning preferences refers to an individual's style of acquiring new knowledge, attitude and skills. An individual learning style focuses on the difference in adult learners learning choices and how they plan to learn the content and teaching approaches. Learning preferences is essential in an adult education setting because adult learners bring their experience to the learning environment. In adult education, the term 'experience' is vital in designing learning content and selecting teaching approaches because the concept of an adult refers to individuals who have lived long enough to gain experience.

According to the earliest study of Bischof (1969:12-14), "an adult person has lived for quite some time, gathered experiences of events which have influenced the thinking, beliefs, and behaviour. The Adult person has a great memory (remembers) of these events". Braimoh and Biao (1988:15) describe the experience as "the accumulated effect of consequential life events that shape both the behaviours and personality of the individual". Braimoh and Biao (1988:15) further explained that the more life events a person encounter, the more experience the individual gains,

and because no two individuals meet the same type of life event in the same intensity and number, no two individuals are affected in the same way by the same life events. An adult person is a unique person, thus, learning content should address the challenges posed by these life events that could affect the quality of learning today and life's progress tomorrow (Legge, 1989).

With artificial intelligence chatbots, preferences in learning may be for text, verbal or visual presentation of materials in animation (Budiu, 2018; Coniam, 2014; King, 2002; Laurillard, 2013; Smutny & Schreiberova, 2020). A text-based artificial intelligence chatbot sends reminders to the student for upcoming events, feedback on assignments and distributes published learning content (Coniam, 2014; Laurillard, 2013). A text-based artificial intelligence chatbot functions by instructions to reply to queries sent by a student (Budiu, 2018). Verbal artificial intelligence chatbots such as Siri from Apple, Alexa from Amazon, Cortana from Microsoft, or Assistant from Google act as individual digital helpers. The applications use speech recognition and artificial intelligence to understand and interact with students (Smutny & Schreiberova, 2020).

Virtual-based artificial intelligence chatbots improve teaching and learning through videos or animations (King, 2002). Visual artificial intelligence chatbot is an administrative tool for managing students' emotions, identifying students who attend lectures, and participating in tests (Smutny & Schreiberova, 2020). Adult education administrators can harness these different learning styles [text, verbal or visual] into a teaching strategy to make learning preferences meaningfully inclusive and supportive (Collins, 2006; Khan, 2020; Nitirajsingh Sandu &Ergun Gide, 2020).

2.4. The Learning Support

The learning support in adult education deals with providing support as an advised study partner or mentor. As experts' advice, artificial intelligence chatbot uses the knowledge of students' strengths and weaknesses to provide a solution (Ramírez et al., 2018). As a study partner, an artificial intelligence chatbot helps students in the content through the provision of study materials and instant progress feedback (Agarwal, 2019; Singh, 2018), thereby reducing pressure and frustration resulting from some education systems and cultures where students feel helpless waiting for feedback (Plitnichenko, 2020). As a mentor, the artificial intelligence chatbot provides academic support, counselling on personal and social problems to ensure success in learning (Sanchi Satam et al., 2020). Learning support also involves a one-to-one teaching scheme with an

allocated small number of students (Gallagher, 2014; Maseleno et al., 2018) by identifying students' needs and preferences (Chatti, Agustiawan & Jarke et al., 2010; Jenkins & Keefe, 2002).

Studies also report that artificial intelligence chatbot provides a collaborative setting wherein students engage in active participation for advanced knowledge production, sharing and increasingly inspire each other (Dillenbourg et al., 1995; Slavin, 2010). Collaborative learning promotes critical thinking, engaging conversations, active listening to ensure contributory problem-solving (Garcia-Almeida and Cabrera-Nuez, 2020; Slavin, 2010). The place of artificial intelligence chatbot is to encourage innovative, intelligent facilitation of relationship skills required for collaborative learning (McLaren, Scheuer & Mikšátko, 2010; Muehlenbrock, 2006), by identifying students with similar needs or preferences and grouping them for specific learning styles (Upton & Kay, 2009; Vizcaíno, 2005). Artificial intelligence chatbots provide needful information from stored data to enable adult education administrators to make increasingly better predictions in the grouping of students (Luckin et al., 2016:14).

As a counsellor, an artificial intelligence chatbot engages in active listening to answer students' queries about their personal, social, and career problems (ArchanaParab, SiddheshPalkar et al., 2017; Chun Ho Chan et al., 2018). Artificial intelligence chatbots are distinct from human beings because they patiently gather experience. This suggests that the content and counselling approaches must be closely related to the experiences an individual adult student wants to address, irrespective of the learning group. To obtain a more accurate diagnosis of a learning experience and address the problem, an artificial intelligence chatbot uses a diverse range of counselling theories, text-based communication strategies, and visual and audio inputs (DeVault et al., 2014; Hahn, Nierenberg, & Whitfield-Gabrieli, 2016). In addition, artificial intelligence chatbots' challenges may limit benefits.

2.5. The challenges of artificial intelligence chatbots in adult education

The artificial intelligence chatbots may face the following challenges discussed in the next section.

3. Ethical Issues in the use of Artificial Intelligence Chatbots

Ethical issues could create challenges for artificial intelligence chatbots in adult education because information stored in databanks can generate numerous problematic moral concerns. Artificial intelligence chatbots are an alternative approach for information gathering, which helps to provide prompt feedback and administrative support for students (Microsoft/ power virtual

agents, 2021; Rajput, 2019). Research maintains that artificial intelligence chatbots data demands standard criteria for privacy and consent expected from the users (Marr, 2019; Woolf, Lane, Chaudhri & Kolodner, 2013). Privacy deals with the confidentiality of the personal information of artificial intelligence chatbots in the design and implementation of the program (Stahl & Wright, 2018), with measures to ensure privacy and informed consent (Dare, 2019; Jones, Kauffman & Edenber, 2018)

3.1. Truthful Informed Consent And Trust Theory

Truthful informed consent suggests that consent letters must be devoid of prejudice by willingly stating the purposes of the use of the sought information, the level of hazards and who must be responsible for the harm resulting in the use of data, and the consequences of misconduct in the use of information (Jones, Kauffman & Edenberg, 2018). Truthful informed consent in artificial intelligence chatbots by trust theory stipulates that 'Trust' is defined as a psychological state involving the intention to accept vulnerability based upon positive expectations of the behaviour of another entity, for example, artificial intelligence chatbot (Gefen, Karahanna & Straub, 2003; McKnight, Carter, Thatcher & Clay 2011).

Trust theory maintains that people accept trust when their expectations are positive (e.g., depending on the institution and department providing the artificial intelligence chatbots to safeguard their private information) (Fulmer & Gelfand, 2012). Trust provides the opportunity for a better understanding of diverse, interacting characteristics that advance different types of trusting and trust cues (Lockey, Gillespie, Holm, & Someh, 2021). Trust promote self-confidence in the product in which trust is a prerequisite (Luhmann, 2000).

Trust theory in artificial intelligence chatbots determines the users' ability to willingly accept vulnerability with good reason in various forms of data, with the understanding that the trustor (i.e., who is doing the trusting), the referent of trust (what or who are they trusting in), and the nature of trusting (i.e., what are the risks, vulnerabilities or dependence in the trusting act) (Lockey et al., 2021:5464.). Trust enables artificial intelligence chatbots users to consider accepting the multisystem within the multicultural society. It also helps researchers discover trust and distrust among users of their information. Trust theory seeks answers to promote a) the recognition of artificial intelligence chatbot users' legal rights to fight betrayal of trust of personal data and b) different individuals' and groups' need for truthful consent of artificial intelligence chatbots' information.

3.2. Electricity/Loading Shedding

Electricity/loading shedding could be a problem for artificial intelligence chatbots in adult education (ARTiBA, 2021). The electrical energy required to power artificial intelligence chatbot-friendly gadgets such as audiotapes, computers/laptops, internet, mobile phones, printers, telephones (United Nations Department of Economic and Social Affairs (UNDESA), 2014). Electricity allows students to connect and engage in conversation with artificial intelligence bots using diverse technologies (Kirubi et al., 2009; Kozma et al., 2004; Merriam-Webster Dictionary, 2021). Loadshedding is a problem in African countries resulting in expenditures on candles, kerosene, and lamps, generators (Filippin, 2000; Igbafe, 2009; Pode, 2010; Sovacool, 2013; Tamrat & Teferra, 2020) that are not artificial intelligence chatbots friendly. Electricity/loading shedding can limit artificial intelligence chatbots' capacity to " respond like human beings, understand human language and respond to speech and text' (Deshpande, 2019:1).

4. Recommendations

This paper recommends the need for a policy and practice statement of responsibilities for the government, the universities and adult education for establishing artificial intelligence chatbots. A policy is "a deliberate course or method of action selected from among alternatives and in light of given conditions to guide and determine present and future decision" (Merriam-Webster, 2020:1). Policy statements should include specific areas of contribution by the government and the universities to facilitate access to adult education and adult learners. A policy statement should state strategies for determining the effectiveness of artificial intelligence chatbots in adult education and the training of adult learners. A policy should encourage future research on artificial intelligence chatbots to monitor, evaluate and follow through on what worked, what did not work and why.

5. Conclusion

This present article examined the place and role of artificial intelligence chatbots in adult education and the training of adult educators. The paper explored existing literature to understand how artificial intelligence chatbots influenced the services offered for the users to draw possible knowledge for adult education. The place and role of artificial intelligence chatbots in adult education and the training of adult educators demand awareness creation and knowledge-building for acceptance. The paper focused on explaining the meaning of artificial intelligence chatbots, the

benefits in the learning environment, learning preferences, learning support and possible challenges likely to hinder the application of artificial intelligence chatbots. Adult learning is a field of study within an educational institution with an intense need for artificial intelligence chatbots to help adult learners acquire new knowledge, attitude and skills for immediate application. The study is the first phase of the ongoing research to establish the importance of artificial intelligence to adult education and the training of adult educators in Nigeria.

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