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Chapter 9

ChatGPT and Other Generative Artificial Intelligence (AI) Tools in Teaching and Learning as Integrative Pathways to Contemporary University Education

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ABSTRACT

The emergence of artificial intelligence such as ChatGPT and other generative AI tools is redefining the educational landscape. This chapter discusses how ChatGPT and other generative AI tools are used for teaching and learning globally, with a focus on the difference between developing and developed countries. Varied responses between educators and institutions in Africa compared to the developed world and highlights of the skill gaps to be filled to ensure effective and ethical use of generative AI tools by both learners and educators in the developing world were discussed. The chapter concludes by highlighting the implication of poor handling of the current epoch on the future of education and the overall development of the African continent. The study was significant to practice, society, and policy based on a developing country's perspectives.

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INTRODUCTION

Technological advancement has trailed human history which has made the innovation of the latter era surpass that of the former, thus leading to technological development that speaks to the dictates of each epoch. The 21st century is not an exception which is witnessing technological advancement in emerging trends such as Artificial Intelligence which according to Bakare (2023) is ushered in by the Fourth Industrial Revolution (4thIR). Bozkurt (2023) averred this technology as a phenomenon that is influencing the human domain in the 21st century at an unprecedented rate and at the same time redefining all aspects of human endeavour of which the educational ecosystem hinged on teaching and learning is core.

Artificial Intelligence (AI) among digital technologies seems to disrupt global space in medicine, science, health, aviation, and education in contemporary times. This technology which is sometimes called machine intelligence is not natural as it involves developing computer programs to complete tasks that would otherwise require human intelligence. Chaudhry and Kazim (2022, p. 157) defined AI as “a computer system that can achieve a particular task through certain capabilities (like speech or vision) and intelligent behaviour that was once considered unique to humans”. This is leading to a paradigm shift in which there is expected to be a synergy between technology and humans as the former cannot do without the latter, though there might be changes in practices as well as delivery on the part of humans.

According to Mander (1978) as cited in Quadri (2022) who asserted that technology more often than not disrupts traditional practices, requiring people to adapt and consider the potential benefits and drawbacks of new technologies. This disruption has also been a source of concern to educators who felt their roles would be displaced (Selwyn, 2019). Howbeit, Bakare (2023) have recommended that these technologies should be seen as enablers and not a displacer as the place of human cannot be over-emphasized in the technological ecosystem; but what needs to be adjusted is “the human mindset” to embrace this innovation. This is in tandem with the affirmation of Bozkurt et al., (2023) who argued that any technology is an extension of man’s capabilities and AI is an addendum as well as the exhibition of human intelligence.

The advent of AI into the education domain is a watershed, that is changing the education landscape in terms of teaching and learning; instructional technology; archival and library; assessment, and many more. Artificial Intelligence (AI) seems to be able to improve and change the whole educational system worldwide which higher institutions of learning in the Global North are keying into but the same cannot be said of these institutions in the Global South like Nigeria. The tendency of its application to be adopted by lecturers to complement their efforts in higher education institutions is also high as its advantages cannot be overlooked. In addition, AI seems to have demonstrated the capacity to assist learners in receiving more personalized support and providing a student-centric approach to teaching and learning due to the ubiquity of the technology.

Artificial intelligence has been a part of education for a while before the recent phenomena arrival of ChatGPT which has also drawn attention to other similar but (probably) less effective tools. Both teachers and learners were already familiar with tools such as Grammarly, Quillbot, Google Lens, ProWriter, Article Rewriter, and other writing and creative assistants (OSU, 2023; Sánchez-Prieto et al., 2020). Nonetheless, the arrival of ChatGPT in November 2022 ushered in an unprecedented interactive model with seemingly unparalleled natural language processing ability that captured the imagination of the world, specifically the academic world. More reason Baidoo-Anu and Owusu Ansah (2023) affirmed ChatGPT and other generative AI as extending educational frontiers that are setting the pace for remodelling and

remodification of the educational ecosystem. Thus, beckoning both tutors and students into a phase of learning, unlearning, re-learning, and upskilling to be able to navigate this technological space seamlessly.

ChatGPT and other similar tools such as Google Bard by Google and Bing by Microsoft are Generative Artificial Intelligence (G-AI). According to Lim et al., (2023), G-AI can be defined as a technology with a multitude of capabilities such as the ability to leverage deep learning models which enable it to generate human-like content in various formats in response to complex and varied prompts. According to UNESCO (2023), ChatGPT is described as a language model that allows individuals to interact with computer technology conversationally or naturally. In an actual sense, GPT implies a Generative Pre-trained Transformer generally for a family of natural or conversational language models specifically invented by Open Artificial Intelligence (AI), which also refers to a form of AI generative tool owing to its capability of producing original outcomes or results.

Generative AI (G-AI) tools such as ChatGPT can generate various forms of content such as music scores, computer codes, food recipes, and academic papers capable of passing the scrutiny of the strictest reviewers. Trained on a tremendous amount of information and data up to the year 2021, ChatGPT can hold human-like interaction on a wide range of topics and explain complex concepts clearly and concisely (Farrokhnia et al, 2023). It is also capable of synthesizing literature to create ‘original’ well-written documents on virtually all subjects. This has endeared it to students who now make use of it to write assignments, pursue self-directed studies, and understand concepts that hitherto seemed too complex. Despite its numerous advantages in all spheres of human endeavour, its influx into the educational domain is generating heated discourse of two sides to a coin that cannot be overlooked if the educational ecosystem does not want to be left behind in this innovative wagon. It is based on this premise that this chapter will navigate the world of ChatGPT and Other Generative AI (G-AI) Tools in Teaching and Learning, and take into perspective its implication for practice, society, and educational policies most especially in a developing country like Nigeria.

GENERATIVE AI IN TEACHING AND LEARNING

The place of generative AI in recent times cannot be neglected as educators across the world have also found these tools to be highly useful in generating lesson plans, conducting assessments, and grading students. Others have also used the tools to generate examination questions and designed interactive tutorials for their students and to conduct basic research. However, only lecturers in developed countries seem to have publicly embraced the use of Chat GPT and openly used it in their official duties (Baidoo-Anu and Owusu Ansah, 2023). Educators in Africa are mostly uncertain about the use of generative AI in education believing that it promotes intellectual laziness and encourages cheating. This could be due to the misconception that is making them see this technology as taking over their jobs and displacing their significance in society (Bakare, 2023). As a result, it is rare to have any official viewpoint on the use of generative AI by educators and learners alike.

On the contrary, Western educators are taking a direct and practical approach to address the disruptions created by the emergence of generative AI. While some states in the United States of America (USA) recently placed a ban on the use of generative AI tools in its school districts (NBC, 2023), virtually every tertiary institution in the United Kingdom (UK) and USA has acknowledged the pervasiveness of generative AI and are therefore developing coping strategies which should have been the attitude of educators most especially within the Nigerian educational space. Many lecturers have started using generative AI

to help in their research while others have integrated it into their teaching activities. Some educators have also understood that they must properly understand how generative AI tools work so that they can point out their strengths and weaknesses to students who have begun to see the tools as the ultimate arbiter of knowledge (Cooper, 2023; Mhlanga, 2023).

In addition to this, some institutions have also developed programmes for both students and educators by providing them with the requisite skills and competencies for the effective use of generative AI. This includes developing a skill set in the usage of AI content detectors such as Originality.ai, GPTZero, Sapling, Copyleaks, OpenAI Text Classifier, CrossPlag AI, AISEO, etc. developed to show the authenticity and originality of digital content. This is expected to furnish both parties with the capabilities of staying ahead of the technological curve, or when that is not possible, to keep pace with development in this critical and pertinent area. Most of these trainings are domiciled in the university libraries and have now formed a part of the digital literacy training usually offered to the students (Teal, 2023). Bakare (2023) averred this as the provision of sustainable library services which is not inhibited by time, means, or location due to the ubiquitous nature of this technology.

Many tertiary institutions have also come up with policies such as mandating students and educators to make full disclosure of any content generated through AI tools to instill a sense of accountability in addition to guiding against ethical issues in the usage of these technologies. In addition, some universities have also created caveat statements that educators must share with their students to warn them about the shortcomings of G-AI tools (Boston University, 2023). This is supposed to be the outlook of educators in the Global South knowing fully well that these technologies are game changers which when infused into the nitty-gritty of academic activities helps in facilitating pedagogical participation in addition to strengthening existing traditional system (Bakare and Okuonghae, 2023)

High-ranking universities, such as those in the USA have admitted that they have not fully decided on the place of G-AI tools, thus they are proceeding to err on the side of caution by leaving a bulk of the decision in the hands of teachers who must ensure that they share the caveat of the university and ensure that the students make effective and ethical use of the tools. One issue that is widely discussed is the ethics of using G-AI tools (Boston University, 2023) while Bozkurt (2023) outlined the challenges of quality control, reliability of knowledge sources, downplaying human agency in educational knowledge chain, technical complexity, the possibility of teacher replacement, dependence on technology, a lack of creativity and critical thinking, etc. These are topical issues of concern in the Use of Generative AI among Educators and Learners.

THE POTENTIAL OF CHATGPT INTEGRATION IN THE NIGERIAN EDUCATIONAL SYSTEM

The ChatGPT is a very recent technological development that has been applied to the educational industry in developed countries, especially in higher education but the reverse is the case within the Nigerian educational landscape. The area where the ChatGPT can be used in education is not but limited to teaching, learning, research, administration, library service delivery, and community engagement. Owing to its capability to generate and assess information at an unprecedented rate, ChatGPT is capable of performing some functions relating to teaching, learning, and research processes with the assistance of other forms of AI, it is imperative to note that ChatGPT could enhance both the process as well as experience of learning particularly for students (UNESCO, 2023). Given this, ChatGPT could be utilized

as an independent tool or could be integrated into some other platforms or systems employed by higher education institutions, particularly in Nigeria.

The application of technology is always seen as a positive vibe for education. The advent of ChatGPT and other generative AI tools, therefore, holds great potential for both teachers and learners in Nigeria if it can be embraced positively with open hands and a broad mind. Indeed, it holds greater potential for the entire educational system in the nation knowing fully well the significant role as the giant of Africa in the continent. This is viewed from the perspective of rising demand for education among the teeming youths in an environment of limited access to education and emerging technologies that make students stand the test of time as well as able to compete favourably with their peers on the global landscape. On the other hand, many public tertiary institutions in Nigeria are battling with the steam of increased student enrollment and fewer infrastructural facilities in addition to a lack of recent educational technological equipment to meet the demands. Private universities that were at the forefront of academic continuity amid the Covid-19 pandemic which redefined the phase of online learning within the Nigerian space (Bakare and Ademakinwa, 2020) are not keeping up with the pace in the usage of G-AI in recent times which could have been a morale booster for the public institutions. More reason, the recent shift towards online learning by both private and public educational institutions would benefit from the strategic use of G-AI tools within the Nigerian educational space.

In addition, distance education systems such as the Open University and various programs run by other universities in Nigeria can benefit from these tools. Students who have to engage in self-directed study now have a tool that can break down complex concepts and make them better understand the course content. In addition, they would also be empowered to make their contribution to the learning process thereby enriching the course content and becoming more empowered to acquire deeper knowledge and gain the necessary skills (Domenech, 2023).

As academic curriculum evolves in response to market demand, G-AI also has the potential to help both teachers and learners incorporate the latest knowledge into the existing course content so that learners do not continue to gain knowledge that would be obsolete even before their graduation. This will go a long way in inculcating recent skills into students that fit into the dictates of contemporary times and be able to navigate the labor market curve seamlessly. What G-AI offers is the opportunity to infuse dynamism and creativity into the curriculum to prepare students for the rapid evolution of knowledge and ideas in the modern world (Malinka et al., 2023) which will put them on a better pedestal globally.

Most importantly, G-AI tools allow students to have a globalized education even in their local environment. Generative AI tools (especially internet-enabled tools) synthesize their responses to each prompt based on information from a wider range of sources that students may not ordinarily have access to or skills to obtain by themselves. Reading these contents, therefore, empowers Nigerian learners to participate in the global scholarship arena without any iota of constraint. Of course, this depends on the ability to leverage information from these tools to conduct deeper searches and wider studies on each subject. The stimulation provided by these platforms cannot be discounted.

The potential for educators is also considerable which will inform the sustainability of the Nigerian educational system. Educators can use ChatGPT and G-AI tools for administrative tasks such as setting up class schedules, communicating with students, and developing test questions, marking guides, and worksheets among others (Domenech, 2023). There are also reports of ChatGPT being used to develop a language learning tool to facilitate effective second language acquisition (Topsakal and Topsakal, 2022). If this is being done in other countries, it can also be done in Nigeria where lecturers' workload is so enormous that each lecturer needs significant assistance to cope. However, the use of ChatGPT

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and G-AI tools has not become institutionalized or widespread in Nigeria due to various factors. It is important to echo that ChatGPT can perform several simple or technical functions (UNESCO, 2023) for example conducting basic research, calculations as well and proofreading. To grasp further how ChatGPT can be applied or incorporated into teaching and learning, the below table displays these as noted by (UNESCO, 2023).

Apart from the above submission, the possible benefits of ChatGPT and other related generative AI in facilitating teaching and learning in higher education institutions are highlighted by Baidoo-Anu and Ansah (2023). This was situated within the Nigerian educational landscape and is presented below:

Personalized Tutoring: Nigerian educators can harness ChatGPT to offer personalized tutoring as well as feedback to students based on learning needs and progress. This is supported by Chen, Chen, and Heffernan (2020) who reported that ChatGPT is capable of providing personalized mathematics tutoring to students, which will in turn enhance learning outcomes.

Automated Essay Grading: Nigerian educators can use ChatGPT to grade and assess student essays which affords teachers ample time to focus on other aspects of teaching. The study by Kim, Park, and Lee (2019) revealed that ChatGPT is instructed and trained on how to use datasets to grade human essays, Essays written by students, especially high school pupils could be graded accurately without errors.

Language Translation: Nigerian educators can use ChatGPT to translate course materials into several languages making them accessible to students irrespective of the languages they speak knowing fully well that there are diverse languages in Nigeria. The above statement was affirmed in a study conducted by Johnson et al. (2016) and revealed that ChatGPT is trained on a dataset of bilingual sentence pairs

Table 1. Ways ChatGPT can be applied or incorporated into teaching and learning

Descriptions of AI in Teaching and Learning	Examples of Areas of Application in Teaching and Learning
AI creates alternative ways of uttering an idea	Students generate queries in ChatGPT and use the regenerated answers to examine alternative responses.
AI as an alternative to developmental tools for augmenting teaching and learning	Students enter information into ChatGPT depending on the structure of a debate. Students can ask to use ChatGPT for discussions
AI assists groups of people to research and solve problems collectively	Teamwork helps students in using ChatGPT to locate information required to complete specific tasks or assignments.
AI performs as a guide in navigating both physical and conceptual spaces	Teachers use ChatGPT to generate course content for classes and advise students on how to sustain learning specific ideas.
AI teaches students and gets instant feedback	ChatGPT offers a feedback mechanism to students based on the provided information by tutors e.g. exam scores.
AI helps during the design process	Teachers ask ChatGPT ideas relating to curriculum designing to focus on goals and objectives.
AI offers tools to play with and for data	Teachers offer information to students who write different questions in ChatGPT to find additional information. ChatGPT could be used in supporting language learning.
AI assists the student to reflect on learning material	Students describe their level of understanding of ChatGPT and inquire about ways to assist them in mastering the learning material. ChatGPT can also be utilized to perform other functions such as job interviews.
AI provides games and problems to extend learning	Both the teachers and students could ask ChatGPT for ideas about how to extend students' learning after providing a summary of the current level of knowledge for example through quizzes and exercises.
AI offers teachers a profile of individual students' current knowledge states	Students interact with ChatGPT in a tutorial-type dialogue and ask ChatGPT to produce a summary of their current knowledge state to share with their teacher for assessment.

which could accurately translate between languages on several translation benchmarks. This ensures that no Nigerian student is left out within the educational ecosystem.

Interactive Learning: Nigerian educators can use ChatGPT to create an interactive learning environment especially where the students can interact with a teacher virtually in a discussion manner. Kim, Park, and Lee (2019) noted that ChatGPT model-based discussion or conversation agent can support students effectively in learning English as a second language which in turn improves English proficiency. This will ensure that all Nigerian students are vast in the usage of the English language since it is the official language of the nation.

Adaptive Learning: Educators in Nigeria can use ChatGPT when creating adaptive learning systems that adjust teachers' teaching methodologies to students' progress reports and performance. This was supported by Chen, Chen, and Heffernan (2020) who showed that ChatGPT as an adaptive learning system could offer more effective support for students learning programming which is expected to improve performance on programming assessments.

In summary, ChatGPT can be an influential tool capable of improving teaching and learning through personalized tutoring, systems essay grading, and language translation as well as interactive and adaptive learning within the Nigerian educational ecosystem.

ISSUES IN THE USE OF GENERATIVE AI TOOLS

It is important to note that despite the rave reviews that have trailed the emergence of AI tools, there are specific issues that may undermine the idea behind its development in the African educational system. As pointed out by Arakpogun et al., (2021), Africa is about a decade late to the AI race which means that its specific needs may not be properly catered for by existing AI tools. Available literature has raised issues such as training data bias in ChatGPT and other tools (Borenstein and Howard, 2021; Akgun and Greenhow, 2021; Vargo and Hopp, 2023). This means that the tools designed by mostly American and European developers may have been trained to 'see' issues from the Western perspective which has always been the bane of technological development in each era. Scholars such as Gondwe (2023) observed that existing G-AI tools are light on African corpus and may not be properly trained on cultural sensibilities peculiar and indigenous to Africans. However, there is also the recognition of the fact that the tools can also learn from the inputs of various people from all over the world, including Africans.

Of major concern, however, are other issues such as the technological capacity of African countries such as Nigeria to support an AI-driven educational process. Many tertiary institutions in Nigeria are still lacking the critical infrastructure necessary for digital learning. This may make it difficult for technology enthusiasts to effectively push the agenda of integrated use of G-AI in education in Nigeria. For instance, tertiary institutions in the Global North have developed or acquired technology to detect unethical use of generative AI in the academic world while there is a dearth of reports of the existence of these tools in Nigeria.

In addition to the inadequate infrastructure, there is also the challenge of skilled personnel necessary to properly onboard students and lecturers in the use of G-AI. As pointed out by Celik et al., (2022), it is important to have educators with adequate pedagogical knowledge combined with technology skills for effective integration of AI into education. Another major issue in the adoption of ChatGPT in Nigeria is the lack of clear policy guidelines on its use or non-use. Due to its sudden emergence and continuous evolution, there has been no official directive from the Nigerian Universities Commission (NUC)

regarding the response to the emergence of these tools. This probably accounts for why no university in Nigeria has also articulated a response to its adoption and usage as against their counterparts in developed countries. The consequence is that critical issues are not discussed thereby leaving several grey areas for many lecturers.

The lack of a robust conversation on the use of AI tools is probably responsible for some negative attitudes towards it among some Nigerian educators who view the use of ChatGPT as unethical and a way of watering down the quality of academic outputs. There is a commonly expressed opinion that scholars who rely on AI tools would become lazy and unable to pay attention to the details of their academic work. ChatGPT was also seen by some as a tool that might facilitate cheating and other forms of academic fraud, as students see it as a veritable opportunity to copy and paste one another's works (Morocco-Clarke, Sodangi, and Momodu, 2023).

Existing literature has also shown that, while academic institutions are seeking means of mastering the use of AI tools for effective teaching and learning, educators and institutions in Africa have not demonstrated that they are aware of the existence of these tools not to talk of devising strategies to ensure their effective use and making them useful in teaching and learning. This has grave implications for the future of the educational space in Africa. Gondwe (2023) observed that this crop of boundary-spanning educators is not readily available in countries such as Nigeria which may hinder the effective use of AI tools. Other issues noted by Baidoo-Anu and Ansah (2023) are as follows:

Lack of human interaction: ChatGPT and other AI cannot offer the same level of real human interaction as a teacher, lecturer, or tutor. The implication of this is that educators have the instinctive ability to decide if there is any error or glitch in the teacher-student interaction which is alien to a technology like ChatGPT.

Limited understanding: ChatGPT does not understand the true concepts that student is trying to learn because they are trained on a pattern in which it could function. This implies that educators are professionally trained to factor in the environmental condition during the learning process which the ChatGPT might not be aware of unless it is part of the code used to develop it.

Bias in training data: ChatGPT and other G-AI are only good in the data they are trained on and then if there are biases in the training received, there will also be bias in the model. This implies that there is a limitation to the knowledge that ChatGPT can provide in answering a query as extant literature has shown that it can only provide data up to the year 2021. This is in contradiction to the intelligent nature of man who has a sense of history and can also use present information to make predictions for the future.

Lack of creativity: ChatGPT can only generate and create responses based on the pattern of data they received during training; this can reduce the originality of responses received from the data. This is unlike the educators who can infer and make meaning from different datasets in solving an identified societal issue

Dependency on data: ChatGPT is trained on a large amount of data, if the data is not enough or relevant, the model may malfunction. Educators have been trained to work with data in addition to using their intuition to make meaningful decisions

Lack of contextual understanding: ChatGPT cannot understand the context which could lead to poor responses. Educators can consider environmental factors in making informed decisions and read learners' moods to decipher what could be causing emotional instability that is causing mental imbalance.

Limited ability to personalize instruction: ChatGPT can only offer or provide overall information about a phenomenon but may not be able to personalize instruction that can meet the student's particu-

lar needs. Contemporary education has transcended to embracing student-centrism which is fostering lecturer-student interactions.

IMPACT OF THE STUDY

Practice: Educators within the African space and Nigeria are aware of the significant role that the ChatGPT and other G-AI tools are playing, and there is a need to change their perspective as well as remove any misconception about the adoption and usage of these technologies so that they can fit into the contemporary standards in the discharge of their duties. Students' horizons have also been broadened in the various ethical issues involved in the usage of these technologies despite their myriad of advantages.

Society: Nigerian society will be better informed when ChatGPT is well-harnessed ethically.

Policy: Stakeholders in the educational landscape most especially the Nigerian Universities Commission (NUC) should promote the adoption and usage of ChatGPT and G-AI in addition to putting up a policy framework as well as strategies to ensure the smooth sale of these technologies within the Nigerian educational ecosystem.

CONCLUSION

Like previous innovations, ChatGPT and G-AI tools have become an integral part of education just as it has permeated other areas of human endeavour. These technologies are currently perceived as disruptive by some while others see it as a paradigm shift laced with innovations and creativity. The most tenable position is that ChatGPT and G-AI tools offer great opportunities for education in Nigeria if positively harnessed. When integrated strategically and efficiently, it can help bridge the digital divide between Nigeria and other advanced countries. This will showcase the nation as the giant of Africa and take the proper place in technologically advancing the course of the African continent. It also has the potential to revolutionize teaching and learning in Nigeria with new methods and insight into teaching courses that focus on contemporary societal needs and dictates. The current apathy toward generative AI tools among educational stakeholders, therefore, needs to be urgently addressed.

RECOMMENDATIONS

There is an urgent need for a policy document on the use of generative AI tools, particularly ChatGPT in African tertiary institutions and also within the Nigerian educational clime. The Association of African Universities (AAU) should handshake stakeholders in the formulation of policies that should spell out what constitutes fair use and what should be considered academic fraud in line with global standards within the knowledge economy.

There is also the need for training and skill development for educators in Nigeria regarding the workings and effective use of ChatGPT and G-AI tools. This is necessary to obtain their full support for the integration of G-AI tools in teaching and learning and to ensure that they are empowered to guide their students in the ethical use of these tools.

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Professionals such as librarians should step up awareness creation, advocacy, and capacity development programs to enlighten and empower both tutors and learners in Nigeria on the adoption and use of ChatGPT and G-AI tools. This will go a long way in showcasing the significant roles of the library in solving any identified societal issues. In the long run, it will ensure that Nigeria is strategically positioned to take advantage of the opportunities inherent in the use of generative AI and other modern tools.

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KEY TERMS AND DEFINITIONS

AI Content Detectors: These are AI-driven tools that ensure that digital content shows human intellectual prowess rather than machine input to promote authenticity and originality.

Artificial Intelligence (AI): This is a computer system that can achieve a particular task through certain capabilities (like speech or vision) and intelligent behaviour that was once considered unique to humans.

ChatGPT: This is a language model that allows individuals to interact with computer technology conversationally or naturally.

Fourth Industrial Revolution (4thIR): This is opined as the 21st-century era of technological advancement driven by emerging technologies like AI.

Generative Artificial Intelligence (G-AI): These are technologies with a multitude of capabilities such as the ability to leverage deep learning models which enable it to generate human-like content in various formats in response to complex and varied prompts.

Global North: These are developed countries that have embraced the use of ChatGPT and other Generative AI tools in the mainstream of teaching and learning.

Global South: These are developing countries that are faced with myriads of challenges in embracing and infusing AI technologies into the educational ecosystem.

GPT: This is a Generative Pre-trained Transformer generally for a family of natural or conversational language models specifically invented by Open Artificial Intelligence (AI).

UNESCO: The United Nations Educational, Scientific and Cultural Organization.