

Artificial Intelligence, Robotics and Information, and Communication Technology (ICT) as Tools for Business and Education Management

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Abstract

Intuitively, artificial intelligence, robotics, and information and communication technologies are important because they give enterprises and institutions insights into their operations that they may not have been aware of previously and because, in some cases, they perform tasks better than humans. As tools for business and education management, artificial intelligence, robotics, and information and communication technologies in the 21st century are Business and education systems have been described as vital to keeping abreast with rapidly changing technologies. Its importance has been translated into huge potential in terms of positive outcomes, although investments in ICT in Nigeria's business and education systems have not yielded much when compared to similar investments made in communication. This paper briefly discussed the roles of artificial intelligence, robotics, and information and communication technologies as tools for business and educational management. At the end of the paper, suggestions were made for how to use artificial intelligence, robotics, and information and communication technologies in business and education management in the best way possible.

Keywords: Artificial Intelligence, Robotics, ICT, Business, Education, Management

Introduction

Information and Communication Technology (ICT) is an extensible, broad, and evolving term that includes any communication device, encompassing radio, television, cell phones, computer and network hardware, software, systems services, and so on, that retrieves, manipulates, transmits, or receives information electronically in a digital form. That is to say, it covers all advanced technologies for manipulating and communicating information. Advanced technologies are all about performing tasks by machine (hardware and software) that require human intelligence but without the presence of a human being. Paradoxically, with ICT, artificial intelligence enables robotic devices and not just robots to understand language, solve problems

after analyzing them, provide logical reasoning like a human being could, and all such possibilities that human beings are capable of. Artificial intelligence has great applications in the business and education rather than just robotics (Ahmad, Alam, Rahmat, Mubarik & Hyder, 2022).

Conceptually, Artificial Intelligence and Robotics are two related but entirely different fields. The primary distinction between robotics and artificial intelligence is that robotics is a subfield of engineering, whereas artificial intelligence is primarily concerned with computer programming. Robotics, on the other hand, also takes into account the device's mechanical components, such as its design and construction. On the other hand, artificial intelligence has emerged from computer science. It is nothing but algorithms and programs. In other words, robotics involves both hardware and software aspects, whereas artificial intelligence is all about software for business and education management more efficiently.

Information and communication, artificial intelligence and robotics have become the vital means of facilitating the task of business and education management. These variables have become an essential part of our everyday lives and cannot be avoided due to the fact that using variables in business enterprises or education has become the most effective factor for productivity and service delivery (Simin Ghavifekr; Mojgan Afshari; Saedah Siraj & Kalaivani Seger, 2013; Federal Republic of Nigeria, 2012). In all businesses and institutions regardless of size, including private, not-for-profit, public and mixed ownership, business and education management is the act of getting people together to accomplish desired goals and objectives using available resources efficiently and effectively, following ethical guidelines, striving to create integrity and sustainable organizations caring for their immediate communities as much as possible.

In this paper, the author analyzes the instrumentality of these innovations (AI, Robotics, and ICT) issues and prospects with a focus on business and education management. This essay outlines the current challenges in the applications of AI, robotics, and ICT in business and education management and then summarizes current policies and debates toward the application of IA, robotics, and ICT or its components to meet society's highly complex demands.

Conceptual Issues

Artificial intelligence (AI) has the potential to solve some of the most significant problems that exist in business and education today, to innovate teaching and learning practices, and to ultimately speed up the process of achieving sustainable development, particularly Sustainable Development Goal 4, which seeks to ensure inclusive and equitable quality education and to promote lifelong learning opportunities for all. However, these rapid technical breakthroughs inexorably bring with them a multitude of hazards and concerns, which have, so far, surpassed policy discussions and regulatory frameworks in a number of nations, including Nigeria. For this reason, UNESCO reaffirmed its commitment to supporting Member States in their efforts to harness the potential of artificial intelligence and information and communication technology (ICT) technologies to achieve the Education 2030 Agenda. UNESCO also said that it will keep working to make sure that the use of AI and ICT in business and education is guided by the core principles of inclusion and equity.

A human-centered approach to artificial intelligence is fundamentally required to fulfill UNESCO's mission. It aims to shift the conversation to include AI's role in addressing current inequalities regarding access to knowledge, research, and the diversity of cultural expressions and to ensure that AI does not widen the technological divides within and between countries (Singh, & Kapoor, 2015). In other words, it wants to make sure that AI does not make the situation worse. The promise of "AI for all" must be that everyone will have access to the products of the technological revolution that is currently taking place and will be able to benefit from them, particularly in terms of innovation and knowledge (Palanivelu & Vasanthi, 2020).

In light of the above, Palanivelu and Vasanthi (2020) affirm that the deployment of AI technologies in business education is to enhance human capacities, protect human rights for effective human-machine collaboration in life, learning, and work, and leverage the emerging technologies to boost production and service delivery and for sustainable development. The way we use artificial intelligence to change every part of our lives—to improve livelihoods, reduce inequality, and promote fair and inclusive globalization—will determine how we need to change the way we do business and teach (Kapoor, 2019).

Role of Artificial Intelligence in Business

The role of artificial intelligence (AI) in modern digital life is quickly expanding, and the marketing and advertising industries are no exception. Artificial intelligence is transforming industries one by one, from office management to business communication, artificial intelligence can be used for a variety of tasks, such as identifying data trends to reduce market risks, improving customer service with virtual personal assistants, or even analyzing millions of documents across a company's servers to discover compliance lapses. But businesses have only lately been able to foresee and anticipate the potential that robotics and artificial intelligence will offer to the future of business (Palanivelu & Vasanthi, 2020)

By utilizing instruments like data mining, pattern recognition, and natural language processing, artificial intelligence makes use of self-learning systems. Thus, artificial intelligence is incredibly scalable in terms of its major business advantages over human intelligence, leading to incredible cost reductions. Additionally, rule-based software and artificial intelligence's consistency help businesses reduce errors. It is an excellent business decision because it has been there for a while, keeps becoming better, and can document processes (Singh & Kapoor, 2015).

Artificial intelligence applications make use of robotics, computer vision, speech recognition, machine learning, and natural language processing technology. There are several business prospects offered by these technologies. Artificial intelligence can be obtained by machine learning, and deep learning is one of the fields of machine learning and a way to comprehend it.. The advent of new technology has had a huge impact on marketing, just like it has on every other field, and it will continue to do so in the years to come. It is clear that AI has improved marketing performance in a variety of ways. For instance, it is anticipated that AI will have an increasing impact in the near future. Eye-tracking data will automatically update and reformat websites. Salespeople will be replaced by robots in the future. Without a doubt, new marketing trends brought on by AI will transform the research market and render it irrelevant. With the

developments and advancements in AI, the world of marketing is changing quickly and will continue to do so. The rate of this transformation will also impact how business is viewed in academic, research, and commercial contexts. Organizations will face significant difficulty in adapting to the shifting business landscape. With the development of new technology, businesses will need to continually train their staff to match the emerging development.

Uses of AI and ICT in Business

Undoubtedly, technology is very necessary for business because it has caused an explosion in commerce and trade, reason for the revolution of many traditional business models and concepts. Artificial Intelligence and Information Technology have just about changed every aspect of business in a big way, and this has never happened this fast before in history. To be more specific, here are a few ways in which information technology has affected business.

1- Communication

In the business world, communication plays an important role in maintaining the relationship between employees, suppliers, and customers. Therefore, the use of both simplify the way to business communicate business and customers.

2- Time saving

AI and ICT applications can save time in the retrieval of information from a database or website. Rapid searches can be carried out by simply cueing in a keyword such as the name of a customer or a component. Another way that time can be saved is in the rapid duplication of information. For example, an e-mail can be sent to all of the relevant members of an organization simply by creating a pre-prepared mailing list for all communications of a certain type.

3. Customer Relationship improvement
Companies are using **AI and ICT** to improving the way of design and manage customer relationship. Customer Relationship Management (CRM) systems capture every relationship a company has with a customer so that a more experience gain is possible.

4- Management Information Systems
Information data is very important for business organization and a valuable resource requirement for the safe and effective care, that enable the company to track sales data, expenditure and productivity as well as information to track profits from time to time, maximizing return on investment and recognize areas of improvement (Dalia, Rania, Marwa, & Salem, 2021).

5- Security

Most businesses of the modern era are subject to security threats and vandalism. Technology can be used to protect financial data, confidential executive decisions and other proprietary information that leads to competitive advantages. Simply put, AI and ICT helps businesses keep their ideas away from their competition. By having computers with passwords, a business can ensure none of its forthcoming projects will be copied by the competition (Ahmad & Ghapar, 2019).

6- Efficiency of operations

AI and ICT also help a business understand its cash flow needs and preserve precious

resources such as time and physical space. Warehouse inventory technologies let business owners understand how best to manage the storage costs of holding a product.

Uses of AI and ICT Application Tools in Educational Administration

There are a lots of AI and ICT application tools that have been vastly used in education and management. Available AI and ICT applications for education management purposes are computers, the internet, broadcasting technologies (radio & television), and telephony. But AI and ICTs are more than just these technologies, older technologies such as the telephone, radio and television, although now given less attention, have a longer and richer history as instructional and management tools (Sayed, Mohd, Muhammad, Muhammad, & Syed, 2021; Cox, 2021; Ubulom, Kayii, & Dambo, 2016). For instance, radio and television have for over forty (40) years been used for open and distance learning, although print remains the cheapest, most accessible and therefore most dominant delivery mechanism in both developed and developing countries. Specifically, usefulness of AI is as follows:

- a. AI aids the development of skills for the learners; and
- b. AI enhances the development and management of an online repository to host curated AI-related training resources, national curricula and other key digital skill in robotics training courses;

Robotics

Advances in technology continue to push the envelope in business, communication and education management. The use of robotic and simulation technologies have proven themselves to be worthy components of available educational resources. These technologies use in the education environment have shown their value in everyday learning and in the specialized education of students with disabilities (Kapoor, 2019). For instance, the use of robotics has allowed complicated medical procedures to be simplified, the work of dangerous construction projects to be safer and the discovery of our universe to be possible. When applied to business and education, robotics and simulators can change the way business is conducted and how students learn and ultimately create a more knowledgeable and well-adjusted student.

Uses of Robotics in Education Management

Robots can be used to bring students into the classroom that otherwise might not be able to attend. In New York, a second grader with severe, life-threatening allergies was unable to attend school due to his condition. A four-foot-tall robot provided a 'real school' experience for the boy, 'attending' school and bringing the boy with him via an internal video conferencing system. Robots such as the one mentioned are able to 'bring school' to students who cannot be present physically (Morikawa, 2015).

Higher Education

Robotics - Many careers require specialized knowledge in delicate practices, specifically in the realm of healthcare. When receiving a medical education, many students find benefits in the use of robotics. When learning to perform complicated medical procedures, a human subject is not feasible, so educators are employing the use of robots as stand-ins. Robots can be created and programmed to give off all indications of human life, including breath and heartbeat. Their use

can also be seen in such procedures as injections, surgeries and even delivering children (Sayed, Mohd, Muhammad, Muhammad, & Syed, 2021; Dirican, 2015).

Special Education

Robotics - Students with special requirements are reaching new levels of learning through the use of robotics in the classroom. With these technologies children with autism are learning communication and social skills and students with developmental issues and attention disorders are learning focus. Individuals with severe physical disabilities are also offered a constant companion and health monitoring system - all through the use of robotics. Robots can be programmed to suit each individual child's need, offering special education in a much simpler, accessible format.

Nature of Business and Education Management with Artificial Intelligence, Robotics, and Information and Communication Technology

Business has been around since prehistoric times. It may have begun with nothing more than barter trade, if the history books are to be believed, but it has since morphed into something far more complex, and none of that would have been possible without technology. The major industries of the world would collapse, if the existence and use of information and communication technology and their paraphernalia were to be snatched suddenly from businesses. This is because most businesses and education cannot be done in the 21st century without Artificial Intelligence, Robotics, and Information and Communication Technology.

The relevance of Artificial Intelligence, Robotics, and Information and Communication Technology in Business and Education Management

Over the years, technology has caused a knowledge explosion in business and education. Because of technology, many traditional business and education models and concepts have been revolutionized. From a new perspective, artificial intelligence, robotics, and information and communication technologies have given us the opportunity to see things from a new perspective, and to approach what we were already doing from a new perspective. Technology has also given us greater efficiencies for conducting marketing and educational research.

Some of the areas in which technology is crucial to business and education management include point of sales systems, the use of ICT in management, accounting systems, and other aspects are, especially to education; e-learning or online learning, brings inclusion, promotes higher-order thinking skills, enhances subject learning, encourages collaboration, etc.,

However, Lynch (2018) and Amie-Ogan, Nwile, and Elenwo, (2021) outlined some of the possibilities for advancements in business and education using artificial intelligence, robotics and ICT as in plagiarism detection, exam integrity (grade scope), chatbots for enrollment and retention, learning management systems, transcription of faculty lectures, enhanced online discussion boards, analyzing student success metrics and academic research, spam filters, smart email categorization, voice to text features, smart personal assistants, such as Siri, Cortana and Google Now, automated responders and online customer support, process automation, sales and

business forecasting, and security surveillance, etc. These are helpful for effective education management in the following ways:

- i. National and global data that advises teachers of the best learning interventions,
- ii. Adaptive learning programs that respond to students
- iii. Regularly updated and relevant content
- iv. Tailored learning plans based on student needs and performance
- v. Predictive models that are school-specific

The potential benefits of disruptive technologies in business and education do not detract from, but rather enhance, classroom instruction in a variety of ways (Lynch, 2018; Serdyukov, 2017). Lynch summarizes five intriguing potential benefits of integrating AI and ICT, especially in education;

Personalization: It can be overwhelmingly difficult for one teacher to figure out how to meet the needs of every student in his or her classroom. AI and ICT systems easily adapt to each student's individual learning needs and can target instruction based on their strengths and weaknesses.

Tutoring: AI and ICT systems can "gauge a student's learning style and pre-existing knowledge to deliver customized support and instruction.

Grading: AI and ICT can help grade exams using an answer key, but it can also compile data about how students performed and even grade more abstract assessments such as essays.

For example, if many students are answering a question incorrectly, AI and ICT can zero in on the specific information or concepts that students are missing, so educators can deliver targeted improvements in materials and methods. Some students may be shy about taking risks or receiving critical feedback in the classroom, but "with AI and ICT, students can feel comfortable making the mistakes necessary for learning and receiving the feedback they need for improvement." Much of the potential envisioned for AI in education centers on reducing time spent by teachers on tedious tasks to free up time for more meaningful ones.

Evaluation of Literature

In order to gather references for the review, systematic searches on various online repositories for relevant articles on the concepts of AI, robotics, and ICT were conducted. Selection was made for concepts that either primarily addressed non-technical issues or which themselves contained substantial literature reviews that could be used to gain a picture of the most recent applications of artificial intelligence, robotics, and information and communication technology. This systematic search was combined with snowballing (also known as pearl growing techniques) using references by and to highly relevant matches to find other relevant material. While typically underreported in systematic reviews, this method has been shown to be highly effective in retrieving more relevant items (Bayo, & Kayii, 2020; Badampudi et al. 2015). Some grey literature was included because there are a large number of reports by governmental organizations summarizing the social implications of AI, robotics and ICT. Because many issues

relating to the variables are foreshadowed in the literature on learning analytics and not as tools in business and education management, this topic was also included. Even though some of the general literature on AI and robots didn't directly talk about business and education management, it was still thought to be relevant, especially since it was known that education might be a late adopter and that the effects would be felt more through changes in society as a whole than through educational applications.

Literature reviews which suggested trends in the usefulness of these technologies were included, but items which were detailed reports of the development of variables were excluded, because the concern was that they were tools in business and education management. Much of such literature reflects the development of AI and robotic technologies and their evaluation compared to other forms of teaching and educational management. However, according to a recent review, it is primarily written by computer scientists, mostly from a technical point of view, with relatively little connection to pedagogy or ethics (Zawacki-Richter et al., 2019). Some authors, like Luckin and Holmes, want to go beyond the rather narrow development of to think about how artificial intelligence (AI), robotics, and information and communication technology (ICT) can be used to solve the big problems of running businesses and schools in the 21st century (Luckin et al., 2016; Holmes et al., 2019; Woolf et al., 2013).

In this paper, the author imagines a business venture and a school classroom ten years into the future from the time of writing, where an entrepreneur, educational manager, and a teacher will work with and apply AI, robotics, and ICT for business operation and educational management.

Conclusion

It is evident that Artificial Intelligence, Robotics, and Information and Communication Technology have a great impact on business and education management, and their role is equally beneficial for both academic and administrative activities. Its applications help not only the learning inside a classroom environment but also the business operators in various administrative tasks attached to the classrooms, like students' grading and assessment, finding their intelligence level, and their interests. Additionally, Artificial Intelligence, Robotics, and Information and Communication Technology also help business and education managers in production and service management, course management, classroom management, and managing attendance. It also helps business organizations and educational institutions manage their offices, make lecture notes and video lectures, and helps the students learn through virtual reality. In addition, it also provides help in other departments like admission, budgeting, facility management, resource management, examination management, and record keeping. So, the literature review puts the most weight on how AI, robotics, and ICT:

- i. be designed to support efficient business and education management rather than replace employees in these sectors.
- ii. for the personalization of learning experiences through adaptability should be encouraged;
- iii. be for monitoring of haptic data to adjust learning material to business operators' and students' emotional and physical states in real time.
- iv. The potential of AI, robotics and ICT to support the learning of twenty-first century skills, such as collaborative skills is needed.

However, it is summarized that there continues to be widespread debate over the pros and cons of deploying artificial intelligence, robotics, and information and communication technology (ICT) as tools in business and education management, including the concerns about depersonalization and the ethical considerations as pointed out in this work, as well as an emerging consensus that the extraordinary range of current and future benefits will carry the day. Global adoption of AI, robotics and ICT in business and education management is transforming the way business enterprises and institutions are managed. Because of the increasing expansion of digitalization and transformation, more businesses and institutions are incorporating artificial intelligence, ICT, and machine learning into their supply chains in order to maximize their resources by lowering the time and money spent on operations and research. Companies are under enormous pressure to incorporate AI, ICT, and robotics, whether in manufacturing, energy, transportation, or institutional laboratories, to assist in boosting operational efficiencies and better business decisions through futuristic technologies. Therefore, the study suggests that the integration of AI, robotics, and ICT will reshape business and education management by:

- i. Providing a widespread advancement in machine learning (ML), computer vision, deep learning, natural language processing (NLP), and digital learning interfaces with customization options for business and institutional enterprises.
- ii. Its applications can manifest in all sorts of ways depending on organizational needs and the business intelligence (BI) insights derived from the data you collect. They are new and evolving ways of perceiving information in business and education.
- iii. assisting in the creation and updating of lesson content; maintaining current information; simplifying administrative tasks; and tailoring it to various learning purposes

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