Artificial Intelligence and Reengineering Educational Content and Resources for Industrial Transformation in a Depressing Economy

Egbebi John Oluyemi[1,*], Jegede Adepitan Adebowale[2], Alabi Christianah Oluwakemi[3]

[1] Ahmadu Bello University, Zaria, Nigeria

[2] Lagos State University of Education, Oto/Ijanikin, Lagos State, Nigeria

[3] Emmanuel Alayande University of Education, Oyo, Nigeria

Abstract

The paper explored artificial intelligence and the reengineering of educational content and resources for industrial transformation in a depressing economy. it specifically examined artificial intelligence and education service delivery; the concept of artificial intelligence; the prospects of artificial intelligence in the education industry across three levels in Nigeria; key challenges of reengineering educational content and resources in a depressed economy; benefits of digital pedagogy on school curriculum; impact of reengineering educational content and resources on the economy; case studies on balance educational resources and content for industry enhanced output; factors militating against artificial intelligence/reengineering of educational content; and educational resources; and indicators of depressed economy against artificial intelligence/reengineering education. The paper concluded and recommended among others that, all concerned education authorities like national education, research, and development; National Commission on Education, etc should work as a matter of urgency on educational institutions' curriculum overload to blend to the yearning of industries by the application of artificial intelligence to assist all managers of education; and role of technology, that of artificial intelligence should be infused into institutional administration and management: encourage educational institutions to adopt and implement digital learning platforms and tools, such as virtual classrooms and adaptive learning software, to improve the quality and accessibility of education through artificial intelligence apparatus.

Keywords: Artificial Intelligence, educational content, educational resources, Depressed Economy, reengineering

Emails: [1]oluyemiegbebi@gmail.com, [2]jegedeaa@lasued.edu.ng, [3]christianah.kemialabi@gmail.com

Introduction

Most instructional givers in their various categorizations across institutions of learning such as teachers, tutors, lecturers, and resource persons among others always refuse to blend with the modern efforts that have to do with an infusion of artificial intelligence and reengineering of education with teaching and learning processes. According to the National Council of Teachers of Mathematics (2021), reported and take Mathematics study contents for instance no longer expected to be taught using a manual scheme of work alone but there are over one thousand information technology-related sites on the internet that could be useful to obtain and teach the subject easily by the application of internet resources via artificial intelligence command. As learned by scholars, researchers, and even teachers, the concept of change is inevitable and people must be ready to adapt to such variations to move education service delivery forward in the era of globalization (Ihebom & Uko, 2020). Hence, it is expected of every teacher while planning the content and resources in schools and colleges to explore the assumed benefits of artificial intelligence in a positive way for reengineering education in a depressed economy most especially in the developing nations of the world (The University of Arizona, 2021). It is expedient to have a paradigm shift as the economy changes and grows, and thus align educational content and resources in Institutions from basic, post-basic, and even tertiary education with the needs of the industry (Egbebi & Bamimore, 2021). However, many educational systems around the globe have not kept pace with these vicissitudes, leading to an incongruity between what students are learning and the skills that are in demand for such development.

A vital challenge in reengineering educational content and resources in the school system is the inadequacy of coordination and collaboration between educational institutions and industries to come to terms with the application of artificial intelligence (Levesque, 2024). What to teach in schools is expected to start from home and society so that the duo will blend. The best order from society to school now is the use of artificial intelligence to better the education industry. Teachers cannot solve all of the problems of teaching and learning by theoretical dictates alone.

By defining certain keywords on the sub-theme of this paper discourse;

1. Reengineering educational content involves revamping the curriculum and learning resources to make them more relevant to the appropriate moral, physical, psychological, mental, and emotional academic needs of learners that allow the application of artificial intelligence and the use of the internet. All put together as intrinsic and extrinsic needs of learners in related institutions, in the long run, will benefit the learners themselves and, their industries and lead to industrial transformation for higher productivity in nations, and even developing countries;

2. Educational Resources

    Educational resources are used in the learning environment to help and assist peoples' development through the right learning pedagogy. Artificial intelligence device is part of education resources. They are usually designed to reinforce learning. They include: i. physical resources: textbooks, workbooks, instructional materials, and laboratory equipment; ii. Digital resources: online courses, educational software, and electronic learning platforms; iii. Human resources: teachers, school administrators, and support staff who give instruction and support

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students' learning; and iv. Community resources: libraries, museums, and organizations that provide educational services or studies;

Resources for personal and industrial transformation: These may be the tools and techniques that can be used to support the process of transforming industries through educational institutions learning packages in the systems.

3. Industrial Transformation: This refers to the idea of bringing better output from the interaction of both educational institutions and industries. This means the school will send their products to work effectively and efficiently in the industries for higher productivity and the nation's development;

4. Depressed Economy

- Depressed economy: This refers to the state of an economy where there is slow growth or even negative growth i.e. products of the schools cannot perform well in the industries due to the inability of the players to take advantage of artificial intelligence for the reengineering of education systems. The skills and knowledge gained from educational institutions are not useful for the industries.

The Concept of Artificial Intelligence

Artificial Intelligence (AI) refers to the ability of a machine or computer program to learn lessons, think, and make decisions in a way that is similar to that of living human intelligence (Oxford Dictionary, 2023). AI is used in a wide range of applications, such as facial recognition, language translation, speech recognition, decision-making, and problem-solving devices or equipment (Merriam-Webster, 2023). AI is bound or may commit errors while performing what human beings can do.

Prospects of Artificial Intelligence and Education Service Delivery

The Future of AI as it grows and matures and is deployed at scale across the education industry, is expected to bring both significant benefits and challenges, from changes in education services models and educational administration to risks related to data privacy, cybersecurity, and bias (McKinsey Global Institute, 2023)

The rise and growing use of AI is changing the nature of work, the structure of schools and colleges, and the relationship between humans and machines (Adiguzel et al., 2023). In the postulation of McKinsey Global Institute (2023), the following are the prospects for which AI can serve the education industry in the foregoing.

1. Improved Efficiency: AI can automate tasks and processes, leading to increased efficiency and productivity in various industries' education service delivery.

2. Enhanced Decision Making: AI can assist in decision-making by analyzing large amounts of data and identifying patterns and trends which is the bane of the education industry across all levels in Nigeria.

3. Personalized Experiences: AI can provide customized services and products based on individual preferences and behaviors in classrooms.

4. Improved Healthcare: AI can help with diagnosing diseases, identifying treatment options, and monitoring patient health.

5.   Advancements in Science and Technology: AI can assist in scientific research and discovery, enabling breakthroughs in various fields, most importantly the education industry.

Key Challenges of Reengineering Educational Content and Resources in a Depressed Economy

1. Inadequacy of learning resources itself;

2. Disparity between curriculum planning and implementation

3. Teachers' recruitment, training and development

4. Information Technology and Analogue means of disseminating Instruction

Inadequacy of Learning Resources

When resources like textbooks, lab equipment, and digital tools are inadequate or lacking, it makes it hard for students to get the education they need (UNESCO, 2022). Take a look at all levels of educational institutions in Nigeria today. Check their classrooms; staff offices; packing spaces; access roads; laboratory equipment; access to availability, usage, and maintenance of internet and computer facilities; etc.

Disparity between curriculum planning and implementation: If the curriculum is not aligned with industry needs, then students might not be learning the right skills. Take the instance of too loaded educational curriculum as contained in the national policy on education e.g in basic schools, at least 8 or 12 subjects must be taught in a day; in post-basic schools, there were 35 subjects to be taught including the trade subjects: Junior secondary school students on daily basis in their respective schools will take up to 12 or 16 subjects per term or session. Senior secondary school students will rottenly take a maximum of 9 subjects and a minimum of 8 subjects per term/session. Similarly, in Nigerian tertiary institutions, a student can offer between 16 and 24 credit units per session (Otonko, 2012). The summary is that school curricula are assumed to be too much for students to learn well and at the same time blend to the requirements of the industry. According to a study conducted by the Education Commission of the States (2018), it was reported that a student of a tertiary institution usually takes a maximum of four courses totaling 8 credit units per session.

What technique does the teacher adopt to teach the students – with computers and internet usage or i.e. digital or analogue-based learning? And if it's not implemented well, that can lead to a waste of resources and a lack of effectiveness in the learning process. This may signify that something is wrong with curriculum planning and implementation in Nigeria.

Information Technology can play a huge role in revamping educational content by using digital tools:

- Platforms like virtual learning environments (Google Meets; teleconferencing; telegram; Google Classroom; zoom), and online courses (digital library management courses; information literacy courses; collection management courses; reference service courses; digital preservation courses; research methods courses; data science; digital marketing; photography etc).

All these put together may provide students with access to:

Learning materials and Interactive experiences are more attractive than traditional methods. At this juncture, one will pause to deliberate on actually which learning mode or pedagogy is the best tutorial for learners in their various categories that will blend with the needs of industry emancipation. This may be what is needed for the reengineering of educational content and educational resources for the expected transformation of industry. This

presentation is addressing… Which one is the best approach to disseminate instructions in classes - digital or analog? In other words, is it a mix of digital or analog? The presenter should interact with the audience for 15 minutes to harness evidence-based value from the presentation for the use of stakeholders in the education sector. This may assist in transforming the depressing economy in industries. Curriculum planning and implementation are expected to consider the needs of the industry during the drafting stage, please! What should educational institutions apply on the application of too much-loaded curriculum?

Benefits of Digital Pedagogy on the School Curriculum

Still, through the use of the internet and computer facilities, big data and analytics may be obtained: Data can be used to analyze student performance and identify areas where the curriculum needs to be improved upon.

Adaptive learning: This allows students to learn at their own pace and get personalized feedback, which can help them to better understand and retain information. Furthermore, in line with the postulations of Egbebi et al. (2023), reengineering educational resources through digitalization could serve and benefit the institutions, students, teachers, and other stakeholders in the following ways:

The Role of Industry Academics' Partnerships in Reengineering Educational Content And Resources

After all, the goal of all educational institutions is to prepare students for the job market, right? Yes…Industry-academia partnerships may provide a lot of benefits in reengineering educational content and resources.

- Industry input: Companies may provide insights on the required forms of skills and knowledge that are greatest in demand, which may help to inform curriculum development.
- Internships and work placements: These may provide students with real-world experience and help them to develop the skills they require for the job market.
- Research collaborations: Collaboration between industry and academia may lead to discoveries and innovations that can be incorporated into the curriculum planning and reimplementation arrangements.

To foster these kinds of partnerships, the following ideas may be resolved:

Industry-academia partnerships in reengineering educational content and resources:

- Encouraging industry visits: These may give students and educators a firsthand look at the latest technologies and practices in the industry working angle.
- Creating joint research centers: These centers may bring together researchers from industry and academia to work on projects of mutual interest, thus achieving the goal of reengineering content and resources.
- Holding job fairs and networking events: These may help to connect students with potential employers and provide them with opportunities to learn about the job market and curriculum developers then incorporate this into the school syllabus and scheme of work.

Impact of Reengineering Educational Content and Resources on the Economy

If educational content and resources for industrial transformation, even in a depressed economy, here are a few ways reengineering educational content and resources may lead to industrial transformation in a depressed economy:

- Increased competitiveness: When students are armed with the right skills and knowledge, they may help to make businesses more competitive and innovative, which can boost the economy.
- Reduced skill gaps: By aligning the curriculum with industry needs, you may help to reduce skill gaps and increase the pool of qualified workers, which may support economic growth.
- Improved productivity: With better-trained workers, businesses may become more productive, which can lead to higher wages.

Case Studies on Balance Educational Resources and Content for Industry-Enhanced Output

1. Singapore's Skills Future initiative: This initiative was launched in 2015 to support lifelong learning and skills development. It may be useful for reengineering Nigeria's educational system to support economic growth in industry.
2. Estonia's digital education system: Estonia has implemented several innovative digital education initiatives, by providing every student with a laptop and access to a nationwide learning platform
3. The National Industrial Skills Development Program (NISDP): This is a program launched by the Nigerian government to train young people in technical and vocational skills. The program has been successful in reengineering educational content and resources. It focused on the provision of practical, hands-on training to support economic growth in the system.

Factors Militating Against Artificial Intelligence/Reengineering of Educational Content; and Educational Resources

The following are specific factors that can militate against reengineering educational content and resources:

- Resistance to change: Some teachers, administrators, and policymakers may be resilient to change, making it difficult to implement new methods and technologies.
- Inadequate or lack of funding: Reengineering educational content and resources may be expensive, and some schools and colleges may not have the required funding for the procurement of such content and resources.
- Infrastructure issues: In some areas, the infrastructure (such as internet connectivity or access to technology) may be insufficient, which can make it difficult to implement digital learning initiatives in the school system.

Indicators of Depressed Economy

Few indicators of a depressed economy can be deduced in the foregoing. In the opinion of Tooze (2022), these are the indicators of a depressed economy.

- High unemployment: A high rate of unemployment, most especially among the youth.
- Slow or negative growth: If the economy is not growing or is shrinking, this may be an indicator of a depressed economy.
- Decreased consumer spending: When people are worried about their economic future, they may cut back on spending, which can further slow the economy down (Casillas et al., 2019).

Conclusion

The need for reengineering educational content and resources is persistent in a depressed economy, where the skills and knowledge of the workforce are expected to be merged with the needs of the industry. Based on the analysis presented in this paper, it is clear that a combination of technological advances, industry-academia partnerships, the inadequacy of instructional facilities, and a reoriented curriculum can help to close the gap between educational institutions and the economic growth of industries through balanced curriculum process and implementation. These events, if implemented effectively, can support the transformation of industries and lay the foundation for sustained economic development in Nigeria. The issue of a too-loaded curriculum that is hindering progress between the industries and educational content and resources is standing as an obstacle to the real transformation in the industry.

Recommendations

The following recommendations are hereby suggested to reengineer educational content and resources for a pressing and advanced industry transformation in a depressing economy.

1. All concerned education authorities like the National Educational, Research and Development; National Commission on Education, etc should work as a matter of urgency on educational institutions' curriculum overload to blend with the yearning of industries.

2. The role of technology: Encourage educational institutions to adopt and implement digital learning platforms and tools, such as virtual classrooms and adaptive learning software, to improve the quality and accessibility of education (Wagner, 2015).

3. Industry-academia partnership: Establish frameworks for industry-academia partnerships, such as joint research centers and internships, to ensure that educational content and resources are aligned with industry needs.

4. Teacher preparation: Invest in teacher training and development to ensure that educators are equipped with the knowledge and skills needed to effectively use technology and industry-aligned curriculum in their teaching. This could involve professional development programs, workshops, and support for teachers to integrate new methods and technologies into their classrooms.

5. Encourage businesses to invest in workforce training and development programs that are aligned with the skills and knowledge being taught in educational institutions. This can help ensure that workers have the skills needed for industry transformation and support economic growth.

6. Promote entrepreneurship and innovation in education by supporting the development of new educational models, such as online learning platforms, microcredentials, and apprenticeships. These can help to improve the flexibility and accessibility of education and encourage the development of new skills and knowledge that support economic growth.

7. Increase funding for research and development in education technology, with a focus on creating solutions that are effective, scalable, and affordable (Aina and Abdulwasiu, 2023). This can help to make educational resources more accessible and affordable for students and educators.

8.   Investment should be made in instructional facilities through the procurement of modernization and expansion of educational infrastructure, including classrooms, laboratories, libraries, and other resources. This can help to ensure that educational resources are accessible and up-to-date, and can support the development of new teaching methods and technologies;

9.   Promote public-private partnerships to support the implementation of educational reforms and initiatives. This can help to ensure that there is a shared vision and commitment to transforming educational content and resources and can provide the necessary resources and expertise to support sustainable and effective change.

Declaration of AI Use
The authors did not use any AI tool to write the text or refine it.

Statement of Absence of Conflict of Interest

The authors mentioned above hereby solemnly declare that they are not and shall not be in any situation that could give rise to a conflict of interest in what concerns the findings and recommendations contained in this academic article.

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