(Review Article)

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Technology with responsibility: Artificial Intelligence and its impacts on industry 4.0 and education

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Abstract

Technology is the most pressing and elusive goal of any nation for the development of the education system and the entire system. Artificial Intelligence is making many changes in the educational setup. It has both positive and negative impacts on education, a versatile approach plays an important role in the education sector with huge possibilities for new emerging trends in the learning and teaching process. The field of artificial intelligence is an area of science that creates and studies machines to stimulate human intelligence processes. As a result, the study objectives in this paper are designed to assist professionals, students, teachers as well as business experts. Firstly, it examines the important technological elements and characteristics of AI, which are vital for the fourth industrial revolution in the education field. Second, this article analyses the key achievements and different obstacles that make the AI revolution for education in Industry 4.0 so possible. AI changes the styles of teaching and learning presently.

 The study also looks at the possible influence of AI on education, such as how teachers' roles are evolving and the need for new skills in the industry. This study enhances the currently existing reservoir of knowledge and offers insights into the future implications of this fast-expanding technology by offering a complete analysis of AI's impact on Industry 4.0 and education. This is especially important in today's environment when the usage of artificial intelligence (AI) is becoming more common and has the potential to dramatically impact our society and economy.

Keywords: Artificial Intelligence; Industry 4.0; Normative principles; Education

1. Introduction

The primary goal of AI is to optimize routine activities, increasing their quickness and effectiveness (given it is properly integrated and supported). McKinsey reported (1), As a consequence, the number of businesses using AI continues to rise worldwide. The fourth industrial revolution is the next stage in the automation of industries such as manufacturing, driven by disruptive developments such as the emergence of data and interaction, statistical analysis, human-machine interaction, and robotics advancements.

Industry 4.0 will need the development of an entirely novel kind of worker. To change with, manage, and capitalize on Industry 4.0, tomorrow's industry executives and managers will need new skill sets. Individuals are required to be creative thinkers, problem-solvers, designers, speakers, and value-driven executives.

According to D.P Gaikwad. (2) the Industrial Revolution is divided into four stages: the mechanical industry, the second stage, the third stage, and the fourth stage. The first revolution, based on water and steam, began in the 18th century. The second stage, characterized by mass production and moving parts, occurred in the 20th century. The fourth stage, driven by industrial robots, is now in progress.

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AI improves Industry 4.0's demand forecasting and ensures that inventory grows and lowers as needed. In the manufacturing industry, AI mainly deals with decreasing downtime and assuring the continuing efficacy of production lines. When ordering substitute components, AI can be used to anticipate. AI improves Industry 4.0 by ensuring that supply increases and lowers as needed. AI in the educational industry is largely concerned with reducing interruptions and maintaining the continuing efficiency of teaching and learning is very common in technical colleges as well as in the medical field.

 AI provides educational firms with a high degree of insight that they may utilize to assess the outcomes of their different components. Javed. Mohd, et al.(3) argue that AI analysis of databases can boost a facility's overall efficiency and product reliability. It enables machines or other smart devices to detect anomalies and monitor attributes. Higher education institutions, like industries, must grow and adapt to this new environment. This piece dives into the notion of Industry 4.0, its ramifications for many sectors, and its transformational influence on educational institutions.
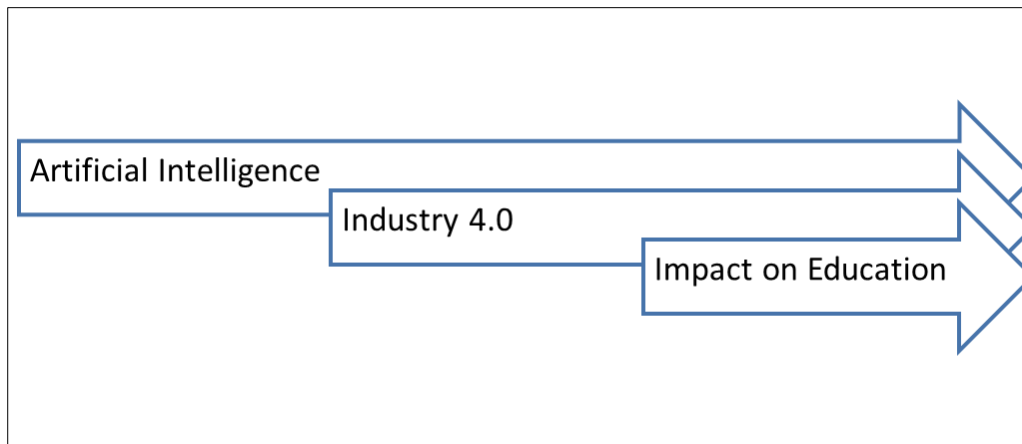
Figure 1 Interrelationship Diagram

It is critical to not just build technology, but also to understand where, and how to apply it. That style of thinking is introspective as well as transdisciplinary. Educational institutions must immediately redefine themselves.

Research Objective

Industry 4.0 is truly revolutionary, with one of its key goals being to meet the needs of educational institutions in the best possible way. The following are the key research aims of this article:

- To investigate the impact of artificial intelligence in the digital age on the educational sector.
- To identify the demand for AI in the education sector.
- To investigate Industry 4.0 processes in the Education sector.
- Identify and investigate AI applications for the development of stable educational institutions.
- To investigate the benefits and drawbacks of applying AI in the education industry.

2. Research Methodology

This secondary data literature review is conducted by reading numerous related documents, websites, and articles. Academia is experiencing the fourth industrial revolution. Investigations, primarily in advanced nations, have focused on the issues of AI disruptions in education, but the prospects and advantages of AI for learning have garnered insignificant attention.

Its fundamental goal is to comprehend and carry out intellectual tasks like contemplating, gaining unfamiliar skills, and adjusting to novel contexts. Comesaña.M. et al.(4) discuss that large-scale information collecting is being made possible by technological advancements. Shortly, artificial intelligence (AI) methods will supplement the advanced capabilities of learning analytics to deliver knowledge at a suitable time. Novel insights are offered by information collected through digital learning and instruction activities. These datasets may be analyzed not just to determine whether responses are right or wrong, but also to determine the reasoning behind the learner's decision. Perez. J.(5) argues that Machine learning and artificial intelligence (AI) can completely transform our understanding of learning. driven by AI devices

and technologies, like as augmented and virtual reality (AR) and tailored instruction algorithms, are improving how students learn by means humans never imagined. Restart. (6) shows educational institutions must adapt their teaching and learning processes without losing perspective of their purpose. Learners must comprehend how to correspond, employ, and implement technical information in a variety of circumstances, as well as how to find affinities across numerous topics to develop a "fact" that will be relevant to the actual world. This brings us to an additional highly crucial aspect: pupils must work within an activity paradigm to work alongside others, instructors, as well as the community at large.

Opportunities and Obstacles such as Including Industry 4.0 in higher education come with both advantages and disadvantages. As curriculum changes, teachers must stay current with new developments and adapt their pedagogy accordingly. Important factors to take into account include tackling the possible loss of work brought on by automation and guaranteeing fair utilization of technology.

But there are a lot of options. Professionals ready for the future of the industry will be in high supply, and universities that adapt to these developments will be seen as trailblazers in the field of education. Research initiatives and industry partnerships may improve an institution's standing and importance. There are many streams in the education sector where AI-based tools are needed but due lack of proper knowledge and opportunity it is not possible to implement them everywhere.

For example, some government colleges in India are not ready to accept AI-based education learning tools because of scarce resources and a lack of knowledge. Education needs to transform into a completely IT-based system for growth and development. Fati Tahiru. (7) argues this is one of the few studies that provides a comprehensive picture of the potential, upsides, and challenges that the use of AI presents to the educational profession. And using the Technological-Organizational-Environmental (TOE) theoretical framework as a lens to analyze the challenges of AI adoption in the education field.

3. Results and Discussions

AI is an all-encompassing concept with applications across several industries. The literature study claims that AI had a significant influence on Industry 4.0, which changed the educational landscape. Agility is the basis for improved technologies as well as survival. The method of developing artificial intelligence is highly dynamic and provides the door to discovering new tactics. In higher education, advanced tangible tools can now examine physical quantities, comprehend processes, and measure factors ranging from applied control. Now is our chance to take advantage of this stage in the Industrial Revolution and develop an education system that is more meaningful, intentional, and improving. This framework aims to assist Industry 4.0 applications' scaling principles by acting as a manual guide. It assists the sector in determining which aspects of teaching and learning need to be addressed the most. AI first developed new products and services for IT enterprises. Industry 4.0 eventually required more technically sound personnel, which at that point caused a chasm to open between Industry 4.0 and education. Machine learning (AI) possesses the capacity to completely transform our understanding of education. Artificial intelligence (AI)-powered tools and technology, like as augmented and virtual reality, and tailored educational algorithms, are improving education for pupils.

4. Conclusions

In this study, I identified several issues that IT researchers and technologists face as they try to improve the education sector, as well as Industry 4.0, to provide clients with better products. AI plays a vital role in the reshaping of education to meet the end user's needs. To perform efficiency and productivity we need to use machine learning. Student satisfaction and better results should be possible only through the implementation of Artificial Intelligence and its techniques.AL is a very new process of the self-assessment of the company and it is a very handy tool. It takes advantage of the strength of the business and also stays away from the weakness part of it. It also prioritizes the institutions' responsibility in the context of opportunities and threats. This article has also some limitations like not giving better solutions or working on multiple ideas etc. Artificial Intelligence changing or creating the education sector very rapidly and providing better results.

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