Review Paper on Artificial Intelligence in Education

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Abstract

The purpose of this study was to measure the effects of artificial intelligence on education. Artificial Intelligence is a field that includes computers, machines, and other human-like intelligence artifacts characterized by cognitive, learning, adaptability, and decision-making abilities. The findings of this study were that AI is widely adopted and used in various ways in education, especially in educational institutions. The inception of AI was in the form of computers and computer technology, moved to intelligent web and online education systems, and eventually used humanoid robots and web chatbots that individually performed the tasks and functions of instructors and used embedded computer systems along with other technologies or a trainer with them. With the help of these platforms, teachers were able to perform various administrative tasks such as improve the quality of educational activities by conducting research and evaluation of student challenges more effectively and efficiently. Meanwhile, the system leverages machine learning and adaptability so curricula and content are tailored and personalized to student needs, driving adoption and retention, improving the student experience and overall quality of learning.

1. Introduction

Once Henry Ford had illustrated in an analogy, Innovation does not mean work with which what was the norm the company should only work such as finding ways to produce horses faster. Sometimes instead of keep looking at the norm, one must develop new ways of doing things. Instead of making the horse faster, build an automobile that will faster than a horse which will as a result lead a person from point A to Point B faster. It was these principles and approaches that lead to the rapid developments in technology that have occurred over the years, especially in the field of education.

When we talk about Learning in specific, it is best described as an interdisciplinary artifact that includes, for example, philosophy, psychology, pedagogy, anthropology, artificial intelligence (e.g., Artificial Intelligence in Education (AIED)) and human-computer interaction (HCI). E-learning deliverables are more than just technical solutions. For example, web-based e-learning sites (no matter how sophisticated) containing sophisticated multimedia resources, Java applets, and dynamic database links promote interaction on cognitive, behavioral, and physiological levels. and other ways to attract users. E-learning artifacts are perhaps best compared to information artifacts known from the cognitive dimensional framework, which defines a "system under study" as "something designed to process, store, and transmit information." It is explained that there is each information artifact provides one or more entries containing encoded information to operate on. The environment used to operate the write possesses the importance of equal measure. The range of users who interact with eLearning artifacts is wide and diverse. The main actors are educators, instructional designers, psychologists, and students. Not only the aforementioned actors have their own unique expectations and prerequisites for the e-learning artifact, but also the different degrees of expertise and professionalism (e.g. not every teacher or psychologist is a professional teacher), motivation to learn (e.g. an adult student may have different learning techniques and motivation than a student who has to memorize chemistry exam formulas; the teacher must not be enthusiastic about teaching using a computer system), education, environment and many more such variables. So, anyone who engages in the learning process becomes a participant in a versatile and comprehensive learning paradigm.

2. Methodology

The study aims at the impact of artificial intelligence on education in contemporary world. More specifically, it sets out measure how much the Artificial Intelligence has affected education, considering its various aspects that include administration, teaching, and learning. Therefore, the study uses a retrogressive approach that involves evaluation of secondary data and materials or studies that have been conducted previously. When performing a systematic or semi-systematic literature review and review of secondary data, it is given that a deeper understanding will be achieved of the subject[1]. This approach is only affected by research involving meta-analyses conducted on a specific topic port of identifying, analyzing, understanding, and synthesizing the potential of artificial intelligence, and impacts education, so that research is experiential. warrants that it is based on reasonable assumptions or evidence. In general, qualitative research designs, including qualitative content and thematic analysis, are used for assessment in a variety of ways. Thematic and content analysis involves conducting a thorough critique of each text and identifying recurring themes from reviewing various texts. This forms the basis for descriptive research conclusions and conclusions [2]. Evaluating the impact of AI on education is an appropriate research design and strategy for the purpose of this study.

Keywords and search strings are used in various search databases such as EBSCOhost, ProQuest and Web of Science. Additionally, search Google Scholar using keywords and search terms to identify articles in various journals focused on research on the impact of AI on education. Journals containing articles are then searched on Scimago, and journals with an H-index of 20 or higher are part of the search. The H-Index is a measure of author-level scholarly productivity in terms of publications and citations, and contribution to scholarship and scholarly activity. The higher the H-index, the higher the prestige of the journal. Many professionally written publications, governmental and institutional reports were selected following a selection process.

3. Role of AI in Education

Diagram

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Algorithms are the heart of artificial intelligence. The history of artificial intelligence can then be seen as the one of the developments of smarter and more efficient (or sophisticated) algorithms. Perhaps the most famous algorithm in recent times is his PageRank, which was developed by the founder of Google in his 1996 as a student at Stanford University [3]. Ranks the relative importance of web pages by counting the number of external links to a website page. This determines where your website appears in Google Search. All computer programs are algorithms. They consist of hundreds, if not thousands, of lines of code representing the mathematical instructions that computers follow when solving problems (arithmetic and numerical calculations, checking essay grammar, processing images, describing patterns found in nature, etc.). All of these create artificial intelligence algorithms that differ from other computer programs in that they involve several specific approaches, applied to areas considered inherently human, such as vision, speech recognition, and decision-making and learning.

Using the service-oriented architecture in above figure web-based ITS development can greatly improve the traditional ITS development process because the client-side system can be built on top of educational web services even if these services are not yet available or unknown to ITS developers. This is because each web service is dynamically described by a service description language such as WSDL. A WSDL is found by an application that needs to use it and is invoked through the communication protocol defined by its interface. In the diagram above, the core of the Educational Web Server is a quantity and information fund for various educational services, dynamically organized but highly structured (tree or table/database, etc.). The basic assumption is that the directory lists services that are ready for learners to use. A service must notify the directory of its readiness and availability. Teachers can therefore find available services by searching the address book. Then you can decide whether to do this automatically.

Table

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In AI learning systems, learner models are important to enhance their ability to learn independently. It is based on student behavioral data generated from the learning process. Analyze student thinking and skills to assess learning ability. Then there is knowledge analysis that is mapped to how students acquire knowledge. Student modelling associates learning outcomes with various factors such as learning materials, resources, and learning behavior [4]. It creates knowledge models, knowledge structure maps, and includes detailed educational content. This usually includes subject knowledge, error rules often made by students, and misunderstandings[5]. Combining the knowledge field model and the student model, the teaching model determines the rules of access to knowledge fields and allows trainers to customize their teaching strategies and actions. As education progresses, students become more proactive, take action, and ask for help. AI systems are always ready to provide assistance through learning theories embedded in learning models. The interface describes student performance through more input media (speech, taps, clicks) and provides outputs (text, images, cartoons, agency). Advanced machine interfaces provide AI-related capabilities such as natural language interaction, speech recognition, and emotion recognition for learning capabilities.

The technology can also be incorporated into handling of whole institutions like schools. Assessment of tests and exam sheets consume a lot of time, and the margin of error and incorrect evaluation are likely to take place. An assisting machine could scan the text and check if it is relevant to the question asked. One could also implement plagiarism checkers while performing this evaluation to find if two students have written exact same sentences. Virtual labs incorporated with sensing and hearing aids which train students before they enter a real lab. Such simulation programs already exist the aviation where pilots are trained virtually before they can man an actual airplane. There are chemicals which could potentially harm students if not handled with care and to train then virtually beforehand will reduce the chance of any harm that might come their way. These practices will better ensure the safety of students.

4. Capabilities of A.I.

Table

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As an intelligent system, it will be interesting to see how AI affects instructor and student performance. As the number of students in educational institutions grows, AI systems work well to reduce the workload of teachers. Artificial intelligence systems help instructors analyze curriculum and course materials to design customized content [6]. These systems can also be evaluated by generating tests after analysis. This ultimately frees up the instructor to focus on more important issues such as student performance. During one-on-one lessons, AI solutions can better analyze learning data, enabling teachers to create personalized lesson plans for each student. Human bias is also related to the problem of artificial intelligence in education. AI solutions can classify reports and exams according to pre-set rubrics and benchmarks to avoid bias [7]. This is made possible by artificial intelligence based on computer vision systems that read and recognize images of handwritten paper. These systems not only reduce prejudice, but also prevent students from cheating and plagiarizing. By analyzing student data, the AI ​​system finds students' shortcomings and corrects them early in their education. This is quite useful as the treatment of most students is usually similar by the conveners of the national education system[8]. In other words, the same teaching style does not lead to the best learning outcomes for all students. AI can help make personalized teaching decisions for each student based on their personality, strengths, and complementary skills. This way all students can improve their learning performance and have fun. A growing number of students also helps students build knowledge systems with enhanced learning, habituation, and creativity. In addition, the AI ​​system predicts each student's career her path by collecting learning data and adjusts the student's college course selection. Based on individual skills and career paths, students can earn a better degree and acquire skills that can be applied in the real world. Based on the above discussion, AI has great potential in automating and accelerating administrative tasks for both educational institutions and educators [9]. AI can already do this automatically. There is homework and essay grading, allowing the instructor to spend more time with the student one-on-one with her. AI developers are creating new ways to assess written tests and exams. We create artificial intelligence on top of our materials to create customizable digital learning interfaces applicable to students of all ages and grades. Additionally, while learning, artificial intelligence allows instructors to gain insights about their students “based on the entire ecosystem of learning tools,” according to Brightspace creator Nick Oddson. AI systems are leaner because they have subject matter issues.

5. The Role of Models

A model can be described as something which is to predict the future phenomena. For example, a model of weather the predict future weather patterns, a model for movie recommendations which can recommend you movies you might like, a model for shopping items which can suggest new items to the customers.

When considering the role of artificial intelligence in the field of education, a model can possess three distinct roles. These three roles of models[10] are as follows:

* *Models as Scientific Tools*: A model used for understanding the current situation and predicting some aspect of it. For example, a set of tests which could predict the prospects of the student albeit they continue to perform in the current manner.
* *Models as Component*: A model for supplementing the already existing way of teaching. For example, changing the contents of course based on the tests undertaken by the student at the end of each unit which would help them learn at a pace congruent with their current ability.
* *Models as basis for design:* A model which completely revamps the whole education process. For example, the communication between teacher and student through a computer tool.

These three possible models are not mutually exclusive and often are integrated into one another. However, while doing so, it might not be possible to satisfy requirements of all of them.

Historically models have been used to pinpoint the core of a problem and then go on to present a solution for the problem. This model-based approach is still relevant in the current scenario and so in the AI based education. A model is created out of the empirical approach and is reliable in overcoming challenges. Further it can be updated or even completely revamped (creating a new model from scratch) if such an action is required.

A continuously evolving and up to date model is required for the correct implementation of technology into the education field.

6. Conclusion

This study aimed to assess the impact of AI on education. A qualitative research study using literature review as study design and methodology was adopted. Every Journal articles, professional publications, and professional reports from professional conferences which could help in taking the study forward were discovered and used in analyzes of the research objectives. The development and use of computers and related computing technologies heralded the research and innovation that led to the development and use of AI in various industries. In particular, the development of the personal computer, and its subsequent development with increased processing and computing power, and the ability to integrate or build computer technology into various machines, devices, and platforms, supported the development and use of artificial intelligence from top to bottom. It has been shown to have a significant impact on the sector and has permeated the sector. AI is ubiquitous and used in education, especially in educational institutions, which is the focus of this research. Analytics to assess the impact of AI on governance, the teaching and learning aspects of education, with a focus on assessing how artificial intelligence has been applied and what impact it has had. Artificial intelligence in education first took the form of computers and computer-related systems, but later took the form of the web and online learning platforms. Embedded systems have made it possible to use robots in the form of robots or humanoid robots as co-teachers or independent trainers, or to delegate functions such as teachers and trainers using chatbots. Using these platforms and tools has increased the effectiveness and efficiency of teachers and improved the quality of teaching. Similarly, AI has provided a better learning experience for students as artificial intelligence has enabled adaptation and personalization of teaching materials to suit the needs and possibilities of students.

Overall, AI has had a major impact on education, especially in the field of administration, teaching, and education sector or in the context of an individual educational institution.

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