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ABOUT US

WHITE BLACK LEGAL is an open access, peer-reviewed and refereed journal providededicated to express views on topical legal issues, thereby generating a cross current of ideas on emerging matters. This platform shall also ignite the initiative and desire of young law students to contribute in the field of law. The erudite response of legal luminaries shall be solicited to enable readers to explore challenges that lie before law makers, lawyers and the society at large, in the event of the ever changing social, economic and technological scenario.

With this thought, we hereby present to you

ARTIFICIAL INTELLIGENCE – ASSISTING OR REPLACING TEACHERS

AUTHORED BY - DHANYA.B

ABSTRACT

Artificial intelligence (AI) is going through a tremendous growth and its invention is fundamentally changing many facets of contemporary civilization. As AI technologies continue to evolve and proliferate, their influence on the global workforce landscape becomes increasingly pronounced. This research paper explores the evolving relationship between Artificial Intelligence (AI) and human educators in the field of education. As AI technology continues to advance, there is a growing debate regarding whether AI can effectively replace or merely assist teachers in the classroom. This study delves into various applications of AI, including machine learning and robotics, in educational settings, examining their potential to enhance the learning experience for students and alleviate the burden on teachers. The research reviews existing literature on AI's impact in education, considering both the advantages and challenges associated with its integration. It investigates AI-powered tools that act as teaching aids, personalized learning platforms, and virtual instructors. Additionally, it analyses the ethical, social, and pedagogical implications of AI in education. The paper also reviews various literature and in addition presents empirical findings from surveys and, offering insights into how students and educators perceive the role of AI in the classroom. It considers factors such as student engagement, academic performance, and the evolving responsibilities of teachers when AI is introduced into the learning environment. The results of this study aim to provide a comprehensive understanding of the ways AI can either complement or replace traditional teaching methods. By shedding light on the potential benefits and challenges, this research contributes to the ongoing dialogue surrounding the integration of AI in education and informs educators, policymakers, and stakeholders about the future of teaching in a technology-driven world.

BACKGROUND

The replication of human intelligence functions by machines, particularly computer systems, is known as artificial intelligence. AI (Artificial Intelligence) has been rapidly evolving over the years, and its impact on employment has been a topic of significant discussion and concern. To understand the historical, current, and future trends of AI and its impact on employment, let's break it down into different phases:

Historical Trends: During 1950s-1990s AI research began in the mid-20th century. During this period, AI had limited impact on employment as it was primarily confined to research and niche applications. During 1990s-2000s Progress in AI slowed down due to unrealistic expectations, lack of funding, and technical challenges. AI's impact on employment remained minimal during this period.

Current Trends: Resurgence of AI (2010s-2020s): The current era has seen a resurgence in AI, driven by advances in deep learning, big data, and computing power. AI and automation technologies have begun to automate routine, repetitive tasks across various industries. This has had an impact on certain job categories, such as manufacturing, data entry, and customer service.AI is also being used to augment human capabilities. For example, in healthcare, AI assists doctors in diagnosing diseases and recommending treatments, enhancing their effectiveness. While some jobs have been automated, AI has also created new roles in areas like AI research, data science, machine learning engineering, and AI ethics.

Future Trends: AI is expected to become even more integrated into various industries, from healthcare and finance to education and transportation. AI is likely to impact knowledge work by automating data analysis, research, and decision-making. This could affect professions like financial analysis, research, and legal services. The future might see increased collaboration between humans and AI. Workers may work alongside AI systems to enhance productivity and make more informed decisions.

In conclusion, AI's historical, current, and future trends reflect a dynamic and evolving landscape. While AI has the potential to automate certain jobs, it also creates opportunities for new roles and enhances human capabilities. The key lies in proactive workforce development, ethical AI deployment, and effective policies to mitigate potential negative impacts on employment.

Literature review

Artificial intelligence has wide-ranging effects on the socioeconomic environment, ranging from productivity to inequality and unemployment. AI, or artificial intelligence, has the potential to significantly impact employment in various industries. Throughout history, technological advancements have led to the displacement of certain jobs while creating new employment opportunities in other areas (Maheshwari & Dhole, 2023) [1]. However, the rapid pace of technological advancement and the increasing capabilities of AI and machine learning raise concerns that the impact on employment may be more severe than in the past. Indeed, AI-driven automation has the potential to enhance productivity and contribute to job growth (Baigh et al., 2021) [2]. The adoption of AI technologies can increase productivity and efficiency in various industries, leading to the creation of new job opportunities (Shaping the transition, 2022) [3.]

The literature on how artificial intelligence affects unemployment has grown significantly over the past few decades (Ernst et al., 2019; Martens and Tolan, 2018) [4]. However, many of these works treat AI as a component of a more intricate automation process (Wang and Siau, 2019) [5]. Two literary strands can be distinguished in the wide sense. The first strand asserts that artificial intelligence will "replace" employment, whereas the second strand encourages the "displacement effect" between them. A body of theoretical and empirical research supports the "replacement effect" in the first strand of literature.

There are differing opinions on whether AI will lead to overall job loss. Some argue that AI will result in unemployment as tasks currently performed by humans become automated. However, others believe that new industries and jobs will be created as a result of AI. The document suggests that a transition period is needed to adapt to the changing economic landscape and that measures such as income redistribution and job-sharing can help alleviate the effects of unemployment. Ultimately, the impact of AI on job loss is still a topic of debate. (Nilsson, N. J. ,1984)[6]

In another literature (Mutascu, M. 2021)[7], based on theoretical model it suggests that the impact of artificial intelligence (AI) on unemployment depends on the level of inflation in an economy. When inflation is low, AI can actually help reduce unemployment. This happens because AI can create new jobs and compensate for any increase in wages. In other words, AI replaces fewer jobs than it creates.

This positive effect decreases as inflation goes up. When inflation is high, AI doesn't have much influence on unemployment. This is because high inflation tends to automatically reduce unemployment (known as the "Phillips effect"), and AI doesn't counteract this effect. So, in high inflation situations, AI doesn't make a big difference in unemployment rates. The research also suggests that the size of the government and foreign direct investment (FDI) inflows play a role in these effects. In summary, AI tends to have a positive impact on unemployment when inflation is low, but its effects are less important when inflation is high because other economic factors come into play.

The importance of providing specialized training to the workforce to ensure that employees at all levels of organizations are equipped to work alongside AI and automated systems is emphasised in this literature (Andreeva, A., Yolova, G., & Dimitrova, D. 2019, June)[8]. This educational focus not only enhances competence but also alleviates concerns about job displacement, thereby contributing to a smoother transition into the digital era. Moreover, international institutions bear the responsibility of regulating these processes at a supranational level. Adaptation of existing international legal frameworks to address new social realities is essential, with subsequent implementation at the national level. This will help ensure consistency and fairness as countries navigate the challenges and opportunities presented by automation and AI. This research underscores the pressing need for legal scholars to engage in theoretical studies concerning the legal status of robots and AI. The development of clear legal guidelines in areas such as safety, liability, and damages will be crucial as society increasingly relies on these technologies.

Purpose of the Research

The incorporation of robots into educational settings, powered by machine learning (ML) and artificial intelligence (AI), has already enhanced classroom experiences. When managed appropriately, this integration can provide valuable support to both students and educators. Classroom robots have various applications, such as functioning as instructional aids, collaborative learning companions, or even as independent instructors delivering comprehensive lessons. Additionally, some robots serve as valuable tools for students to hone their programming skills. Therefore, the objective of this research is to determine whether robots can complement or potentially substitute for

traditional teaching roles in the classroom as students acquire knowledge. The aim of this research is to comprehensively explore the role of Artificial Intelligence (AI) in education, specifically focusing on the potential for AI to replace or assist teachers. This research design outlines the methodology and procedures to investigate this crucial aspect of the evolving educational landscape.

Research Objectives:

a) To assess the current landscape of AI integration in educational settings.

b) To examine the impact of AI on student learning and teacher roles.

c) To understand the perceptions and attitudes of students, teachers, and education professionals towards AI in the classroom.

d) To identify the potential benefits and challenges associated with AI-based education.

Research Methodology

The research methodology for this study primarily relies on a comprehensive literature review to investigate whether Artificial Intelligence (AI) assists or replaces teachers in educational settings. This approach involves the systematic analysis of existing research articles, reports, and scholarly publications to gain insights into the current state of AI integration in education and its impact on the roles of teachers. The chosen literature is systematically screened, categorized into themes related to the impact of AI on teacher roles, and analysed to synthesize findings, encompassing arguments, opinions, and empirical evidence regarding whether AI predominantly acts as a supportive tool or holds potential for replacing teachers in the educational context. The resulting comprehensive overview of the current understanding of AI's role in education, particularly concerning teacher assistance and replacement, aims to consolidate existing knowledge and contribute to the ongoing discourse on the evolving dynamics of AI in educational settings.

Discussions and Findings

Robots used for assisting Education

1. MBOT ROBOT

The Makeblock mBot was developed by Makeblock, a Chinese company specializing in educational robotics and DIY electronics. Makeblock is known for creating a range of educational tools and robotic kits designed to teach programming, electronics, and robotics to students and hobbyists. The mBot is one of their most popular products and is widely used in educational and maker communities around the world. Makeblock's mission is to make technology and robotics education accessible and engaging for learners of all ages, and the mBot is a prime example of their commitment to achieving this goal. The Makeblock mBot, with its modular design, allows users to quickly and easily experiment with different configurations and learn about mechanics and electronics as they do so. It boasts a variety of sensors, such as line-following, ultrasonic distance, and light sensors, enabling it to respond to its environment intelligently. Additionally, it offers wireless control through a smartphone app, promoting interactive learning and real-time experimentation. Makeblock provides a wealth of educational resources and challenges, making it an ideal tool for schools and parents seeking to teach STEM (Science, Technology, Engineering, and Mathematics) concepts. Its compatibility with the Arduino IDE also enables more advanced users to delve deeper into programming and robotics, making it suitable for a wide range of skill levels and ages.

2. **NAO Robot**

The NAO robot, developed by SoftBank Robotics, is a humanoid robot designed for various applications, including research, education, and entertainment. Standing at around 58 centimetres (23 inches) tall, NAO features advanced capabilities such as speech recognition, natural language processing, and a wide range of sensors, including cameras and touch sensors. This allows NAO to interact with humans, recognize faces, and engage in conversations. NAO is often used in academic and research institutions to study human-robot interaction and develop applications in fields like artificial intelligence, robotics, and cognitive science. It's also employed in educational settings to teach programming and robotics, as well as in healthcare for tasks like assisting with therapy and special needs education. NAO's versatility and sophisticated technology make it a prominent platform for exploring the potential of humanoid robots in various domains. Indeed, the NAO robot's advanced capabilities extend beyond the technical realm. Its ability to establish empathy with children and guide them through intellectual, physical, social, and emotional activities is a significant asset. This quality makes it particularly valuable in promoting inclusive education, especially for students with disabilities like autism and emotional or behavioural disorders. NAO's presence and interaction help these students' overcome shyness, reluctance, mistrust, and frustration, fostering the development of their social skills and self-esteem. Moreover, NAO's role in educational settings can contribute to creating a more inclusive environment, as it cultivates positive attitudes and perceptions toward special education in general education classes, ultimately enhancing the overall educational experience for all students.

3. <u>LEGO Robot</u>

Lego Mindstorms is a popular platform for building and programming robots using Lego bricks and a programmable brick called the EV3 or NXT. These kits are widely used in both educational and hobbyist settings, offering a versatile and accessible way to delve into robotics and programming. The Lego robot's uses are diverse and encompass a range of applications. In education, Lego robots serve as valuable tools for teaching STEM (Science, Technology, Engineering, and Mathematics) concepts, fostering creativity, problem-solving, and critical thinking skills among students. They provide a hands-on approach to learning, enabling students to build and program robots to complete tasks and challenges. Lego robots are also used in robotics competitions such as the FIRST Lego League, where teams of students' design, build, and program robots to tackle specific missions. Beyond education, Lego robots are employed in research and development, serving as rapid prototyping platforms for testing various robotic concepts. They are used in industry for simple automation tasks and in fields like manufacturing and logistics, showcasing the adaptability and scalability of these systems. Additionally, Lego robots are often used for entertainment and creativity. Hobbyists and enthusiasts can design custom robots, including remote-controlled vehicles, automated contraptions, and even art installations, demonstrating the breadth of applications that these systems can support. Ultimately, Lego robots stand as a testament to the power of play and exploration in fostering a deep understanding of robotics and technology across a wide spectrum of users, from young learners to seasoned engineers and makers.

4. <u>KASPAR Robot</u>

Kaspar is a remarkable humanoid robot designed to serve as a social companion for children with autism and other communication challenges. Resembling a small, 3-year-old child, Kaspar features a silicone mask as its face, deliberately devoid of defining characteristics like age, gender, or emotional expressions. This intentional ambiguity allows children to project their imagination onto Kaspar, envisioning it as a playmate or a comforting presence. Kaspar's role is to assist teachers and parents in helping children with autism overcome their social and communication difficulties by engaging with them in a childlike manner. After conducting field trials in homes and classrooms, the researchers are working to make Kaspar accessible to every child who could benefit from it. Research with Kaspar has shown that robots can serve as safe and reliable tools for promoting social interaction and communication in autistic children. Kaspar's primary goal is to teach these children a set of fundamental skills, such as understanding others' emotions, responding appropriately, expressing their own emotions, and participating in group activities—a set of abilities many of us learn naturally without specialized education. The use of robotic playmates for therapeutic purposes is inspired by well-documented findings in the literature regarding the benefits of early intervention for autistic children in developing social and cognitive skills. Kaspar stands as a promising innovation in the realm of assistive technology, offering support and opportunities for children with autism to thrive socially and emotionally.

Based on another literature, secondary empirical research has been made. For data collection purposes, the researchers have opted to utilize online open structured surveys, a method that allows participants to provide short or extensive narrative responses. This approach is chosen for its ability to yield valuable insights from participants. The questions in the surveys are designed to elicit the perceptions of both students and teachers regarding artificial intelligence (AI) and its potential applications in education [9]. The responses are collected online from diverse participants located in various geographical regions. One of the advantages of employing online surveys is their cost-effectiveness and the rapid response times they offer, making the overall survey process highly convenient. Additionally, the use of a snowball sampling technique has been instrumental in gathering a diverse set of participants from locations including India, the United States, Greece, and Qatar. The survey instrument comprises two distinct Google Forms, each tailored for use by teachers and student

respondents separately. This customization ensures that the questions and topics are relevant and specific to each group, enabling a more focused and meaningful data collection process. The online survey received responses from a total of 79 participants, with a breakdown of 41 students and 38 teachers. It's worth noting that among the student participants, there is a mix of individuals currently pursuing their studies and those who have already completed their educational journey. On the other hand, all the teachers who participated in the survey are actively engaged in the teaching profession at the time of the survey. This diverse group of respondents, including both students at different stages of their education and working teachers, provides a broad perspective on the subject matter under investigation, enriching the survey's insights and findings.

In response to a question about the possibility of replacing classrooms with teacher-less robots, nearly 80% of students expressed a negative viewpoint. Their concerns revolved around three main aspects: the inadequacy of robots in providing effective education, the loss of the personal and emotional connection inherent in human teachers, and the potential disruption of the existing school structure.
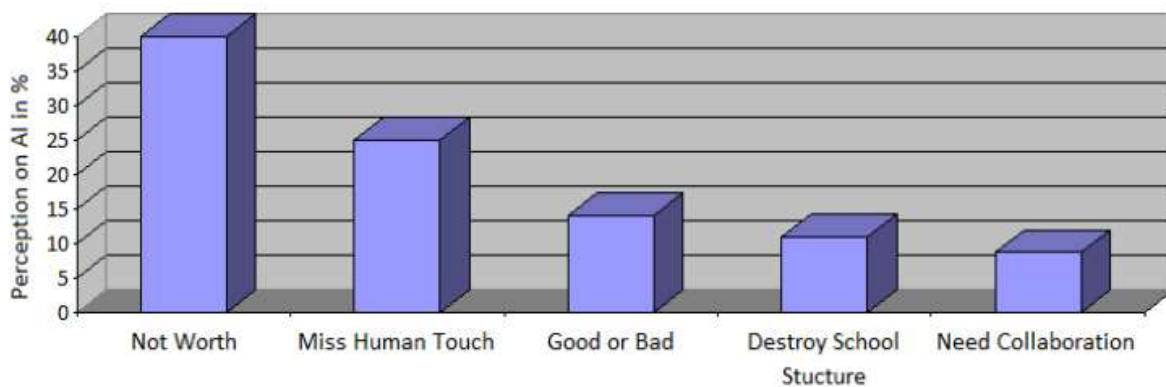
Robots replacing Teachers (Student's perception)

When teachers were questioned about the potential transformation of the teaching model, with the complete replacement of class teachers by robots, almost ninety percent of the respondents expressed strong opposition to the idea. However, there were a few individuals who were not entirely clear about how such a model would function in the absence of a human teacher.

Robots replacing teachers (Teachers Perception)
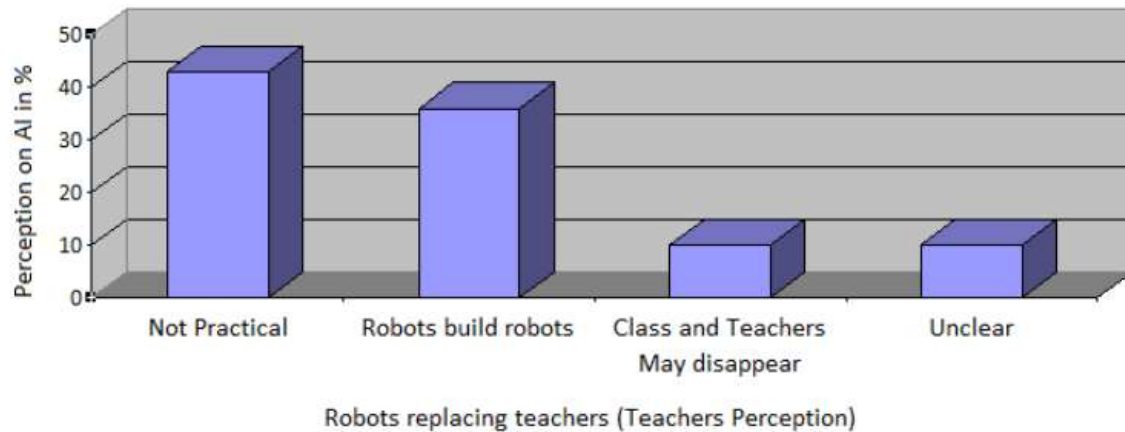
Scope and Limitations

The scope of this study is to synthesize and analyze existing literature to offer an overview of the current state of knowledge regarding the role of AI in education, particularly in the context of teacher assistance and potential replacement. The focus is on understanding the broader trends and themes related to AI's role in various educational settings, higher education, and professional training, with a global perspective. The study addresses literature published in the past decade, providing insights into recent developments. While primarily a literature synthesis, it may suggest avenues for future research within the field of AI in education.

This study has several limitations. Firstly, it relies solely on existing literature, potentially omitting the latest developments in the rapidly evolving field of AI in education. Furthermore, the quality and bias inherent in the selected literature may introduce biases into the analysis. The study's temporal constraints, focusing on the past decade, may restrict the examination of long-term trends and the historical context of AI in education. Additionally, the study takes a binary approach to the multifaceted impact of AI in education, which might oversimplify the intricate dynamics at play. Finally, it does not account for cultural and regional variations in the adoption and influence of AI in education, which can significantly impact outcomes.

Conclusion

In the ongoing discourse on whether AI will replace teachers, it is important to acknowledge that AI undoubtedly holds the potential to transform education. The advancements in artificial intelligence

have already proven valuable in augmenting teaching methods, personalizing learning, and streamlining administrative tasks. However, it is unlikely that AI will completely replace teachers in the foreseeable future. The essence of education extends beyond the mere transmission of knowledge; it involves mentorship, emotional support, and the fostering of creativity and critical thinking, which are distinctly human qualities. While AI can enhance and complement the role of teachers, the importance of human educators in shaping the holistic development of students remains irreplaceable. Instead of viewing AI as a threat, it should be seen as a tool to empower and support teachers in their mission to provide quality education. The successful integration of AI into education will require educators to adapt, acquire new skills, and find a balance between technological advancements and the enduring value of human interaction in the classroom. Thus, rather than replacing teachers, AI has the potential to revolutionize and redefine the teaching profession in a way that ultimately benefits both educators and students. Their role is to support students in developing and enhancing their skills and in overcoming challenges they encounter during their learning journey. Robots primarily function as teaching aides, as they lack the independence required to operate as fully autonomous educators; their actions are based on pre-programmed instructions. It's worth highlighting that some teachers are open to the idea of robots assisting them with various daily tasks such as grading, teaching, reproducing educational materials, and translating languages. This robot assistance can be advantageous for teachers because it allows them to focus on other critical aspects of their work, ultimately benefiting both students and educators. However, this situation is not set in stone. In the past, we couldn't have predicted the introduction and significant influence of AI, which has affected numerous industries. Likewise, the continued progress of AI has the potential to reshape our world and potentially lead to job disruptions. The teaching profession may also be influenced by AI.

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