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The Use of Artificial Intelligence in Educational Institutions: Social Consequences of Artificial Intelligence in Education

Eğitim Kurumlarında Yapay Zekanın Kullanımı: Eğitimde Yapay Zekanın Sosyal Sonuçları

Fatih ULAŞAN*

Abstract

Artificial Intelligence (AI) technology was created to solve problems that are complex to be solved by humans, related to the construction of machines that understand, monitor, reason, predict, interact, learn, develop and work like humans. Thanks to the development AI has achieved in recent years, AI has surpassed its limits in the field of computer engineering and has begun to be effective in almost every field. AI has started to contribute to the management of information in education and directly to the education and training process, with its features such as learning, making predictions, solving complex problems, having experience and adapting to changing conditions. Systems inspired by AI have become very popular and have been applied in almost every field, especially in educational institutions. The biggest impact of this technology on education has been in the delivery of education. Technological developments are starting to change many sectors and the education sector is also keeping up with this change. AI is not just made to support learning. AI is used in all educational institutions (teacher duties, administrative works, teaching, school and classroom management). Research needs to be increased, especially in terms of the social impact that AI will have on people regarding the use of AI in education. Qualitative method was used in this study. The purpose of the article is to investigate the effect of AI on traditional education, to examine the point the traditional education has reached with AI and to analize the social consequences of AI in education.

Keywords: Education, artificial intelligence, technology, public administration, applications.

Öz

Yapay zeka teknolojisi, insanlar gibi anlayan, izleyen, akıl yürüten, tahminlerde bulunan, etkileşime giren, öğrenen, geliştiren ve çalışan makinelerin yapımı ile alakalıdır ve insanlar tarafından çözülmesi karmaşık sorunları çözmek için yaratılmıştır. Yapay zekanın son yıllarda kaydettiği gelişme sayesinde bilgisayar mühendisliği alanında sınırlarını aşmış ve neredeyse her alanda etkili olmaya başlamıştır. Yapay zeka, öğrenme, tahminde bulunma, karmaşık problemleri çözme, deneyim sahibi olma ve değişen koşullara uyum sağlama gibi özellikleriyle eğitimde bilginin yönetimine ve doğrudan eğitim ve öğretim sürecine katkı sağlamaya başlamıştır.Yapay zekadan ilham alan sistemler oldukça popüler hale gelmiş ve

* Dr., Cumhuriyet Savcısı, Adalet Bakanlığı, e-posta: fatih_ulasan@hotmail.com , ORCID: 0000-0003-3301-4823.

eğitim kurumları başta olmak üzere hemen hemen her alanda uygulanmıştır. Bu teknolojinin eğitim üzerindeki en büyük etkisi eğitimin sunumunda olmuştur. Teknolojik gelişmeler birçok sektörü değiştirmeye başlarken eğitim sektörü de bu değişime ayak uydurmaktadır. Yapay zeka sadece öğrenmeyi desteklemek için yapılmamıştır. Ayrıca, yapay zekâ tüm eğitim kurumlarında (öğretmen görevleri, idari işler, öğretim, okul ve sınıf yönetimi) kullanılmaktadır. Özellikle yapay zekanın eğitimde kullanılması konusunda insanlarda yaratacağı sosyal etki bakımından yapılan araştırmaların çoğaltılması gerekmektedir. Bu çalışmada nitel araştırma yöntemi kullanılmıştır. Makalenin amacı yapay zekanın geleneksel eğitim üzerindeki etkisini araştırmak, geleneksel eğitimin yapay zeka ile geldiği noktayı inceleyerek yapay zekanın eğitimdeki sosyal sonuçlarını değerlendirmektir.

Anahtar Kelimeler: Eğitim, yapay zeka, teknoloji, kamu yönetimi, uygulamalar.

Introduction

Artificial intelligence (AI) is an artificial operating system that is generally based on human intelligence and is expected to exhibit high cognitive functions specific to human intelligence, such as learning, comprehending, inferring, thinking and communicating. In addition, AI is a technology that makes it possible to produce solutions to problems and imitate the way of thinking of humans, based on the idea of copying human mental abilities (Sağlamtunç, 2020). Today, AI has become important in many fields such as the defense industry, the army, public administration, justice system, education, health sector, business, accounting and economy. Since the field of AI and its studies are developing day by day and it is difficult to keep track (Oke, 2008). The use of AI is especially common in public administration fields. In addition, the impact of AI on public administration begins to change this sector and also changes expectations. In the traditional public administration, the relationship between the public sector and society has been worn out. With the initiation of AI in public services, public administration has begun to become faster, more efficient and less costly. AI is seen as a solution to undesirable situations such as stationery, bureaucracy, waste of time, excessive cost and labor. AI systems can manage automated routine processes, have the potential to help reduce administrative burdens and solve resource problems, and can help public employees cope with highly complex tasks. AI can help better understand real-time processes and give shorter and more abundant feedback loops for public services (Ulaşan, 2023, p. iii).

Thanks to the development AI has achieved in recent years, AI has surpassed its limits in the field of computer engineering and has begun to be effective in almost every field. AI has started to contribute to the management of information in education and directly to the education and training process, with its features such as learning, making predictions, solving complex problems, having experience and adapting to changing conditions. Today, AI has entered the classrooms with its level of development and has been included in the educational structures of primary schools, high schools and universities under the name of "smart, adaptive or personalized learning systems". AI has the power to contribute to education in many ways. In the education management phase, it can assist students and teachers in the management and presentation of information and contribute to the learning and teaching processes (Arslan, 2017, p. 71). In this study, the role of AI in the area of education is presented in a general framework, benefits and challenges of AI to teachers and students in education is discussed, and the social consequences of AI in education will be emphasized.

Research Method

The literature review is used in the article and the article gathers, analyses and evaluates foreign researchers` an in-depth exploration about AI in education and focuses

on definitions, characteristics, and idea of the AI in education to improve the understanding and build a strong base helping to understand the researches and information in the article. The study includes logical and analytical methods such as discourse and historical analysis. Document analysis is used in the article. The article gathers information from existing documents. Documents are concrete materials in which thoughts and facts are recorded such as online sources, books, articles, government records and etc. Also, in this study, the experiences of countries in the AI in education are analysed and characterised systematically so as to guide the future inventors and developers of the software/application/ service in the AI in education. Document analysis considered as a systematic procedure which reviews and evaluates texts and documents. By the help of document analysis, the information collected from AI and AI in education, effects of AI in education on the traditional education and social consequences of AI on people are analysed and interpreted in order to have the deep understanding, and increase the level of the empirical knowledge on the AI in education. The analysis includes meetings, books, journals, websites, newspapers, press releases, governmental reports, surveys and etc. The aim is to review the prior literature on the AI in education as the part of the study by finding, choosing, appraising and synthesising the information found in sources. Also in this article, the historical research was used to help people understand past and present developments of the AI in education and permits people to provide probable answers to existing issues and challenges about effects of AI in education on the traditional education and social consequences of AI on people. This study can shed a light for other researches about the AI in education.

This article is largely literature review and gives analytic discussions from social and academic practices in the world. Research materials consist of various sources:

- Research papers of foreign scholars who specialize in the field of the AI in education.
- Official media sources;
- AI applications/software making decisions in education.

The Definition of AI

AI can be defined as the dominant concept of the Fourth Industrial Revolution, as a super/umbrella concept with an interdisciplinary perspective. AI refers to intelligent machines and ways of making them and is primarily related to computer science and engineering. Additionally, AI is known as an interdisciplinary field where these machines are studied (Dörfler, 2022). The purpose of developing AI is to use it in areas where human intelligence is needed and in complex tasks that will ease the burden on people (Xue & Wang, 2022). Systems with human-like intelligence, called AI, have become popular among the academic environment and the public since the second half of the 20th century. The first use of the term AI was made at the Dartmouth College Conference held in 1956 (Popenici and Kerr, 2017). Digital technology developed with AI has begun to be effective in daily life by changing the way people think and act. The main development and public interest in AI started with the emergence of Artificial Neural Networks and Deep Learning (Chan & Zary, 2019).

A basic definition of self-awareness, language and learning skills, reasoning and comprehension skills, boundaries, and intelligence is difficult. While the same problems are in question for AI at the same time, Peter Norvig and Stuart Russell wrote the leading introductory book on AI, "AI: A Modern Approach" (2010, p. 1-2) and presented 8

different definitions of AI. They defined AI with 4 basic categories as humanely thinking and humanely acting and rationally thinking and acting.

Table 1. AI Definitions and Categories

1) Thinking like human • The efforts to make robots think… robots with full and real minds (Haugeland, 1985). • Automation of activities individuals link with (decision making processes, problem solving and learning) (Bellman, 1978).	**2) Rational thinker** • Examining mental strength through the utilization of computational models (Charniak & McDermott, 1985). • The study of calculations which make it possible to observe, reason and act (Winston, 1992).
3) Behaving like a human • The art of creating machines which performs intelligent functions when implemented by people (Kurzweil, 1990). • The study of how robots can do things that people are currently better at (Rich & Knight, 1991).	**4) Acting rationally** • Computational intelligence which is the study of designs of intelligent agents (Poole, Mackworth, & Goebel, 1998). • AI… is about intelligent behaviours in artefacts (Nilsson, 1998).

Source: (Norvig & Russell, 2010, p. 2)

AI researches generally follow these 4 approaches. While the 1st and 2nd approaches in the table basically deal with the thinking processes and keep reasoning at the forefront, the 3rd and 4th approaches emphasize behaviours and build the definition of the AI according to its importance.

AI in Education

AI technology is developing day by day and has become a system that people encounter in daily life. AI applications in the field of education around the world are used in all areas of education (primary education, secondary education and higher education), in the operation of educational institutions, in the training of employees in other sectors and in many areas, especially in the training of teachers. AI helps understand the abilities and interests of teachers and students. AI systems used in education can excel at certain routine tasks in classrooms, allowing teachers to spend more time with and interact with their students. AI systems can help reduce the level of education to the capacity of students. AI can understand students' knowledge levels by examining their performance in exams and measuring their interest level in courses. Students can both learn information about AI (with AI classes, machine learnin and deep learning classes) and benefit from AI in online courses Students should take AI lessons from an early age. These courses may initially be offered as electives, and the state should encourage students to take these courses. Students need to both learn AI and take lessons from AI. National and regional strategies published by states, especially in recent years, for the development of the AI technology in educational institutions are important enough to change the fate of states. Countries are raising generations that will shape their future with these strategies. For instance, China's sensitivity to AI is also evident in the field of education. In particular, it emphasized the importance of the AI in the field of education with the Action Plan for AI Innovation in Colleges and Universities published in 2018. With this policy, China aims to support the AI-supported personalized and lifelong education system to improve the invention and applications of the AI in the area of education,

reform in the field of education, and support the development of education governance capabilities. This policy aims to align university infrastructure and curricula with AI in 2020 and for universities to become global leaders in AI by 2030. China sees universities not only as places for research and development, but also as an ideal place to create programs and competencies on behalf of the expertise and workforce for an AI-powered future economy (MEPRC, 2018). With the State Council's National Strategy for AI Development and the Action Plan for AI Innovation in Colleges and Universities, China aims to align higher education with AI systems. Additionally, the Chinese government invites AI researchers to work in China through talent programs. The 'Ten Thousand Talents' program was established to encourage AI experts working abroad for research and development positions in China. The aim is to accelerate the training and gathering of high-level AI talents and for these talents to educate China's future generations (Ding, 2018, p. 19; Knox, 2020).

Table 2. Comparison of AI and Human Intelligence in Education

Features	AI in Education	Human Intelligence in Education
Permanence of information	• Robots do not forget any information they have. Knowledge is permanent. • Robots do not forget the capacity of students and what they teach. • They can understand easily whether students understand a topic or not.	• Information is not permanent but cannot be deleted. • Teachers may forget the information they will teach. They can have some illness which affects the teaching quality. • Because teachers give classes to many students, they may just remember the certain number of the information about students.
Transfer information	• Digital information can be easily copied and transferred to other places. • Information can be designed according to students or audients' capacity. • Every kind of the information can be taken by AI. For every information, references can be given instantly. • Students can ask every question without hesitation.	• The quality and limit of information transfer may vary depending on teachers' capacity. • Teachers may not understand the real capacity of students. • Students can be shy or afraid of asking questions to teachers. • Teachers may not answer all questions of students or give wrong answers.
Cost	• The creation of digital information and AI system can be costly. But later the teaching can repeat itself with the lesser cost. • Education institutions do not need to pay AI teachers. One time paying for manufacturers is enough.	• Teaching each person individually is variable, costly and time-consuming due to factors such as age and cognitive capacity. • Teachers should be paid regularly. • When teachers should be paid less than they deserve, they may not teach students well or they do not care students or they work less.
Consistency	• It is consistent and the teaching is always the same under the same conditions for certain students. • The certain quality can be achieved every time. Students do not need to choose AI schools about the quality of the teaching.	• The quality of the teaching may differ. There are many factors that can affect teaching, such as experience, education level, intelligence. • For instance, some students want to go to some schools for their education level because of teachers' quality.
Creativity	• They cannot develop any will,	• Teachers can develop new and original

	consciousness, or desire which affects their quality and creativity.	ideas, objects, systems by going beyond traditional ways of teaching.
Reasoning Power	• Today, AI in educational systems work in a narrow field and with the low capacity.	• Teachers can benefit from their experience in other issues and have a broad perspective to teach students in a better way.

Source: Nabiyev (2003: 94) (edited by the author)

AI systems have begun to be used more frequently in education, and studies on the effects of the AI systems in education have begun to increase (Chen et al., 2020). Many types of AI systems can be used at different stages of education. Natural language processing systems can be used for language education, smart lesson systems if special education is desired for students, and educational data mining can be used if performance prediction is desired (Su & Yang, 2022: 1-2).

AI that can examine student data and student-teacher interaction can increase teachers' capacity to understand, use, and analyze the social implications of AI technologies(Oran, 2023, p. 1359). For instance, in China, the private sector focusses on online education technologies. ALEKS on a web-based learning and assessment system tries to improve the online AI in education. In the system, a student starts the training course with a short diagnostic test to measure how well he comprehends basic topics. Provided that he responses an early inquiry properly, the system thinks he knows the topics and makes a rough plan of what he needs to study in ten questions and utilizes this to make a syllabus. As he progresses, systems update his understanding model and alters the curriculum. ALEKS claims that their system can do some of this. AI and Human Intelligence are two concepts that are generally compared to each other and have similarities as well as contrasts. It is important to understand the features and differences of the two concepts, especially in the field of education(Hao, 2019).

When the studies for the use of AI in education are analyzed, it is seen that researchers use AI techniques indirectly in data analysis or directly for the student interaction and project developments in Turkey and other countries. AI techniques used for data analysis are MATLAB, Cywrite and Moodle. MATLAB was first adopted by researchers and developers in control engineering. It is also used in education today, especially in teaching linear algebra and numerical analysis, and is a popular language among image processing scientists (Özel, 2018). Karadağ (2012), who wrote a master's thesis on MATLAB, said that MATLAB offers students in the fields of statistics, mathematics, finance and engineering the environment to use computers during and after their education.CyWrite is called as a software system and was developed to be used as an integrated learning program in English Second Language classrooms and to take instant feedback on their writings. This system can be a mixture of 4 essential components which are the real-time application programming interface, data management system, web-based text editor and automated writing evaluation system (Dalbey, 2015). Gençer wrote a thesis in T.C. Ufuk University in 2019 about Automated Writing Evaluation Use In An EFL Context: From Paragraph Writing to Essay Writing and made a study which is conducted as a classroom-based study and integrated the use of Automated Writing Assessment into the writing course content. After paragraphs and compositions writen by stıdents utilizing CyWrite, Gençer examined and assessed the students' writings according to grammatical and mechanical errors. In the 2016-2017 academic year, 15 English Language Education students studying at Ufuk University Preparatory School involved in the study. It was stated that the use of CyWrite was not very effective in the long term, but it was stated that the automatic feedback feature of this system provided

great benefits to students in the short term. In addition, in the survey conducted, students stated that they said that this system was very effective and useful in improving their writing skills. Also, most supportive categories of the CyWrite feedback were grammar and mechanics. Students were satisfied higly. The system helped students to improve student's writing skills. The system gave the immediate feedback for students to revise and change their errors instantly (Gençer, 2019). Moodle is called as a software package to make internet-based courses and websites and is utilized in 138 states, supports 77 different languages and has 75000 registered customers. Moodle is a php based open source online education system. Courses are organized in modules. It supports Unix, Mac OSX, Windows and Linux operating systems. The trial version and help system can be accessed online (Elmas, Doğan, Biroğul & Koç, 2008, p. 54). In a study by Suner (2018), 19 students who took undergraduate and graduate courses in the Moodle environment during the 2015-2016 and 2016-2017 academic years were included in the study. A 10-question survey form to obtain students' personal information and evaluate the system; It was prepared in a five-point Likert type, and the 26-question readiness and expectation scale for the e-learning process, whose validity and reliability have been previously studied, and the 29-question satisfaction scale for the e-learning process were used. As a result, it was deemed appropriate to include existing courses in the Moodle environment and students were especially pleased with the web-based teaching of the course, with its visuality, easy accessibility to resources and assignments, and evaluation features (Suner, 2018).

Turkey started to use e-school and FATİH project and wanted to integrate the state-of-the-art computer technology into the public education system. In 2010, the project was initiated. With this project, it is aimed to provide access to and transfer of information within the scope of educational activities carried out in nearly 54,000 schools in Turkey, including pre-schools, primary schools, secondary schools and secondary schools. It has affected approximately one million teachers and around 18 million students at various school levels outside the higher education level (Durnalı, Orakcı, & Aktan, 2019). Also, Bornova Municipality implemented the "digital classroom" application and around 55,000 primary and secondary school students were expected to benefit from this application (T.C. Bornova Municipality, 2019). In 2014, a foundational course in AI was launched as part of the Georgia Institute of Technology's Online Master of Science in Computer Science program. While a residency can cost thousands of dollars, this program only charges $170 per credit hour and therefore only costs a few thousand dollars, which is much less than a residency program. The video lectures of these courses are offered by Udacity and, as of 2017, it has approximately 4000 students and is the largest Master of Computer Science program in the United States. The degree earned by students in this program is not considered "online" and is fully equivalent to a face-to-face diploma. As a result, this program has the same reputation as Georgia Tech's in-person degree (Goodman, Melkers & Pallais 2016: 2; Goel & Joyner, 2017, p. 49). In Turkey, between 2017 and 2021, a search was made by Meço and Coştu (2022) from "Google academic" and the Council of Higher Education national thesis center database using the keywords "artificial intelligence in education", and the results were included with the criteria of articles and theses. A total of 21 studies, including 6 postgraduate theses and 15 articles, were examined. 13.56% of the compiled studies mentioned the advantages of AI in education. In the studies, researchers mostly talked about the advantages of AI, stating that it facilitates individual learning, saves teachers' time when preparing materials, and opens collaborative learning paths for students (Meço & Coştu, 2022, p. 185).

The Challenges for AI in Education

AI is a promising field despite many challenges in the field of education. In the field of education, changes are generally slow. Fundamentally, there are difficulties in three areas: Technical, teachers and students, and social ethics. First of all, cost and technical infrastructure come to the fore. AI is quite expensive when installation, maintenance and repair costs are calculated. It is thought that only the best-funded schools will benefit from AI (Livetilesglobal, 2021). When AI systems are established in educational institutions, the roles of educators and students may have to be re-evaluated. For example, teachers must check these systems and ensure their functionality. But teachers' attitude towards this system is very important. In this case, two types of negative situations may arise. First, teachers can rely too much on this system and over time it can make them dysfunctional. They also need to understand this system well. For this, they also have to receive training. Secondly, they may not believe in the effectiveness of this system and may resist the system. This may be due to incompetence or over-reliance on traditional methods. There is also a risk that the methods that teachers have chosen so far and the knowledge they have taught will be changed or deemed unimportant by AI. Teachers may be uneasy about the danger of falling from the main role to the supporting role in this new technology. Also the main role given to AI can create problems. Teachers know their students well and can understand their capacities. Every learning system may not suit to every person. This may not be related to the poor quality of the system or the incompetence of the person. The effects of AI systems on students may be different. Students can do the work that the AI asks them to do, but they can avoid doing what the teachers want. The work given by teachers can also be done by AI systems. For example, students can have AI to do translation assignments given by the teacher. This situation also causes ethical problems to arise. AI can make the work of students, but it may lead to a decrease in the quality of some and an increase in the quality of others. So it can make the lazy student and teacher even lazier. It can make the cheating student more cheating. Teachers have concerns that relying too much on artificial intelligence could harm students' abilities to learn independently, solve problems creatively, and think critically. Also, since AI systems store students' and teachers' information, data privacy is very important. Individual student and teacher data may be disclosed, shared or used inappropriately. This is a challenge that educators and AI engineers will face (Zhai, Chu, Chai, et al., 2021, p. 13; Seo, Tang, Roll, Fels & Yoon, 2021, p.2) Students might understand indiscriminate collection and exploration of the data through AI machines as a privacy breach such as Facebook–Cambridge Analytica data scandal (Chan, 2019).

The quality and comprehensiveness of the information contained in AI systems is also very important. One of the main concerns is the quality of the data. AI may raise a lot of ethical problems about the access to education systems, advices to students, accountability, effects on business and data privacy. AI regulation should be based on morals, liability, transparency and safety and should be inclusive (Unesco, 2023). Additionally, technical expertise will be needed when using AI in the field of education. Teachers who are not familiar with AI may have difficulty integrating it into this system and may need support and training (Melo, 2023).

The Advantages for AI in Education

The utilization of AI systems in education attracted the great attention, especially from educators. This revolutionizes teaching and learning and may render many traditional education methods useless. One of the key advantages of AI systems in education is the ability to personalize learning experiences for each student. Kelleher and

Tierney (2018) states that AI systems can offer individualized learning plans based on students' individual needs, interests, and abilities. Since students will be highly motivated in subjects related to their interests, their learning rates in these subjects will increase. AI can also help students unlock their potential. AI can measure students' interest and ability in any subject, based on the grades the student gets in the exams, the level of focus in the lessons and the quality of the questions they ask. Additionally, the utilization of AI systems in education reduces the workload of teachers. Teachers can spend less time to plan basic managements and organization about a class and more time to take care of students individually, and helps them allocate their time to more important tasks (Ayala-Pazmiño, 2023, p. 894). AI generally provides certain benefits to institutions, students and teachers. Students can more easily focus on their deficiencies with AI systems, and with personalized education, students can more easily correct their deficiencies. The feedback received from AI will be better than the traditional education and there will be no risk of embarrassment for the mistakes students make. AI can improve itself and be more useful to students as it can learn where students make mistakes through trial and error. AI can help a student's career by measuring the student's grades and achievement level. AI can teach students faster and in less time than traditional education. AI can assist teachers in giving feedback on lessons and topics, and can determine whether students understand the lessons and topics and report back to teachers. It also helps teachers develop their professions and provide missing information. They can also support teachers with always up-to-date information. It helps teachers analyze exams. In educational institutions, AI can automate classification. It prevents workforce loss and helps institutions with data management (Savaş, 2021, p. 21).

Although AI can improve the process of teaching and learning, AI does not have the capasity to replace the role of human teachers. Additionally, AI cannot contribute sufficiently to an issue related to human experience. Sclater and Peasgood (2018) stated that the achievement of AI systems in education depended on the active incorporation of AI and human expertise. Education should use a hybrid system that balances the benefits of AI with the strengths of human teachers. With AI-based simulations, teachers can help students to discover complex events and concepts in a controlled and safe environment. While some situations are normally very difficult to practice in real life, students can learn very useful information thanks to AI-based simulations. Additionally, students should be given lessons about AI and students should be prepared for the future. AI systems can assist teachers in educational institutions with basic activities such as grading. Can perform routine and monotonous operations instead of students. For example, the teacher can understand who is coming to class without taking attendance, helping the teacher start the lesson faster. In addition, since the answer in fill-in-the-blank exams is fixed and unchangeable, AI can easily do this job. In addition, students can contribute to their creative thinking by taking the learning style of AI as a model. AI also helps students and by determining the success rate in courses, it can be realized which subjects are not understood by students. Teachers' job descriptions may change. After AI takes monotonous work from teachers, AI reduces the workload of teachers in the traditional system. But it may impose new tasks on teachers. For example, it can control AI systems and review the information the AI obtains. Additionally, AI systems can recommend departments that students can attend based on their grades and help them choose courses (Neha, 2020, p. 306-307). In recent years, AI-based systems have been developed that will change the education system (Guardian, 2023).

AI in Education for Personalized Learning Experience

One of the most popular areas of AI in education systems is personalized learning. AI can offer specific learning mechanisms based on students' learning styles, needs and interests. Personalized learning in AI-based systems is used in various ways. AI-based adaptive learning platforms analyze students' study methods, performance in classes, strengths and weaknesses, and learning speeds, and thanks to this data, they recommend personalized learning paths and resources according to students' course situations (Singh, 2023). In AI-based course systems, students receive support from AI systems on subjects related to their courses. AI-based systems can recommend resources to students that can improve themselves regarding the subject they focus on, provide resources according to their success, and improve the student's perspective by recommending different resources regarding the subjects in which they are successful. Students who communicate by speaking will not find AI systems strange because they communicate with the human voice, and they can get used to such systems more easily. It is very important for AI systems to communicate with students as much as possible in terms of the amount of data and experience they obtain and for the AI system to improve therselves later. Thanks to the multi-modal learning that AI systems have, they combine text, audio, video and interactive elements and communicate with students in modes that suit their learning preferences. In addition, feedback systems can be established for each student, regardless of the class, by analyzing the information obtained through completely personalized assignments, exams and trainings and personalized learning paths (Elearning Industry, 2023; Almusaed, Almssad, Yitmen & Homod, 2023). For example, in Nigeria, an AI-supported platform called ScholarX scans the internet using student academic and personal information to find suitable scholarship opportunities for students (Ndiomewese, 2016). AI applications can recommend various books and sources according to individuals' interests and needs. In the USA, Carnegie Learning's AI-based Mathia program offers mathematics education tailored to the needs of students aged 6 to 12 by analyzing their answers (Boland, 2018).

AI in Education for Accessibility and Inclusion

Accessible and inclusive AI-based systems are being developed to respond to needs. These systems attempt to assist students with language barriers and other needs. For example, speech recognition software was developed to assist hearing impaired people. Text-to-speech technology was developed to help visually impaired students. In countries where it is difficult for large populations to obtain education, online resources can have a positive impact if the public has the means to access the Internet. For example, the University of Cambridge has developed an AI-powered program called READ that helps students with dyslexia, and this program uses an AI system to analyze text and adapt the screen to make reading easier for people with dyslexia. WAVE, a Nigerian startup, has developed an AI chatbot called Tosin that provides free educational resources and support to students in poor places. This system has features such as understanding students' questions, providing understandable answers and citing sources, and uses natural language processing (Guardian, 2023). Coursera and Udacity applications prompt teachers to review courses by telling them that too many students have answered a question incorrectly or are providing insufficient learning. With applications such as Duolingo, a language learning system, learning and instant evaluations can be made anywhere, anytime on mobile. New ways of interacting with information enable effective learning. For example, thanks to the AI used by Google, searches are shaped according to our geographical location and previous searches. UTIFEN application provides students with learning and students can communicate via voice with assistants like HomePod, Amazo Echo, and Google Home, creating a true voice conversation environment (İşler

and Kılıç, 2021, p. 4-5). The U.S. Bureau of Labor Statistics (2020) found that people with disabilities (19.9 percent) are less likely to work as STEM (Science, Technology, Engineering, and Mathematics) professionals than people without disabilities (24.9 percent). To solve this situation, artificial intelligence systems (Virtual Lab Assistant (VLA), Web Services, Skills Kit, smart speakers and microcontrollers are used. The VLA system provides students with disabilities with a virtual assistant that can be controlled using natural language rather than memorizing specific keywords or phrases in the laboratory. Students can control laboratory equipment via voice command. Hands-on laboratory exercises with sound control can be done personally by students with disabilities. VLA can also be used via any smartphone or Amazon Echo device (Watters, Hill, Weinrich, Supalo & Jiang, 2020, p. 13).

AI in Education for Teacher Support

AI helps teachers save time and reduce errors by assisting them with tasks such as grading, lesson planning, and attendance taking. At the same time, AI can control the teacher's actions and thus errors can be reduced. In addition, AI-supported systems can provide teachers with the necessary information about which subjects students are unsuccessful in and plan the lesson accordingly. Additionally, teachers can recognize outstanding students and their talents can be discovered earlier. AI can predict the potential of students dropping off schools. AI collects student data and quickly alert teachers about students at risk of dropping off. Effective prediction also helps alert teachers to early intervention of uncontrolled behaviors which could trigger dropping off and take active preventive measures (Niyogisubizo, Liao, Nziyumva, Murwanashyaka & Nshimyumukiza, 2022, p. 10). The role of teachers in AI research is very important, and the analysis of teachers can obtain important information about the AI teaching system. Additionally, AI has many advantages for teachers. Teachers should be a model to train AI, feed the AI system with the updated information, check the accuracy of assessments, determine the assessment criteria and give feedback about issues to AI. AI automates the assessment and evalution, gives feedbacks for the effectiveness, tries to incerease teachers' performance, monitors students timely, gives instant feedback, chooses the optimum learning activity, tracks student evalution progress, makes classess more interesting, reduces teachers' workload and plans activities (Çelik, Dindar, Muukkonen and Järvelä, 2022, p. 624)

The AI-based tutoring system, called Squirrel AI Learning, helps teachers create personalized learning plans. The program both checks students' progress and asseses a student's point of learning (Moncayo, 2019). AI can also help improve the quality of teacher education. For example, in India, artificial intelligence is widely used in the field of digital learning. Artificial intelligence can analyse curriculum and teaching issues and support the teacher on issues that need to be explained. Teachers must be fully knowledgeable in the field they teach and have the qualifications to convey what they know to the students. For example, the Global Teaching Insights Report noted that many teachers in developing states struggle to access high-quality educational opportunities. Additionally, the prerequisite for benefiting from AI systems is to have internet. Once people have the internet, it is possible to access some of AI used in the field of AI-based education. Even AI ChatGPT provides information that can help teachers by writing "ways to improve teaching skills". AI is making teachers' jobs easier in classrooms at Indus International School in Hyderabad. Indus International School, which provides education according to the IB curriculum, has tried to personalize learning by integrating AI into its curriculum. Indus International schools in Bengaluru and Hyderabad are the first schools in India to use the Collaborative Learning Model. The teachers have AI-based

support systems that share the daily responsibilities of the teachers while teaching, and this system is implemented in grades (seven, eight and nine) in History, Physics, Chemistry, Geography and Biology (Nataraj, 2022; Jamal, 2023, p. 140-142).

The Social Consequences of AI in Education

Countries compete with each other regarding AI. Every state invests in strategies and plans that will enable it to develop itself as quickly as possible, grow its economy and ensure its prosperity. States are moving towards building their future, especially with artificial intelligence strategy documents. Particularly, states attach great importance to the education of students and try to use the latest technologies for the benefit of students. AI is seen as a solution to the lack of qualified teachers and education. In particular, the underlying cause of student failure and the increasing achievement gaps between poor and rich students emphasize the need for AI. The purposes for which AI is used in education, where it is used, by whom (individuals, institutions or industry), how it is functionalized, at what levels (from a single student to the entire student) and how it works will determine the fate of education for today and the future. Applications of AI in the educational context are rapidly increasing. Although future applications of AI in the educational context have already attracted attention, the potential effects of this technology on students, teachers and society are important and need to be investigated in detail. In particular, there are debates about privacy, the consistency of predictions, the quality of teaching and the opportunities it offers to teachers. Although the applications of AI in the field of education have been talked about and attracted attention around the world, AI learning has not yet been fully implemented and its use in schools has remained very limited. Additionally, no regulations have been made on the utilization of AI systems in education. There are doubts about the effectiveness and adequacy of AI used in education (Holmes, Bialik & Fadel, 2019, p. 169-170). More than 98 per cent of alerts to the facial recognition systems utilized by the UK police force were faulty, with the software described as "not yet fit for use". The Metropolitan Police stated that AI produced 104 alerts, of which only 2 were correct. Facial recognition technology scans check a video stream and compares the images to stored images. This system has been used in Notting Hill Carnival and Six Nations Rugby matches. Additionally, South Wales Police has used this system and made more than 2,400 false matches since June 2017. The vast majority of these were in the UEFA Champions League final in Cardiff, and in total there were only 234 correct alerts, less than ten percent of the total alerts received (Sharman, 2018). South Wales police were given £2.1 million to test a facial recognition system, but it gave inaccurate results 91% of the time. The system has been tested at a Kasbian concert in Cardiff, Prince Harry's royal visit and a Liam Gallagher concert. Relying on this system, the police identified people to whom the system had alerted in 31 cases, but it turned out that these people were innocent and the system was mistaken (Dodd, 2018). The New York State Department of Corrections and Community Supervision has been implementing facial recognition, and it has been reported that numerous family members have been prevented from seeing their loved ones due to false alerts. The faces of people who come to visit are scanned by the facial recognition mechanism. If a visitor's face matches a person who is banned from entering these facilities, that person is not allowed to visit. Studies have revealed that the facial recognition system makes incorrect detections against blacks and other races. This creates significant injustice in the New York prison system, where 75 percent of those incarcerated are Black or Latino (Laplace & McCormack, 2023).

The data given to AI is very important and it takes action according to the data and command given. AI trained with data containing human bias cannot act impartially.

AI systems that people trust impartially rely on data for now, and if the data given is not impartial, the results will not be fair. This is the same for intelligent tutoring systems. These systems are structured solely on information and do not focus on the social, psychological and structural problems of students. Additionally, AI recommends courses to users based on students' performance. The main problem in these systems is to see every student at the same level. Essentially, the system does not focus on why the training provided works. If it just worked for the majority, that's good enough for the system. Additionally, if the curriculum is determined by AI, AI will be the system that determines what should be learned. In addition, standing in front of the screen for hours and doing homework is boring, it is very easy to cheat, and it poses a serious problem in terms of socialization of students. It is thought that due to the artificial intelligence systems used in education, teachers' professional expertise will weaken, social relations in the classroom will decrease, and automated education processes will empty the essence of real education and dehumanize it. AI programs in the field of education generally create spaces that are far from human interaction, without teacher support, and without discussion and negotiation with our peers (Holmes, Bialik & Fadel, 2019, p. 171-174; Selwyn, 2022). Students criticize the use of AI in education because they think that AI used in education spies on them, provides inadequate education, and obtains their private information. In recent years, the European Commission has identified the application of artificial intelligence in education as a 'high risk' area for human rights, democracy and rule of law (Williamson, 2023). There have been various student protests around the world against personalized learning systems, and teaching unions have opposed the imposition of artificial intelligence-driven technological classrooms (Leskin, 2018). For a few thousand dollars a year, Social Sentinel has offered advanced technology to schools across the country to scan social media posts by students at risk of harm. Some schools accepted this offer. Students protested this situation intensely (Sen and Bernnett, 2022). Also, AI-powered Proctorio, an exam proctoring software designed to prevent students from cheating during exams, often did not recognize black faces. Proctorio software used a face detection model that recognized black faces no more than 50 percent of the time (Clark, 2021; Feathers, 2021). Moreover, today AI is not capable of performing complex strategic planning. AI can make simple and easy tasks and is unable to perform tasks requiring precise hand-eye coordination. It cannot make decisions in areas for which he has not been trained and cannot comment on situations it has not dealt with before. They lack characteristics such as empathy, compassion and stubbornness. Most of these can be done by teachers, and teachers learn many of these tasks both in the field and in theory while training. In addition, since teachers can form special bonds with their students, they will pay extra attention to their education and be attentive to them in a way that robots cannot and be stubborn enough to ensure their success (Lee, 2018). In general, AI used in education is ultimately thought to be about power and political expediency. One of the concerns in the utilization of AI systems in education is political and intertwined with dynamics of power and marginalization. There is concern that AI, which has begun to spread into education, is in a strong tendency towards the centralization of power (Crawford, 2021, p. 223; Selwyn, 2023). According to a report by Dallas Morning News, the use of AI in schools to monitor students is widespread in America. Many campuses consider it necessary to monitor students who are at risk of harm (Brodsky, 2022). Although this situation may seem innocent, it carries many risks. First of all, AI systems can be hacked. Additionally, what this information will be and how it will be used is a question mark. In addition, the risk of harm is a very broad concept and the state can monitor anything that it deems risky for students and can take legal action against students the state does not like. Students can even be tracked through this system and their lives may be under the control of the state and its ideology. The AI technology has

problems about transparency. Engineers can train systems to correctly recognise a picture of a cat. However, the engineers may not know how the AI systems reached results. The "*black box*" is the idea that people can comprehend what goes in and what comes out but not what is going on inside – significantly lessens transparency (Weinstein, 2020, p. 451). Likewise, people may not understand why AI identifies a student as at risk. This may make it easier for this system to fall under the control of malicious people. In addition, Black girls face high and disproportionate rates of the school suspensions in the U.S. Based on stereotypes, black girls are viewed as having "lower academic prospects" and "disproportionately high levels of makeup." In cases where Black girls are misidentified by facial recognition technologies, it can lead to negative academic results and disciplinary actions. Provided that the AI system is utilized to determine who is involved in incidents or who is allowed to enter schools, especially black students may be misidentified as students who commits disciplinary incidents (Weinstein, 2020, p. 456-457). Some studies have shown that the application of AI is disadvantageous in terms of individual development. For instance, the frequent use of smart electronic devices negatively affects adolescents' interpersonal relationships and social adaptation, and elderly people cared for by robots feel lonelier and emotionally indifferent (Lai, Xie, Ruan, Wang, Lu & Fu, 2023, p. 2).

Conclusion

AI studies have been carried out for many years. However, there has been a rapid increase in both the capacity of AI and AI studies in the last 20 years. AI technology is used in almost all fields and AI systems are encountered in daily life. AI technologies are used in all areas such as public administration, justice, finance, sports and education. The utilization of the AI systems in the area of education covers many areas such as material management, individualized education, teaching techniques, measurement and evaluation, and grading system. In today's world, students' learning techniques are changing and teachers need to keep up with these situations. With AI, students' situations and developments can be controlled and different strategies are used against these situations. In addition, both students and teachers benefit from AI, and these two segments have to learn this technology. Students have to learn this system because it is the technology of the future and they are educated within this system. For teachers, this system should be checked and if there are deficiencies, they should be noticed and corrected. Although AI systems are useful, they can also cause great harm in some cases. The system operates in accordance with ethical values, does not discriminate and is free of viruses etc. It is necessary to ensure that the system is not subject to interventions and that the system is not corrupt or provides incorrect training. For this, teachers need to understand AI systems to a certain degree. Additionally, for AI systems to work, teachers must enter the correct data into the system. The presence of teachers' and students' data in AI systems requires precise control of this system.

Essentially, policymakers need to think seriously about how AI is being implemented in a variety of ways, in different educational contexts, and with what social impacts. If AI used in education is not used carefully, it will increase existing inequalities and injustices and deepen social divisions and instabilities. The use of AI in education must be taken seriously, its potential risks must be acknowledged, and technochauvinist assumptions that it is the ideal solution must be rejected. In the near future, there will be deeper interaction between application developers and social scientists and historians about AI used in education. In particular, policy makers will have to think deeply about how and where these technologies will be applied (primary schools, secondary schools, universities, national education systems, education policies, etc.).

Author Contribution Rates

The author declares that no other author has contributed to the study and that he has read and approved the final version of the study.

Conflict of Interest Statement

The author declares that there is no conflict of interest with any institution or person within the scope of the study.

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