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POSSIBILITIES AND LIMITATIONS OF APPLYING CHATGPT IN THE EDUCATIONAL PROCESS

Abstract: In recent years, the rise of advanced artificial intelligence technologies has had a profound impact on many fields, including education. One such technology is ChatGPT, a powerful large language model developed by OpenAI. In this paper, the authors consider the possibilities and limitations of applying artificial intelligence, primarily ChatGPT, in the educational process. In addition to general definitions, this popular technology is briefly presented, as well as the possibilities of its application. Consideration is mainly carried out from the educational aspect, with the role of the teacher still in the

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centre. At the same time, appropriate didactic, pedagogical, and methodical possibilities were presented, with which the teacher can be innovative and even more successful, effectively applying ChatGPT in everyday educational work. Of course, the limitations arising from the application of artificial intelligence are also presented. In this article, the benefits and risks related to the use of ChatGPT in education are discussed. The article argues that ChatGPT has at least five main benefits, such as creating learning assessment, enhancing pedagogical practice, offering virtual personal tutoring, creating an essay or research article outline, and brainstorming ideas. However, there are risks related to academic integrity issues, unfair learning assessment, inaccurate information, and over-reliance on AI. The article offers a set of recommendations for the effective use of ChatGPT for educational purposes.

As a final result, we get a more realistic picture of this current topic, which also shows the pedagogical aspects and does not diminish the role of the teacher.

Keywords*: ChatGPT, artificial intelligence, education, possibilities, limitations.*

Introduction

In the field of education at the beginning of the 21st century, special attention is paid to actualizing the improvement of the quality of the teaching process and it is also insisted on a concept that will be ready to respond to the numerous challenges of modern society. Progress in digital information and communication technology have not bypassed educational field either, and due to their possibilities, ICT are increasingly used in education as a support and form of enrichment of the implementation of the teaching process even in emergency situations (Bojović & Stojkanović, 2022).

We are witnessing the rapid changes that are taking place in society and are characterized by the intensive use of computers, online tools, mobile applications, and robots. These changes are noticeable, primarily in the economy, but they have significant effects on the labour market and the entire education system.

Along with technology, the possibilities of the Internet are developing. At the end of the 20th century, Web 1.0 enabled only passive searching and viewing of texts, images, audio, and video recordings. At the beginning of the new millennium, mere browsing has grown into interacting with content, communication between users, as well as participation in the active creation of online content and own profiles/avatars. Web 2.0 technology was marked by services and tools, sites for sharing videos and images, various blogs and micro blogs, and forums, but also the explosion of the popularity of social networks. The definition of Web 3.0 is not exactly defined, but its

most important feature is that tools connect various information (such as users and their online activity) and make decisions. These algorithms were originally designed for the needs of users, but are most intensively used for online campaigns, to promote, and to increase activity/users within various online communities. This technology (smart web and artificial intelligence) was perhaps first available with the advent of the first chatbots.

What is certainly the most popular topic being the application of artificial intelligence in almost all spheres of human activity. It is already a fact that artificial intelligence will be a trend in the upcoming period, but first of all, the concept of artificial intelligence should be accurately defined, as well as its possibilities in certain professions.

Even the very definition of artificial intelligence is changing and there are more definitions. The term artificial intelligence was first mentioned in 1956 by John McCarthy (Russell & Norvig, 2013). Baker and Smith (2019), who pointed out that artificial intelligence does not refer to a single technology, but is defined as computers that perform cognitive tasks such as learning and problem solving.

As a starting point, we will use the definition formulated by the High Level Expert Group on Artificial Intelligence in 2019:

> "Artificial intelligence systems (Artificial intelligence – AI) are software (and sometimes hardware) systems designed by humans that, according to a complex goal, act in the physical or digital dimension, perceiving their environment through data collection, interpreting the collected structured or unstructured data, reasoning about knowledge or processing information derived from this data, and deciding on the best actions to take to achieve a given goal. Artificial intelligence systems can either use symbolic rules or learn a numerical model and can also adapt their behaviour by analysing how the environment is affected by their previous actions" (High Level Expert Group on Artificial Intelligence, 2019).

The popularity of these systems is constantly growing. This process accelerated sharply after the appearance of the ChatGPT site (November 30, 2022), which is available to everyone and enables interactive communication with users in the form of text messages (the so-called chatbot). ChatGPT was developed by OpenAI, an American artificial intelligence laboratory that works closely with Microsoft and is its exclusive cloud storage provider. In addition, this company supported artificial intelligence research with one billion dollars in 2019 and 10 billion dollars in January 2023. This financial background enabled the further development of ChatGPT with one of the world's most powerful supercomputers.

According to the Exploding Topics website, the aforementioned online service reached its first million users in a record 5 days after its launch. This period is even more spectacular if we compare it with the data of other online services. Instagram achieved the same result in 2.5 months, Facebook in 10 months, and Twitter in 2 years.

According to the research by the investment bank UBS, ChatGPT already had 57 million active users in its first month and surpassed the magic figure of 100 million during January 2023 (Cerullo, 2023). In comparison, social networking app TikTok took almost 9 months after launch to build the same user base and it took Instagram roughly two and a half years to reach 100 million monthly active users (Fabio, 2023). It took Google Translate six and a half years to reach this milestone. Deployment has been exceptional, with ChatGPT achieving the fastest consumer application growth ever.

The number of ChatGPT users has extraordinarily enlarged by over one million in just a week after its introduction on November 30, 2022 (Mollman, 2022). According to the latest data available, ChatGPT currently has over 180 million users. At its peak in April 2024, the site was receiving nearly 2 billion visits each month (putting it on the shortlist of most-visited websites in the world). However, according to the latest available data, ChatGPT only gets a little over 600 million monthly visits.

In various ways, AI has the capability to promote advancement and innovation in educational settings (Zhai, 2022). One of the emerging AI tools that can be employed for educational purposes is ChatGPT.

ChatGPT is a large language model (LLM) with the capacity to produce suitable responses to context and engage in natural-sounding conversation (Deng & Lin, 2022). At present, there are three versions of ChatGPT: ChatGPT (a free version), ChatGPT Plus (a premium version), and GPT-4 (an upgraded version) (OpenAI, n.d.).

ChatGPT Application Possibilities

The possibilities of applying ChatGPT in everyday life are for now – endless and unfathomable. The main function of this tool is to generate text based on entered specifications and words or sentences that we can even correspond in real time with ChatGPT. It is certainly important to point out that this tool has been using the database since 2021, and information about events after this date is limited. Since registration is required to use the site, the system "remembers" what the user previously wrote in the conversation and can conduct further conversations based on previous conversations. In addition, the system continuously "learns", based on feedback, its algorithm becoming better and better.

There are intense ethical and legal polemics about possible abuses of this system, but currently the system is learned, and set up in such a way that it rejects requests related to unethical, illegal or morally problematic requests.

The main function of ChatGPT is to generate text based on certain information. Text can be a real-time response, putting it in the role of a virtual assistant, and allowing customers to get quick and accurate answers to questions. This automates a significant part of jobs that were performed by humans. The system answers the

questions in an appropriate manner. These questions can be from everyday life, such as questions related to a healthy lifestyle, for creative solutions in family life, hobbies, entertainment, but from the domain of narrower professional areas.

Text generation can be used to write a post for social media, write a speech at certain events, or even write a term paper or essay. ChatGPT skilfully and creatively generates texts in the Serbian language, especially if the user has some experience in defining parameters. It is easy to conclude that these and similar activities are unethical use of these tools. The trend in this sense is the formation of a culture of using this technology and correct indication of the tools used. ChatGPT has recently been used in a variety of fields, including library services (Lund & Wang, 2023), healthcare (Aydın & Karaarslan, 2022), and education (Baidoo-Anu & Owusu Ansah, 2023; Rudolph, Tan, Tan 2023). Basically, there is no area where ChatGPT cannot be used, so the story of its application is virtually limitless. It is possible to consider the best ways of its application in a wide variety of scenarios.

Some of ChatGPT use cases are:

- Virtual Assistant – functioning as a personal assistant, ChatGPT excels at assisting users with scheduling, reminders, and basic tasks;
- Customer Support – ChatGPT can be integrated into customer service channels, such as live chats or phone calls, to automate responses to common queries: offers automated customer service, answering frequently asked questions and troubleshooting common problem;
- Content Generation – ChatGPT can be used to generate human-like content, so it provides aids with content generation, such as blog posts, articles, and social media captions;
- Language Translation – allows for translation of text from one language to another;
- Tutoring and Education – provides personalized tutoring and educational support across a wide range of subjects;
- Coding Help – assists programmers with code suggestions, debugging, and explanations;
- Creative Writing – collaborates on creative writing projects, generating ideas, and providing feedback;
- Support for Decision-Making – assists users in making decisions by providing information, pros and cons, and alternative options;
- Travel Planning – helps with travel recommendations, itinerary planning, and finding the best deals;

- Mental Health Support – offers a listening ear and suggestions for dealing with stress, anxiety, and other mental health issues;
- Personal Finance – helps with budgeting, investing, and financial planning;
- News and Information – provides up-to-date news, weather forecasts, and general knowledge on a variety of topics;
- Learning New Skills – assists users in learning new skills, such as playing an instrument or mastering a new language;
- Game Companion – serves as a companion or guide within video games, providing hints, tips, and strategies;
- Event Planning – assists with event planning by recommending venues, catering, and entertainment options;
- Medical Information – answers basic medical questions, provides information on symptoms, and general health advice;
- Recipe Suggestions – ChatGPT can suggest recipes based on dietary preferences, available ingredients, or specific cuisines;
- Personal Stylist – not only can it provide fashion advice, but it can also offer outfit suggestions and clothing recommendations based on personal preferences;
- Historical Conversations – in addition to providing natural language conversation, ChatGPT can simulate conversations with historical figures. This unique feature allows it to offer insights into their lives and perspectives;
- Language Practice – it can be used as a tool for language practice, engaging in conversations to improve language skills.

From the above, it can be seen that the use of ChatGPT is comprehensive, and that the range of its uses is practically unlimited – from customer service and support, content creation and curation, to recruitment and hiring, healthcare diagnosis and treatment, financial services and investment, education and training, and to marketing and advertising. While this is quite a comprehensive look at ChatGPT use cases, it's noteworthy that there is a lot more that this chatbot can do.

As one of the strongest aspects of the application of AI (and ChatGPT) is the creation of code in various programming languages and in finding errors in the program. In addition, it is often used for translating various texts, for content analysis, and for summarizing longer textual content such as a single book or report. It is often used to solve mathematical problems or to write literary compositions, essays.

AI and ChatGPT in the Educational Process

The Net-generation requires a new approach to learning characterized by greater student autonomy, which indicates the need to transform the traditional model of knowledge reproduction into a model of active knowledge construction where teachers and students are partners who jointly build a knowledge base that needs to be adopted (Glušac, 2012).

The behaviour paths of new technologies in education mostly follow the laws of the Hype curve. The stages of this curve are:

(1) Technology Trigger;

(2) Peak of Oversized Expectations;

(3) Trough of Disappointment;

(4) Slope of Enlightenment;

(5) Plateau of Productivity.

These phases of the Hype curve were present in almost all innovations related to educational technology and the implementation of new media in the educational process. This trajectory is also expected in the case of the application of artificial intelligence in teaching, for which the expectations are currently too high. It takes some time and experience to optimize the most effective ways of integrating new technology into education, but also education in the course of the new technological revolution.

In addition to the above-mentioned things, teachers show resistance to new technologies, fear of an unknown (English) language, fear of failure, fear of greater knowledge, and experience of students. There is also a constant fear of replacing teachers with computers/robots.

It is considered that the role and importance of the teacher is irreplaceable as it was in the traditional system. A teacher, in addition to teaching and educating, serves as an example for his students. The only change is that due to technological development, teacher lost his/her own position as the only source of knowledge. Teacher is joined by the Internet, cable television, smartphones, and now available artificial intelligence/ChatGPT. The key question is not “if” but “how” an educated, experienced, and methodically prepared teacher can become a good ally with ChatGPT.

There are research studies on the topic of applying artificial intelligence in education. Garito (Garito, 1991) claims that AI is becoming more widespread in education and is being used more intensively. It predicts changes in the quality of

teacher-student interaction. At the end of the 2010s, excessive expectations related to artificial intelligence in education appeared, such as:

- Artificial intelligence can potentially bring a revolution to the world of learning and teaching (Florea & Radu, 2019).
- Artificial intelligence will improve the quality of education worldwide (Mondal, 2019).
- Artificial intelligence can solve the global teacher deficit (Edwards & Cheok, 2018).

Artificial intelligence is used in education in different ways. For example, artificial intelligence has been integrated into several instructional technologies such as chatbots (Clark, 2020), intelligent tutoring, and automated grading systems (Heffernan & Heffernan, 2014). These AI-based systems offer numerous opportunities to all stakeholders during the learning and teaching process (Chen, Chen, Lin, 2020).

After a detailed analysis of the available literature, it can be established that (Chichekian & Benteux, 2022; González-Calatayud, Prendes-Espinosa, Roig-Vila, 2021; Zawacki-Richter, Marín, Bond, Gouverneur, 2019):

- Critical analyses of the challenges and potential risks of using artificial intelligence in education are still not sufficiently established;
- The connections between the application of artificial intelligence in education and pedagogical theories, and pedagogical foundations have not been established, and proven;
- Most of the studies written on the application of artificial intelligence in education focus on the development and evolution of the system, and do not take into account the teacher, as an active and managing element of the educational system.

Regarding the role of artificial intelligence, taking into account the key and active role of teachers in educational systems, the most acceptable position seems to be Reiss, which he formulated as follows: "Artificial intelligence in the near and medium-term future has the potential to enrich student learning and supplement work (human) teachers without giving up on them". In addition, artificial intelligence should increasingly enable traditional divisions such as "school–home" to be unified in terms of learning. Artificial intelligence offers the hope of increasing personalization in education, but it is accompanied by the risks of making learning less social (Reiss, 2021).

The evolution of education towards digital education does not mean that people will need fewer teachers in the future (Dillenbourg, 2016). Instead of speculating whether AI will replace teachers, one should understand the benefits that AI offers to

teachers, and how these benefits can change the teacher's roles in the classroom (Hrastinski et al., 2019).

Most experts agree that artificial intelligence can be applied in the following segments of education:

- personalization of the learning experience,
- creating opportunities for adaptive learning,
- predicting learning outcomes based on activities,
- reducing school dropouts,
- opportunity for professional training of teachers,
- career orientation.

One of the most popular functionalities of chatbots around the world is the processing and generation of texts performed by powerful algorithms connected to huge databases for teaching purposes. For example, we can ask the system to write witty poems or fairy tales, various tasks with certain criteria, or we can ask for an "opinion" about various events, and adjust them to the age of students up to certain years. The effectiveness of ChatGPT for learning and teaching foreign languages was mentioned. Based on precise requirements in terms of concepts, text length, the possibility of choosing nuanced synonyms, choosing specific terminology from a certain field, and the like, they provide almost unlimited possibilities in the subjects of learning a native or foreign language.

As a user-friendly AI application, ChatGPT can be used as an educational tool to foster the ability of both teachers and students to navigate and engage with the rapidly changing world of AI with confidence and understanding (Su & Yang, 2023). In the field of education, ChatGPT can be used to create virtual tutors, answer student questions, and provide personalized learning experiences. It may also be used as a real-world AI application to empower teachers and students to develop their AI literacy, which refers to the ability to understand, use, and critically evaluate AI technologies and their impact on society (Ng et al., 2021; Su et al., 2022). In educational settings, ChatGPT not only can assist in designing assessments, producing essays, and translating languages, but it also enables users to pose and answer a variety of questions, summarize texts, and interact with it like peers (Sok, 2023). Baidoo-Anu and Ansah (2023) claimed that such a model could also demonstrate creativity in writing on almost any topic from a single paragraph to a full research article that can be seen as convincing or almost convincing.

Benefits, Obstacles and Limitations in Applying ChatGPT in Teaching

ChatGPT offers many possibilities, and this tool can be a good assistant both for students and teachers. Students are allowed to use this tool to understand and solve complex problems. For learners who prefer experimental and hands-on learning, ChatGPT is an excellent platform to achieve this (Rudolph et al., 2023). One of the biggest advantages of ChatGPT is its ability to understand and respond to natural language queries. This allows students to ask ChatGPT a query in the same way they would ask their tutors and teachers. This makes ChatGPT more intuitive and learner-friendly. It can be used at all levels of education, from elementary to higher education, and even for professional development (Rahman & Watanobe, 2023).

ChatGPT has many potential benefits in education. It can provide a more personalized and adaptive learning experience for students. It can boost teachers to reflect on the educational content and trust between teachers and students. By using ChatGPT to create personalized recommendations and virtual tutors, students can receive more targeted instruction tailored to their individual needs. For instance, if students need assistance with a physics or chemistry problem, the ChatGPT can offer detailed instructions on how to solve it. ChatGPT can make it easier for teachers to answer students' questions. By using ChatGPT to generate answers to students' requests, teachers could save time and energy, which could be redirected to other tasks. ChatGPT can provide a more engaging learning experience for students. Also, ChatGPT can improve teaching models, assessment systems, and education ecology by empowering the teacher-student-technology triad structure. Creating virtual teachers and personalized recommendations using ChatGPT can ensure students experience a more interactive and enjoyable learning experience (Lo, 2023). Also, ChatGPT can provide useful suggestions for teachers – it can accelerate the transformation of AI by facilitating and coordinating virtual and physical relationships within educational situations, enabling deep involvement in different directions, expanding a broad network, and forming a new ecology of education (Su & Yang, 2023). ChatGPT can provide helpful suggestions for students' writing by recommending topics, outlining structures, providing ideas and improving students' academic writing. Students can request help writing an essay on any topic and ChatGPT can provide suggestions for claims and potential topics for body paragraphs.

In this way, students can combine their ideas, attitudes and knowledge with the suggestions of ChatGPT to complete their essays. Critical thinking of the students is definitely needed to ensure the accuracy of the writing (Su & Yang, 2023).

When it comes to the limitations and problems of applying artificial intelligence in teaching, the first association of teachers is negative and refers to the inadequate use of this tool on the part of students, primarily in the form of generating

homework, solving mathematical problems, even writing seminar papers. Since the basic function of this tool is to generate text based on the entered parameters, it is therefore suitable for writing various papers instead of students. "Spoofing" a text as your own, which was created by someone else, including the chatbot itself, is in itself an unethical, illegal, and punishable act. The aggravating circumstance is that the teacher currently has no support in this sense because there is no tool with which the teacher would detect and determine the origin of the text.

After analyzing the available literature (Celik, Dindar, Muukkonen, Järvelä, 2022; Su & Yang, 2022; Xia, Chiu, Zhou, Chai, Cheng, 2022), it can be concluded that the challenges, obstacles, and limitations of using artificial intelligence, i.e., of chatbots in teaching, are as follows:

- Tool limitations in features (operational reliability, feedback reliability, text capacity/length, slow text generation, etc.),
- Inadequate infrastructure in educational institutions such as internet, computers/smartphone,
- Inadequate level of digital competence of teachers, lack of interest, and desire to innovate, negative attitude towards computers/online tools, lack of trust,
- Lack of accredited seminars and inability to learn, especially about application methodology,
- In addition to digital competencies, lack of methodical/pedagogical knowledge about its application in the teaching and learning process,
- Lack of communication between IT experts and pedagogists, lack of interdisciplinary approach,
- Lack of social and emotional approach in the analysis of artificial intelligence.

Of course, the use of ChatGPT in education has some limitations. First of all, it is important to note that ChatGPT is still a developing technology, and its effectiveness has not been fully tested and verified. While the studies presented in the article suggest that ChatGPT could be a useful tool for education, significantly more research is needed to determine its effectiveness in different contexts. It should also be emphasized that ChatGPT may be limited by data quality. If the data used to train the model is of low quality, the model's responses may not be correct or reliable. ChatGPT can have negative effects and implies the need to adapt educational objectives, methods and ethical education (Su & Yang, 2023). The complexity of the tasks assigned to ChatGPT can also be a challenge. Although ChatGPT can generate human-like responses to simple queries, it can have problems and struggles with more complex tasks.

Another important aspect, which can be a challenge, is the cost of implementing ChatGPT in education. AI technology, and therefore ChatGPT, requires significant investments in both hardware and software, and later in maintenance. The costs of implementation and subsequent maintenance and support can be a challenge for educational institutions (due to lower revenues). Therefore, it is important to find a way to create more affordable technology in the future.

The use of ChatGPT in education also raises issues of ethics and security. It is evident that AI and ChatGPT can be very easily used for manipulation and fraud by students. If the model is not properly monitored and regulated, it can be used to provide inaccurate information or lead students down the wrong path. Another threat is the potential threat to student privacy. If the model is not properly secured, it can be used to collect sensitive information from students without their prior knowledge or consent. Another potential risk is that technology is used to discriminate against certain students. If the model is not trained on data that is representative of all students, it can be used to provide unequal access to education (Su & Yang, 2023).

The use of ChatGPT can bring into question the existing system of knowledge evaluation, since a clear line between the invention of individual knowledge and ideas of students, and those obtained by AI is lost. The University of Hong Kong temporarily banned students from using ChatGPT and other AI-based tools in their academic assignments (Yau & Chan, 2023). In the long run, ChatGPT may lead people to believe that knowledge no longer matters. Namely, the idea can be born that knowledge is easily accessible through technology (ChatGPT) and that, because of that, the accumulation and acquisition of knowledge by an individual-student, no longer has its true purpose.

Conclusion

In this paper, AI and its possibilities are briefly defined, especially ChatGPT, in the educational process are considered. The key role of teachers in education was taken into account, but the need for openness and innovation was also highlighted. In addition to opportunities, benefits, obstacles, and limitations in the application of ChatGPT in education are also considered. It cannot be considered that this tool is completely good or bad, but the educational system cannot ignore it, because it helps teachers and students to be more effective during the teaching and learning process, and on the other hand, it is already intensively present in the market.

The use of ChatGPT and other generative artificial intelligence in education, the so-called “educational artificial intelligence”, can provide students with a highly personalized, adaptive and interactive learning experience. However, it is important to approach integration into educational practices responsibly and ethically, with the support of firmly established theoretical frameworks. This will ensure that educational institutions can take advantage of new technologies and keep pace with the changing background of education.

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МОГУЋНОСТИ И ОГРАНИЧЕЊА ПРИМЕНЕ CHATGPT У ОБРАЗОВАЊУ

РЕЗИМЕ

Последњих година, успон напредних технологија вештачке интелигенције имао је велики утицај на многа поља, укључујући и образовање. Једна таква технологија је ChatGPT, моћан алат који је развио OpenAI. У овом раду аутори разматрају могућности и ограничења примене вештачке интелигенције, првенствено ChatGPT-а, у образовном процесу. Поред општих дефиниција, укратко је представљена ова популарна технологија, као и могућности њене примене. Разматрање се углавном спроводи са образовног аспекта, при чему је улога наставника и даље у центру. Истовремено, представљене су одговарајуће дидактичке, педагошке и методичке могућности, са којима наставник може да буде иновативан и још успешнији, ефикасно примењујући ChatGPT у свакодневном васпитно-образовном раду. Наравно, представљена су и ограничења која се јављају применом вештачке интелигенције. У овом чланку се разматрају предности и ризици у вези са употребом ChatGPT у образовању. У чланку се тврди да ChatGPT има најмање пет главних предности, као што су креирање процене учења, унапређење педагошке праксе, пружање виртуелног личног подучавања, креирање нацрта есеја или истраживачког чланка и размишљање о идејама. Међутим, постоје ризици везани за питања академског интегритета, погрешну процену учења, нетачне информације и претерано ослањање на вештачку интелигенцију. Рад нуди скуп препорука за ефикасно коришћење ChatGPT-а у образовне сврхе.

Као крајњи резултат добијамо реалнију слику о овој актуелној теми, која приказује и педагошке аспекте и не умањује се улога наставника.

Кључне речи: *ChatGPT, вештачка интелигенција, образовање, могућности, ограничења*.