

Evaluation of satisfaction with the use of artificial intelligence in the educational process by teachers in Ukraine

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Abstract

The article is devoted to the study of Ukrainian teachers' satisfaction with the use of artificial intelligence (AI) in the educational process. The rapid integration of AI into education involves the use of technologies such as virtual assistants, adaptive learning systems, and automated assessment. The purpose of the study was to determine the level of teachers' satisfaction and identify the main problems and advantages of using AI in Ukrainian schools. A survey conducted among 807 respondents in December 2023 showed that the most popular services are ChatGPT and Bard (Gemini). The majority of respondents noted increasing the availability of materials, improving the organization of the educational process, and automating the creation of didactic material as the main advantages of AI. At the same time, the main obstacles include technical limitations and risks associated with excessive dependence on technology. In general, the results of the study demonstrate a high interest and positive attitude towards AI among teachers, although there are problems that need to be solved for the effective implementation of technologies in the educational process. A model of AI use in education is proposed.

Keywords

artificial intelligence, educational process, teacher satisfaction, learning automation, technologies in education,

1. Introduction

The war in Ukraine, which began in 2022, caused significant changes in all spheres of life, including education. In the conditions of hostilities, infrastructure destruction and population displacement, ensuring access to quality education has become an extremely difficult task. In this context, distance education has become particularly relevant and has developed into the main tool for ensuring a continuous educational process [1].

In times of war, the safety of students and teachers is the key point. Traditionally, educational institutions become targets of attacks, which makes them unsafe to attend. Distance education allows students to continue their studies in a safe environment, being at home or in places of temporary stay. Thanks to the use of online platforms and digital resources, students can acquire the necessary knowledge and skills, regardless of the physical availability of schools.

The war led to massive displacement of the population both inside and outside the country. Many children and adolescents were forced to leave their homes and educational institutions. In such conditions, distance education provides an opportunity to continue studying without interruption, regardless of the place of stay. This is especially important for those who find themselves in new regions or countries where there may be a language barrier or a difference in educational programs.

Education plays an important role in ensuring psychological stability and support of children during war [2]. Distance education allows to maintain a certain level of normality and structure in students' lives, which contributes to their emotional well-being. Communicating with classmates and teachers, even online, helps maintain social connections and reduce stress.

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The war stimulated the development and introduction of new technologies into the educational process. The use of artificial intelligence [3], virtual classrooms [4], interactive educational materials [5] and other innovative solutions [6] has become a necessity to ensure effective distance learning. These technologies not only compensate for the shortcomings of traditional education in the conditions of war, but also lay the foundation for the future development of the educational system in Ukraine.

Distance education during the war in Ukraine is both a forced measure, and also an important tool for ensuring the continuity of the educational process. It contributes to maintaining the accessibility of education, ensuring the safety of students and teachers, maintaining psychological stability and introducing the latest technologies. In these difficult conditions, distance education turned out to be vital and opened up new opportunities for the further development of the educational system of Ukraine.

With the introduction of AI technologies, the educational process has undergone significant changes, in particular in the field of distance learning, which has become especially relevant in the conditions of the global pandemic of COVID-19 [7] for the whole world and in the conditions of war in Ukraine [8] for its educational system. The use of AI in distance education provides a more personalized approach to learning, automation of routine tasks and improvement of the quality of educational services.

The importance of AI in distance education is due to a number of key factors that significantly affect the effectiveness of the educational process and the quality of education in general.

One of the main directions of using AI in distance education is the personalization of learning. Adaptive learning systems built on the basis of AI are able to analyze the individual needs, strengths and weaknesses of students [9]. Such systems automatically adjust educational materials according to the level of preparation and progress of each student, which contributes to more effective assimilation of knowledge. Personalization allows each student to move at their own pace, avoiding overload or underestimation.

AI makes education more accessible to different categories of students, including those with disabilities or living in remote areas or due to a state of war. AI-driven virtual assistants and online platforms provide 24/7 access to learning materials and support, which is especially important for students who cannot attend traditional educational institutions.

AI-powered virtual assistants like ChatGPT and Bard are becoming an integral part of distance learning. They help students and teachers by answering questions in real time, providing explanations on various subjects, and also helping to organize the educational process [10]. Virtual assistants can work around the clock, providing support to students at any time.

Automation of assessment is an important aspect of the application of AI in distance education. Automated assessment systems allow for quick and objective assessment of completed assignments, providing instant feedback to students. This significantly reduces the workload on teachers, allowing them to focus on more creative and challenging aspects of teaching. Automation also includes creating and managing learning materials, planning lessons, and monitoring student performance.

AI is actively used to analyze large volumes of data generated in the process of distance learning. Learning data analytics allows to identify trends, predict student successes and problems, and develop individual recommendations to improve the learning process [11]. This contributes to more effective management of educational resources and improvement of the quality of education.

Educators also benefit significantly from the use of AI. Virtual assistants can help prepare materials, answer students' questions, and even lead part of the class. This frees up teachers' time for more creative and interactive forms of learning, as well as for individual work with students.

Despite the numerous advantages, the use of AI in distance education also faces certain challenges. Among them are technical problems related to insufficient access to the necessary technologies, as well as risks related to data privacy and ethical aspects of the use of AI. In addition, there is a need to improve the qualifications of teachers for the effective use of AI technologies.

Artificial intelligence (AI) is being rapidly integrated into various areas of life, including education [12]. As already noted, AI systems such as virtual assistants, adaptive learning systems, and automated assessment tools are increasingly being used in school education. Although AI can bring significant benefits, the effectiveness of its implementation largely depends on the positive perception and satisfaction of the key participants in the educational process—students and teachers.

The review by Chassignol et al. [13] demonstrates various trends and examples of AI use in education, such as adaptive learning systems, intelligent virtual assistants, and educational data analysis. A study by Popenici and Kerr [14] examines the potential impact of AI on teaching and learning in higher education, including opportunities for personalization, automated assessment, and adaptive learning. A systematic review by Zawacki-Richter et al. [15] reveals insufficient involvement of teachers in the development and implementation of AI technologies in higher education. Luckin et al. [16] examine the potential of AI to transform education, including personalized learning, adaptive support, and intelligent learning environments. Roll and Wylie [17] analyze the evolution and revolutionary potential of AI in education, looking at different approaches and their impact. The current state and potential of using AI-based chatbots for educational purposes are discussed by Winkler and Soellner [18]. Pokryshen [19] provides examples of teachers using ChatGPT 3.5. Selwyn [20] gives a critical look at the possible impact of AI on the future of education, highlighting the potential benefits and challenges of automating educational processes.

Deeptanshu and Dogra [21], Iatsyshyn [22], Indeed Editorial Team [23], Pokryshen [24], Zhang et al. [25], Baranov [26], Pchelyanskyi and Voinova [27] have also considered the features of the functioning and use of AI in the educational process.

The *purpose of the research* is the formation of recommendations for AI introduction in the educational process based on the assessment of the level of teacher satisfaction with the use of artificial intelligence in the educational process.

Particularly, research objectives are:

1. Determine which technologies and systems of artificial intelligence are used in educational institutions.
2. Assess the attitude and level of satisfaction of teachers with the use of AI in education.
3. Identify the advantages and disadvantages of using AI from the perspectives of students and teachers.
4. Analyze the effectiveness of the implementation of AI in the educational process.
5. Identify the main obstacles and promising directions for the use of AI in school education.
6. Provide recommendations for the effective implementation of AI in the educational process.

2. Research methodology

According to the proposed advice by Deeptanshu and Dogra [21], Lagodiienko et al. [28], the following research elements were chosen for the structure of the methodology:

1. This study aims to determine the level of satisfaction with the use of AI systems in the educational process among students and teachers of educational institutions and to formulate recommendations for the use of AI. The key variables are perceived usefulness of AI, ease of use, impact on academic performance, and overall satisfaction.
2. This research uses a mixed-methods approach combining quantitative and qualitative methods to gain a deeper understanding of participants' views. Quantitative data were collected through structured questionnaires for teachers using a 10-point Likert scale to evaluate various aspects of AI, as well as multiple-choice questions. Qualitative data were obtained through focus groups and semi-structured interviews with participants to gather their opinions and experiences with AI applications.
3. The quantitative survey were conducted among a randomly selected representative sample of 800 teachers from educational institutions in the region. For focus groups and interviews, a purposive sampling method was used to select approximately 50 participants with diverse experiences with AI.
4. Quantitative data will be analyzed using statistical and graphical methods in Google Sheets with descriptive statistics.

3. Results

The prerequisite of the research was communication with education workers and determining their motivation in the use of modern technologies in the educational process. This aspect requires special attention due to quarantine restrictions and, since 2022, the onset of war, which led all educational institutions to transition to distance education. By the start of the study, all participants in the educational process had already accumulated experience with modern technologies in distance education. With the widespread adoption of AI technologies, these tools were naturally integrated into the work of educators.

The preliminary analysis and communication with the respondents helped identify several key issues, which were subsequently addressed through a questionnaire. Given that the author is involved in the system of postgraduate pedagogical education, conducting this analysis and survey was feasible and effective.

The study was conducted in December 2023, with 807 respondents participating. Among them, 90.1% were teachers of general secondary education institutions, 7.8% were teachers of preschool education institutions, 1.1% were teachers of higher education institutions, and 0.9% were employees of out-of-school education institutions (figure 1).

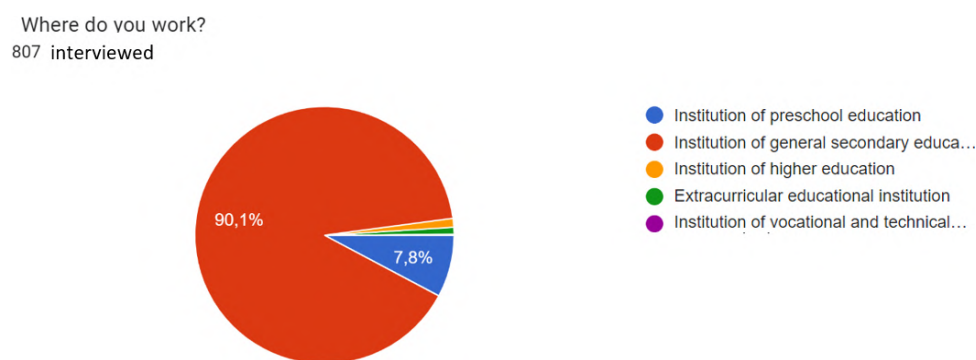


Figure 1: Distribution of respondents.

At the beginning, it was important to find out whether the respondents use AI systems and which ones. The results showed that the most popular are ChatGPT, Bard, services for creating images, videos and audio. 21.5% use ChatGPT in their work, 8.5% – Google Bard (Gemini). The rest noted other various services that have AI tools in their functionality, for example, Canva.

The respondents noted among the most attractive possibilities of AI use in the educational process: increasing the availability of various materials – 37.4%, improving the organization of the educational process – 29.4%, automated creation of didactic material – 22.8%, data analysis to identify the needs of

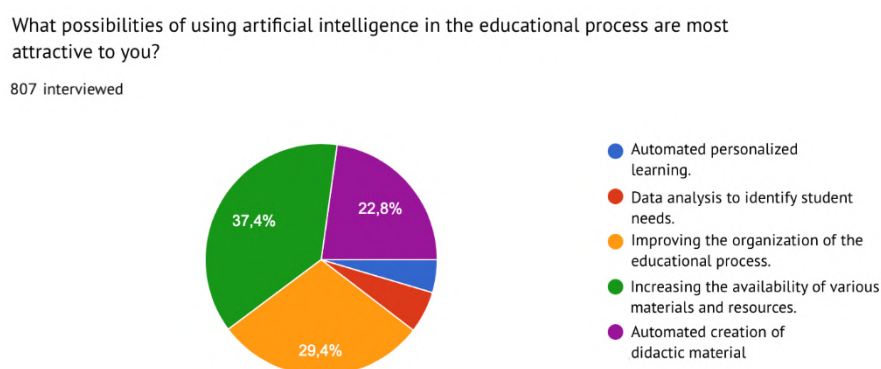


Figure 2: Attractive opportunities.

students – 5.8%, personalized training – 4.6% (figure 2).

Survey participants had the opportunity to choose several answers to questions about helping teachers in their work with AI services (figure 3). The answers were distributed as follows: automated creation of didactic material – 55.5%, creation of tasks and tests – 51.3%, automatic evaluation of tasks and tests – 45.7%, interaction between participants in the educational process – 39%, optimization of individual learning – 26.3% and personalized recommendations – 18.7%. Based on these data, it can be concluded that the possibilities of automating the creation and evaluation of the educational process with the help of artificial intelligence are most in demand among the respondents. They are significantly ahead of other options.

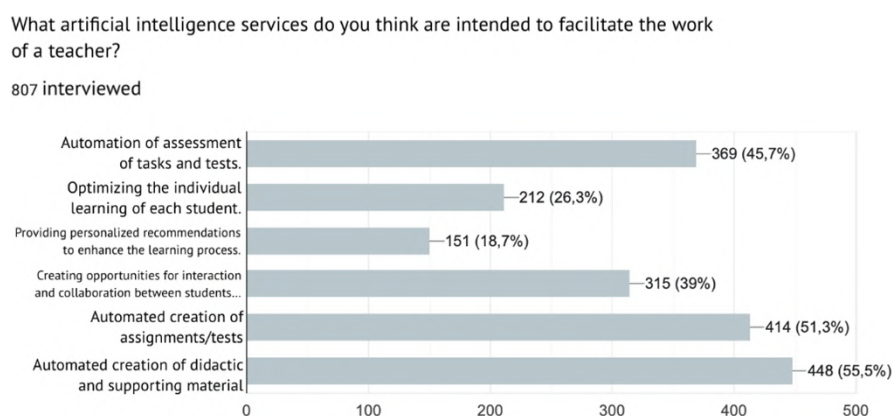


Figure 3: That makes the teacher's job easier.

Among the obstacles to AI use in education, technical problems were chosen by 54.4%, insufficient training of teachers by 25.3%, and a decrease in individual approach by 12.4% (figure 4). As we can see, the vast majority of respondents consider technical limitations – the lack of necessary equipment, software and access to necessary technologies – to be the main obstacle to the integration of AI in education. Therefore, the priority direction for the successful integration of AI in education should be the development of the appropriate technical infrastructure and ensuring access to the latest AI technologies in educational institutions. At the same time, work should also be done on revising educational programs and methods with regard to the AI use.

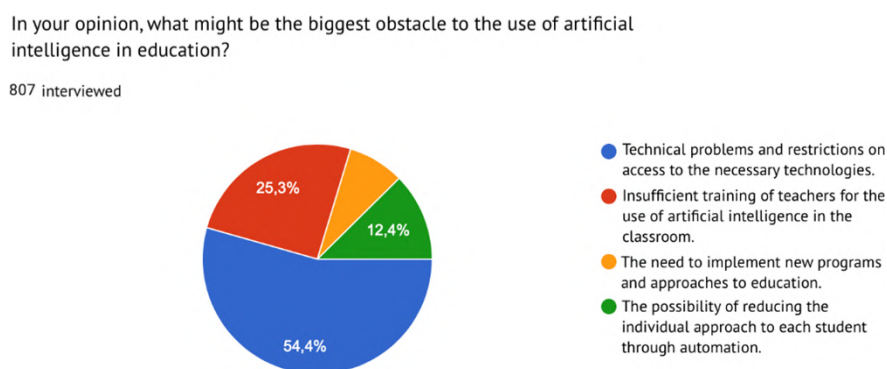


Figure 4: Obstacles in the use of AI.

15.6% of respondents rated the use of AI in education positively (9 and 10); while negative (1, 2 and 3) – 10.8%. The main number of teachers was evaluated by 5 points (20.4%). At the same time, 7 points – 16.2%; 8 points – 17.3%. In summary, we can say that in general (from 5 to 8 points – 65.9%) teachers have a good attitude towards the use of AI in education (figure 5).

As the survey showed, 46.2% of teachers see the benefits of AI for students in increasing interest in learning through the use of modern technologies, another 22.6% speak of convenient and easy access to

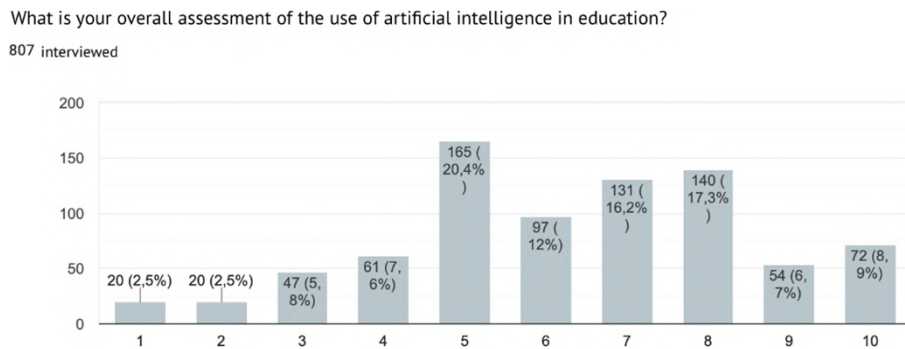


Figure 5: Overall assessment of AI.

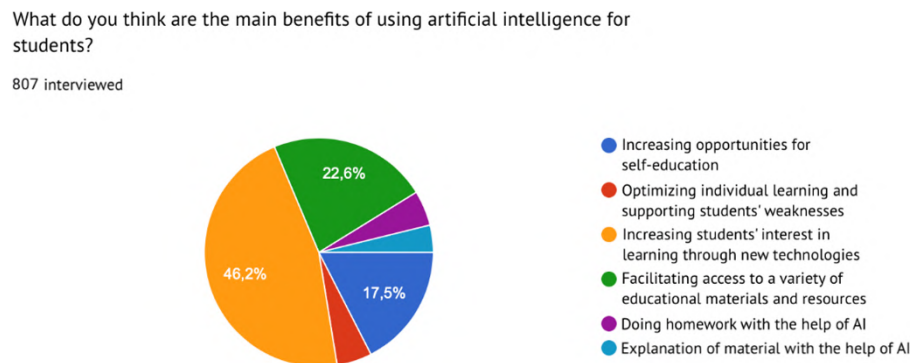


Figure 6: Benefits of AI for students.

educational materials for students, 17.5% about the possibilities of AI in self-education. AI capabilities for individual learning and homework are emphasized by 5% each. The most interesting functionality, from the author’s point of view, is that only 3.8% of the respondents see the benefit of explaining the educational material (figure 6).

To determine the negative impact of AI on students, teachers were able to choose several answers. The vast majority (64.3%) emphasized the possibility of dependence on technology and the loss of personal skills. An interesting fact is that 40.4% indicated a decrease in motivation to study due to passive observation of tasks performed with the help of AI. 28.1% of respondents noted the loss of understanding of the use of available opportunities, and 25.3% drew attention to the feeling of detachment from the educational process (figure 7).

The results show that, in general, the surveyed educators positively evaluate the use of AI in the educational process (15.5%), but the vast majority admits (67.8%) that there are certain difficulties and

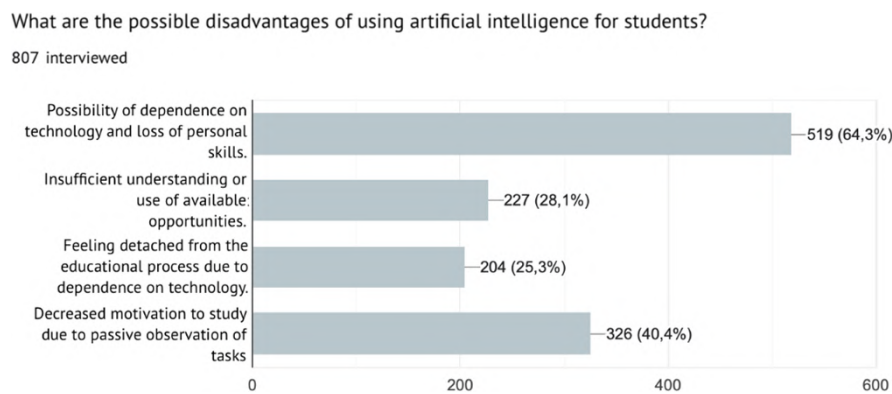


Figure 7: Disadvantages of AI for students.

How would you rate the effectiveness of introducing artificial intelligence into the educational process?

807 interviewed



Figure 8: Effectiveness of AI in education.

issues that need to be resolved. The negative impact of AI is noted by 13.9% and significant negative impact by 2.9% of educators (figure 8). Overall, the analysis shows the majority of respondents are cautiously optimistic about AI and the need for further improvements for its effective implementation.

Regarding the vision of the prospects of using AI in the educational process, almost 80% (40% and 39.4%) point to the development and access to interactive educational materials. 11.2% talk about improving the evaluation system and 9.4% focus on personalized learning (figure 9).

What options for using artificial intelligence would you like to see in school education in the near future?

807 interviewed

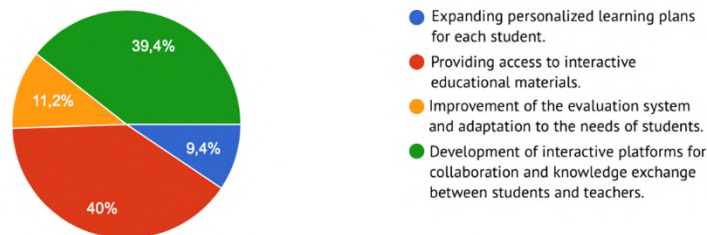


Figure 9: Vision of AI in future education.

Among the useful functional capabilities of AI for the teacher, the respondents highlight the increased accessibility to various teaching methods – 34.4%, facilitation of the preparation for the lesson – 32%, automation of evaluation and preparation of reports – 14.6%, optimization of class management and individual approach to students – 10%, personalized recommendations for improving the educational process – 8.9% (figure 10). It is important for educators to realize that AI expands the possibilities of a teacher’s work.

What possibilities of artificial intelligence do you consider most useful for you as a teacher?

807 interviewed

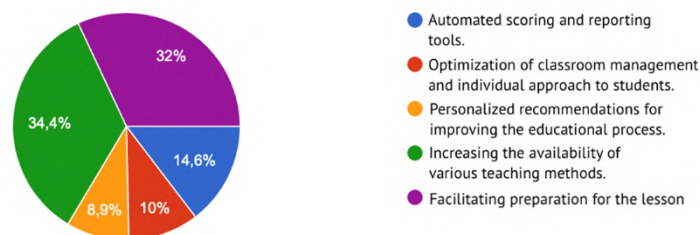


Figure 10: Useful scope of AI use for a teacher.

Regarding the overall assessment of the benefits of AI in education, respondents noted that AI will have a positive effect (24.8%) but with certain limitations (40.6%). 23.3% believe that AI will not solve the problems of education and 11.3% are generally convinced that AI will somehow affect education (figure 11).

How do you assess the possibilities of artificial intelligence in improving the quality of education in general?

807 interviewed

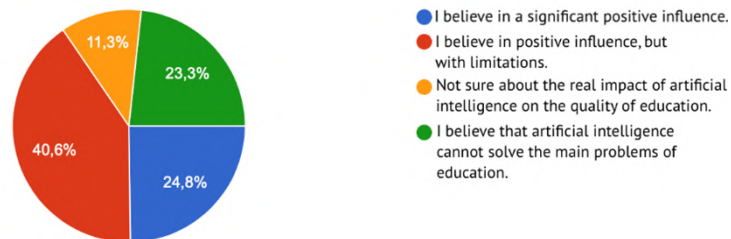


Figure 11: Assessment of the scope of AI use in education.

4. Model for the use of AI by teachers

Based on the conducted research, a model for the use of AI by teachers is proposed, presented in the form of a diagram. The model contains goals, approaches, and specific methods of integrating AI into the educational process (figure 12).

Goal: To enhance the efficiency, accessibility, and quality of the educational process through the integration of AI technologies.

Approaches:

- **Personalized Learning:**
 - To use adaptive learning systems to tailor educational materials according to individual student needs.
 - To implement virtual assistants to provide personalized support and resources.
- **Automation of Routine Tasks:**
 - To automate the creation of didactic materials, lesson plans, and assessments.
 - To utilize AI for automatic grading and feedback.
- **Data-Driven Decision Making:**
 - To analyze educational data to identify trends, predict student performance, and customize interventions.
 - To use AI to monitor and improve educational outcomes continuously.
- **Enhanced Accessibility:**
 - To provide 24/7 access to learning materials and support through AI-driven platforms.
 - To develop resources that cater to students with disabilities or those in remote areas.
- **Professional Development:**
 - To train teachers in the effective use of AI tools and technologies.
 - To foster a culture of continuous learning and adaptation among educators.

Specific Methods:

- **Virtual Assistants:**

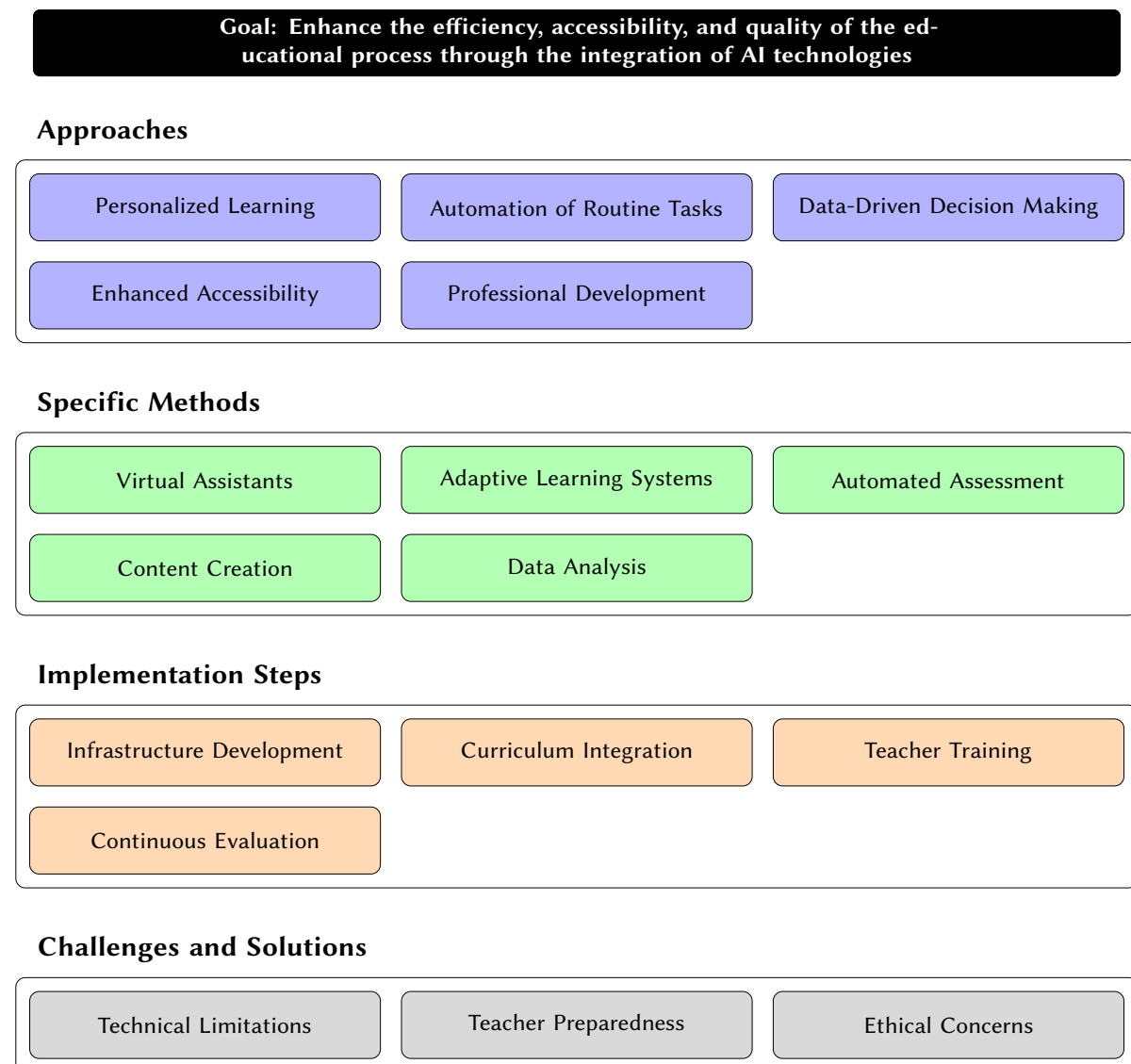


Figure 12: Model for using AI in education.

- **Tools:** ChatGPT, Bard (Gemini).
- **Functions:** To answer student queries, provide explanations, support lesson organization.
- **Adaptive Learning Systems:**
 - **Tools:** AI-driven platforms that adjust content based on student performance.
 - **Functions:** Personalized learning paths, customized assignments.
- **Automated Assessment:**
 - **Tools:** AI-based grading systems.
 - **Functions:** Quick and objective grading, instant feedback, workload reduction for teachers.
- **Content Creation:**
 - **Tools:** AI services like Canva for creating multimedia educational materials.
 - **Functions:** To generate instructional videos, interactive lessons, and visual aids.
- **Data Analysis:**
 - **Tools:** Educational data analytics software.
 - **Functions:** To identify student needs, track progress, recommend strategies for improvement.

Implementation Steps:

- **Infrastructure Development:**

- To ensure that schools have the necessary technological infrastructure and access to AI tools.
- To invest in reliable internet connectivity and modern devices.

- **Curriculum Integration:**

- To update educational programs to incorporate AI tools and methods.
- To develop guidelines for the ethical use of AI in education.

- **Teacher Training:**

- To conduct workshops and training sessions on AI technologies.
- To provide ongoing support and resources for teachers to integrate AI effectively.

- **Continuous Evaluation:**

- To regularly assess the effectiveness of AI integration through feedback and data analysis.
- To make necessary adjustments to improve the implementation process.

Challenges and Solutions:

- **Technical Limitations:**

- **Challenge:** Insufficient access to technology.
- **Solution:** To invest in infrastructure and ensure equal access to AI tools for all schools.

- **Teacher Preparedness:**

- **Challenge:** Lack of training in AI technologies.
- **Solution:** To provide comprehensive training programs and continuous professional development.

- **Ethical Concerns:**

- **Challenge:** Data privacy and dependency on technology.
- **Solution:** To develop clear policies for data use and promote a balanced approach to technology integration.

5. Conclusions

After a thorough analysis of the respondents' responses at Google Sheets, the following general conclusions can be drawn:

1. There is a high level of interest and positive attitude towards the use of AI in the educational process among interviewed teachers and education workers.
2. Respondents consider the automation of task evaluation, personalization of learning to meet the individual needs of students, creation of didactic materials, and better interactivity and collaboration to be the most attractive possibilities of AI.
3. At the same time, the majority of interviewees cite technical limitations as a key obstacle to the effective use of AI, including the lack of necessary equipment and software, as well as limited access to the latest AI technologies in educational institutions.
4. Respondents recognize certain risks of using AI, such as possible excessive student dependence on technology, passivity in learning, and loss of some skills.
5. The general assessment of the application of artificial intelligence in education among the respondents is positive; however, the majority admits that there are problems that need solving.

6. For the successful implementation of AI, it is recommended to first focus on providing the appropriate technical infrastructure, as well as reviewing and updating curricula and teaching methods, taking into account the advantages of AI systems.
7. In addition to investments in technology, respondents emphasize the importance of training and upgrading the qualifications of pedagogical workers for effective work with AI.
8. It is worth taking into account wishes regarding the implementation of interactive AI platforms for collaboration, means of personalization, and automated content creation.
9. It is necessary to take a balanced approach to the integration of AI, not completely replacing the role of the teacher but using new technologies as an auxiliary tool.

Hence, the results of the survey demonstrate a mostly positive, but balanced attitude of the respondents towards the implementation of AI in the educational process. Technological and methodological transformations, provided that balance is observed and the existing problems are solved, can help reveal the significant potential of using AI in education.

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