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Using artificial intelligence to personalise curricula and increase motivation to learn, taking into account psychological aspects

Utilizar la inteligencia artificial para personalizar los planes de estudios y aumentar la motivación para aprender, teniendo en cuenta los aspectos psicológicos

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ABSTRACT

Objectives: this study aimed to assess the effectiveness of artificial intelligence on education, focusing on how it can be leveraged to personalised learning experiences tailored to the specific needs of students.
Study Design: a comprehensive literature review was conducted, alongside an analysis of psychological factors that influence student motivation.
Place and Duration of the Study: relevant academic sources and case studies were reviewed over the duration of six months to gather insights on AI applications in education.
Sample: the sample consisted of the scientific thought and scientists that have integrated AI technologies into their curricula.
Method: a qualitative analysis from literature was utilised in this research to evaluate AI tools' effectiveness in enhancing personalised learning outcomes.
Results: the findings indicate that ChatGPT is currently the most widely utilised AI tool in educational contexts, demonstrating a significant capacity to personalised learning by adapting it to individual psychological profiles and learning paces.
Conclusion: the integration of AI technologies in education presents unprecedented opportunities for curriculum personalisation and student engagement. However, it also necessitates careful consideration of ethical issues, especially related to learner data privacy, to ensure responsible implementation.

Keywords: Adaptive Learning; Cognitive Styles; Motivational Strategies; Emotional Intelligence.

RESUMEN

Objetivos: este estudio tuvo como objetivo evaluar la efectividad de la inteligencia artificial en la educación, centrándose en cómo se puede aprovechar para crear experiencias de aprendizaje personalizadas adaptadas a las necesidades específicas de los estudiantes.
Diseño del estudio: se realizó una exhaustiva revisión bibliográfica, junto con un análisis de los factores psicológicos que influyen en la motivación de los estudiantes.
Lugar y duración del estudio: a lo largo de seis meses se revisaron fuentes académicas y estudios de casos pertinentes para recabar información sobre las aplicaciones de la IA en la educación.

Muestra: la muestra consistió en el pensamiento científico y los científicos que han integrado las tecnologías de IA en sus planes de estudio.
Método: en esta investigación se utilizó un análisis cualitativo de la literatura para evaluar la eficacia de las herramientas de IA en la mejora de los resultados del aprendizaje personalizado.
Resultados: los resultados indican que ChatGPT es actualmente la herramienta de IA más utilizada en contextos educativos, demostrando una capacidad significativa para personalizar el aprendizaje adaptándolo a los perfiles psicológicos individuales y a los ritmos de aprendizaje.
Conclusiones: la integración de las tecnologías de IA en la educación presenta oportunidades sin precedentes para la personalización del currículo y el compromiso de los estudiantes. Sin embargo, también requiere una cuidadosa consideración de las cuestiones éticas, especialmente las relacionadas con la privacidad de los datos de los alumnos, para garantizar una aplicación responsable.

Palabras clave: Aprendizaje Adaptativo; Estilos Cognitivos; Estrategias de Motivación; Inteligencia Emocional.

INTRODUCTION

The use of artificial intelligence in education is marked by significant diversity and complexity. AI applications encompass a broad spectrum of functions and implications, such as personalising the learning experience through technology. It also involves providing enriching educational resources, conducting in-depth analysis of learning data to accurately assess student progress, implementing virtual and augmented reality to create immersive learning environments, and automating administrative tasks to improve the overall educational process. At the same time, it is important to note that these tools are not perfect and may sometimes provide false results. According to numerous studies, there are several key applications of artificial intelligence in education, such as intelligent tutoring systems, automated assessment platforms, collaborative learning environments, game-based learning, and intelligent adaptive learning that adjusts to a student's abilities, level, as well as psychological needs in real time.[1]

Throughout the history of education, humankind has seen significant changes in teaching and learning methods, and the use of modern technologies such as artificial intelligence (AI) is one of the most recent stages of this transformation.[2] History shows that the use of new tools, such as the calculator, has raised questions about the appropriateness of traditional teaching methods, such as learning mathematical calculations. Despite the availability of the calculator, it is important that students first learn basic numeracy skills, as this develops their cognitive abilities and ability to think critically.[3]

Similar principles should be applied to the use of artificial intelligence in education. Students need to understand how what they are learning works and maintain critical thinking, rather than relying on AI to make decisions on their behalf. The use of tools such as ChatGPT should be an additional resource in learning, not a solution to all learning problems. Students should first master the basics of the learning material, and then they can use AI to save time on routine tasks and focus on more complex concepts.[4] Thus, the integration of artificial intelligence should be reasonable and balanced to support students' mental development and increase their motivation to learn.

Furthermore, by incorporating strategies for integrating artificial intelligence in education, we offer students the chance to stay competitive with their peers who are also leveraging these technologies. As with calculators, if some students are allowed to use them and others are not, this leads to inequality in the performance of tasks, leaving students without calculators far behind.[5] This inequality creates a productivity gap that can reduce the competitiveness of those without access to technology.

In this context, it is important to understand the meaning of the term "acculturation," which means adaptation to a new culture - in this case, digital.[6] The acculturation encompasses processes aimed at familiarising students with digital technologies, which is a critical stage for the successful implementation of artificial intelligence tools in the educational process. The goal of acculturation is to change the way students function, allowing them to spontaneously use these technologies in their studies.

Digital acculturation facilitates a seamless transition from traditional teaching methods to innovative ones that incorporate artificial intelligence. This process is much more complex than simply introducing new concepts, as it involves three key aspects: obtaining information, learning to use technological tools, and adapting to new challenges.[7] These elements are essential for integrating digital technologies into the educational process and can significantly increase student motivation and academic achievement.

The main goal of acculturation in the digital environment is to change students' thinking and learning behaviour, as well as to overcome any psychological obstacles that may arise in the process of adapting to the use of these tools. To achieve this objective, it is crucial to instil in students a mind-set that is receptive to change. Specifically, it is essential to blend independent study with interactive in-person learning that fosters student engagement and enhances skill development.

Thus, taking into account the psychological dimensions of the use of artificial intelligence in education is necessary to create a favourable environment that will allow students to adapt to new technologies as efficiently as possible and increase their motivation to learn.

METHOD
General Background
Sample/Participants/Group

The participants in this study included scholars, educators, and researchers who were active in the field of artificial intelligence and its application in education. The sample was curated based on their published works and contributions to the understanding of the relationship between AI technologies and educational practices. A total of 50 significant scientific articles were selected from various educational contexts to ensure a comprehensive representation of the current trends and discussions in this area.

Instrument and Procedures

The methodology of this study is based on a critical analysis of relevant literature, alongside forecasting, modelling, and data systematisation. Initially, key themes and keywords such as "artificial intelligence," "education," "emotional intelligence," "psychological dimension," and "motivation" were identified to guide the literature search. For a detailed analysis, the study focused on 50 articles that provided insights into the effectiveness of AI in enhancing educational processes.

The second stage of the methodology involved assessing the impact of introducing artificial intelligence in education as a tool for motivation improvement. A literature review was conducted using the Evidence for Policy and Practice Information and Co-ordination (EPPI-Centre) methodology, allowing for the precise identification and summarisation of relevant articles and their division into subcategories such as artificial intelligence, acculturation, motivation, and psychological dimensions.

Data Analysis

For data collection, several academic databases were utilised, including Google Scholar, ResearchGate, and Scopus. Articles in English were searched using descriptive operators tailored to each database, resulting in the discovery of 1100 unique articles. A systematic review with content analysis was then performed in order to synthesise the identified studies on the topic. Although the initial search yielded a broad range of studies, the final selection was limited to 50 articles to strengthen the evidence presented in the theoretical framework.

The rationale for introducing artificial intelligence into education to personalised curricula was derived from a synthesis of both scientific literature and practical experiences from the field. Following a thorough literature analysis, a hypothesis was formulated positing that AI integration in higher education serves as an effective motivator for enhancing student engagement. Systems like ChatGPT, which have the potential to supplement or replace traditional teaching methods, are highlighted for their ability to significantly increase student motivation and thus lead to improved educational results.

RESULTS
Artificial intelligence has become widely available and is now being actively utilised by students. As a result, students have begun leveraging these tools to enhance their academic performance and streamline their daily routines.[8] These various technologies help save time and open up new opportunities to improve the learning process. Particularly AI performs some tasks, processes or provides access to information that supports students' learning processes.[9] Therefore, it is important to control and regulate the use of AI, as it can lead to misuse, in particular when writing tests. If used recklessly, AI can become a threat to the learning process, affecting the ability to analyse and critically evaluate information. Students can use tools like ChatGPT to write their papers instead of their own efforts. To solve this problem, OpenAI has developed a tool to detect texts created by AI. Unfortunately, however, this tool is not yet perfect and is currently only able to detect 25 % of texts written by artificial intelligence.[10]

In the context of artificial intelligence use in order to personalise curricula, it is important to note that plagiarism detection software often serves more to intimidate students than as a truly effective tool.[11] While detecting plagiarism continues to pose challenges, even with the aid of modern plagiarism-checking tools, the mere presence of such tools is often a sufficient deterrent for students. Moreover, professors typically turn to these technologies only when they suspect academic dishonesty.[12] This also emphasises the role of artificial intelligence not only in monitoring academic integrity, but also in individualising learning approaches, which helps support students in developing their skills and knowledge, reducing their reliance on plagiarism.

As part of the use of artificial intelligence to personalise curricula and increase motivation to learn, taking into account psychological dimensions, adaptive learning is an educational technique that uses artificial intelligence to customise the learning process according to the individual skills and needs of each student.[13]

The main goal of this technique is to create more intelligent learning environments.

Students may face difficulties during their studies. Of course, some of their classmates may be facing similar problems, while others may have separate challenges. In response to these challenges, students engage with the instructor, who endeavours to accommodate the needs of all individuals.[14] However, based on the size of the class and the time allotted by the instructor, some students may not have time to ask questions or get the help they need. In addition, the instructor teaches the class as a whole, so he or she cannot respond in detail to all students' specific problems and must apply a uniform approach to all.[15]

Adaptive learning, on the other hand, allows for individualisation of the educational process.[16] This means that each student's answer is analysed separately and affects their further learning. As a result, each student receives personalised responses, and artificial intelligence adjusts the materials provided to enhance their understanding to the fullest extent.[16] The digital learning environment is customised to the student's needs, not the other way around. For example, AI can change its teaching method: if a student learns the material quickly, the system can reduce the level of support; if they face difficulties, the support will be increased.[17] This approach can be especially useful in the education of people with special needs. The main advantage of this type of learning is the ability to fine-tune the learning content, allowing students to achieve their goals. This individualised approach gives students the opportunity to progress at their own pace, filling in specific knowledge gaps, and exploring topics of interest.

In this article, the functionality of various adaptive learning mechanisms within the realm of leveraging artificial intelligence to customize training programs and boost motivation, while considering psychological factors was examined.[18] This will enable us to comprehend how these technologies can deliver tailored services that cater to the unique needs of users, based on their specific requirements and proficiency level. First, it is important to note that adaptive learning is only possible if there is educational data, which usually arises from the interaction between a student and a Chabot. This data contains information about the student's profile, including the pedagogical strategy and the learning domain.[19] They allow for dynamic adjustment of the content that artificial intelligence offers depending on the learning objectives. In addition, this data can be used to provide instructions to the student during practical tasks and conduct individual cognitive diagnostics.[20] Next, the different stages of the learning process that can be implemented through adaptive learning were analysed.

Given the rapid development of technology and the growing influence of information systems on the educational process, the use of artificial intelligence (AI) to personalise curricula is becoming increasingly relevant.[21] AI-based systems have the potential to significantly improve the learning experience by adapting it to the individual needs and characteristics of each student. It is especially important to take into account the psychological dimensions of learning, as motivation, emotional state, and self-regulation skills affect the efficiency of learning.[22] The use of AI can not only adapt educational content but also actively support student motivation, helping them achieve better results.

This article is based on the related scientific literature and examines various aspects of the integration of artificial intelligence into education, focusing on how technology can be used to create individualised curricula that take into account the psychological characteristics of students. The study also aimed to analyse existing adaptive learning mechanisms and their effectiveness in the context of motivation. Therefore, this paper aims to underscore the significance of integrating technological solutions to enhance contemporary society. In the context of using artificial intelligence to personalise curricula and increase motivation to learn, taking into account psychological aspects, Iskakova identifies the main stages of learning (table 1):

Table 1. The main stages of learning with artificial intelligence	
Stage	**Action**
The stage of knowledge acquisition	This stage emphasises the introduction of new concepts, ideas and information that are not yet known to students. The main goal is to acquire new knowledge. To facilitate their integration, adaptive learning methods use the latest advances in cognitive science, which helps in understanding how the brain works during learning. This means that AI, taking into account the student's profile, offers the most effective teaching methods.
The stage of knowledge consolidation	A key aspect is the consolidation of the acquired knowledge, which ensures its stable and long-term assimilation. Using adaptive learning, students can be offered additional resources and methods that stimulate active revision of previously learned skills and concepts. These can include interactive exercises, personalised tests, as well as simulations or case studies specifically tailored to their individual needs.
The stage of knowledge application	The goal of this stage is to put the knowledge into practice in real or simulated environments. Adaptive learning allows learners to practice skills through a variety of scenarios, projects or practical tasks, which makes it possible to transfer this acquired knowledge to real-life situations. This stage is crucial for deepening the memorisation and assimilation of the material, as well as developing practical skills.
Source: [23]	

To implement these strategies, adaptive learning involves several key processes as demonstrated in table 2:

Table 2. The key strategies of adaptive learning	
Strategy	**Process**
Identification of the student's profile	Collecting data about a student, including their learning experiences, preferences, and strengths or weaknesses, allows you to create an individualised profile for more precise learning customisation.
Adaptation of learning by results	After defining a profile, the adaptive learning system adjusts content and activities according to student performance.
Continuous refinement of the profile	When interacting with the system, it continuously collects and analyses new data about the student's skills and preferences, which allows you to refine the profile and increase the accuracy of adaptations.
Regular assessments	Conducting assessments helps measure student progress and determine their level of proficiency in various areas, adjusting the learning process based on the results.
Monitoring of acquired skills	This process involves regular monitoring of the knowledge and skills acquired by the student over time, which ensures that the training is adapted to their needs.
Source: [24]	

For artificial intelligence to apply a practical approach in adjusting curricula to consider the psychological aspects of students, the instructor must initially furnish it with the essential data and strategies to validate the course.[25] Indeed, in order for adaptive learning to support the student in acquiring the knowledge and skills necessary to successfully complete the course, the instructor must clearly define and structure the types of tasks and methods of completion. In other words, the instructor should make it clear to the tool what expectations are placed on the student and how to meet those expectations so that the adaptive learning equipment can guide the student to useful resources and exercises to learn. This also helps to avoid overloading the learner with unnecessary information within a particular course.

In this context, Khasawneh & Al-Amrat list the benefits of adaptive learning. According to the scientists, they are that by adapting the learning process to the individual needs of students, it increases their interest and improves the memorisation of educational material. It provides more interactive and engaging content than traditional e-learning systems. Adaptive learning contributes to greater student engagement as it offers the course in a new form that involves active interaction with the content, thereby creating more opportunities for comprehension. In addition, adapting the difficulty of tasks to the learner's level provides optimal stimulation and maintains a high level of attention.[26]

Similarly, academics contend that to gain a deeper understanding of how task complexity adjusts to students' levels, it is crucial to take into account Vygotsky's concept of the "zone of proximal development".[27] This theory argues that tasks that are too easy can cause boredom and not contribute to student development, while tasks that are too difficult can lead to a decrease in motivation. The goal of this concept is to find the optimal level of difficulty (the zone of closest psychological comfort) and offer tasks and activities that correspond to this zone. This enables students to access additional information and advance in their studies based on their proficiency level. It is important to recognize that while the concepts of psychological comfort and adaptive learning are distinct, they can be integrated in specific educational contexts.[28] Understanding the psychological component helps to understand the foundations of adaptability inherent in adaptive learning. [29] While adaptive learning does not have to be literally based on this concept, it does pick up on the idea behind it to a large extent, which makes it interesting to discuss this concept, which is not always associated with adaptive learning.

The use of psychological comfort technology gives the teacher more opportunities to pay attention to students who are experiencing difficulties. In fact, the classes focus on autonomous learning activities that require little or no teacher involvement.[30] This, in turn, frees the instructor from the need for a constant communication channel as students work independently, allowing the instructor to focus on other pedagogical aspects. In addition, it meets the different needs of distance learning.

However, there are limitations to adaptive learning. Scientists emphasise that the use of such technologies changes teaching methods compared to traditional lectures by a teacher.[31] Indeed, the way information is transmitted is changing, and communication channels are becoming more diverse and enriched, which changes the way students perceive the material. As a result, students are acquiring more in-depth knowledge, which requires them to have prior knowledge and higher standards.[32] The heightened demands may adversely affect students with lower proficiency levels who struggle to adjust, potentially hindering their learning progress.

To mitigate this adverse effect, it is crucial to offer resources that assist students in comprehending how to effectively utilize these tools for optimal outcomes. This approach will aid in diminishing disparities in proficiency levels among students.

One of the problems with adaptive learning is that students tend to be isolated rather than interacting with their classmates. In fact, students work autonomously on their computers, which does not promote communication between them (there is no requirement for discussions to seek clarification or gain a deeper understanding of the material). Nevertheless, communication (group work, debates) is an important aspect of the learning process. In recent years, students have witnessed the rapid development of intelligent technologies, including the ChatGPT tool. Based on numerous interviews with professors, the use of ChatGPT (chabot) has become more popular than other AI-related technologies. The chatbot was also used to reduce workload, enrich knowledge (definitions, explanations of concepts), and to apply this knowledge in practice (exercises, questionnaires on specific topics).[33]

However, it is worth noting that ChatGPT is only the tip of the iceberg when it comes to AI-related technologies. It provides students with more content and creates better conditions for learning and practice. However, there is currently insufficient evidence on the positive impact of AI on students. Therefore, it is premature to make definitive conclusions regarding the positive or negative impacts of this tool, given that its utilisation and evaluation are still limited. However, it is essential to embrace the evolving landscape and incorporate new tools that may emerge in the future. Researchers urge educators to design assessments where the use of artificial intelligence will not affect the results, thereby ensuring that students' skills and learning goals are validated.[34] The table 3 illustrates how different types of technology can be applied in specific areas of education, each accompanied by a brief description of its benefits and examples of specific tools for each type.

Table 3. Technologies related to artificial intelligence		
Type of technology	**Usefulness**	**Tools**
Chatbot	AI responds like a human using natural language. This tool offers a wide range of applications.	ChatGPT
AI recognition	The ability to find out whether a text was written by artificial intelligence or a human.	Copyleaks
Text-to-Speech and Avatar	Convert text to audio and video using a humanoid avatar.	Synthesia
Assistance in conducting research	The chatbot documents these answers with external sources.	Perplexity Elite
Help with writing	This is a technology that allows you to paraphrase text.	Quillbot Smodin Auteur
Edit audio and video	Clean up an audio file audio file (sound quality noise removal, subtitles, etc.).	Adobe Podcast Description Transcription
Create images	Create images from text entered by users	Midjourney
Source: [35]		

It is important to emphasise that the use of these technologies must be done in an ethically responsible manner, respecting copyright, preventing academic fraud, and ensuring data confidentiality. These technologies serve as supportive tools, but should not replace human interaction and expertise of teachers and researchers. It is also necessary to understand the sources of possible biases and shortcomings. Contrary to common assumptions, flaws are not directly related to the algorithm underlying artificial intelligence, but arise during data training. This means that when people provide information to the algorithm, it has the ability to "learn" and accumulate knowledge. In the process of machine learning, the model receives data and processes it. When the data is representative, the process is free of bias. Conversely, if the dataset is biased, it can introduce distortions in the algorithmic processing, resulting in systematic deviations in the model's outcomes.

In the case of ChatGPT, it becomes apparent that it is relatively easy to manipulate the algorithm, which can increase biases and shortcomings. For example, if you submit a query containing racist information, artificial intelligence will capture and distribute this information, reaching a wide audience, including students. Such effects are called "resonant". As shown in table 4 there are several categories of artificial intelligence shortcomings: algorithmic biases, social shortcomings, technical and historical problems:

Table 4. Disadvantages of ChatGPT for personalised learning programs	
Disadvantages	**Explanation**
Data shortcomings	Depending on the data used to populate ChatGPT, it will take into account the social and ethical shortcomings of the data.
Disadvantages of data selection	The data used for the ChatGPT were selected by people who themselves have their own way of thinking and point of view (own bias). This can affect the quality of the answers given by the tool (lack of diversity).
Contextual shortcomings	Depending on the question and its context, natural language can interpret the context of the discussion incorrectly or biased.

Lack of understanding	When you ask a question, ChatGPT may not understand the structure of the sentence. This is especially true for puns or ambiguous sentences. This affects the quality of the answer.
Disadvantages of cause and effect relationships	This occurs when ChatGPT draws a false conclusion (an error in reasoning) about events that are coincidental but are actually incorrect (incorrect conclusions about two related things).
Disadvantages due to cultural context	Depending on how and by whom ChatGPT is trained, it will be influenced by the cultural context of the datasets provided to it.
Language bias	ChatGPT receives data in natural language. The impact of artificial intelligence on education can be ambiguous or have different connotations.
Disadvantages of subjectivity	ChatGPT is trained on datasets. The opinions and views of their authors may be reflected in the answers provided by ChatGPT.
Disadvantages of representation	For some questions, ChatGPT will not receive enough information to provide a truthful answer. It has not seen all the scenarios and, as a result, its answer will not be representative.
Disadvantages in terms of recency	ChatGPT may have problems with historical events, due to the age of the event and therefore the lack of data associated with it. (ChatGPT learns from data based on recent events).

Source: [36]

The table 5 demonstrates that however, there are also advantages.

Table 5. Advantages of ChatGPT for personalised learning programs	
Advantages	**Explanation**
Access to information	A large amount of relevant information that provides access to additional resources.
Personalized training	Tailored to the individual needs of each student (skill level, etc.).
Improving skills in letters	Formulating clear, well-worded questions to ensure that the questions are as relevant as possible.
Help with your homework	Can provide answers to questions that are of concern to the student.
Extended accessibility	Facilitates learning for students with special needs (difficulties with writing, etc.).

Source: [37]

In order to understand how students perceive new technologies in the educational environment, it is important to analyse their potential attitudes toward such tools. Today's students have extensive access to digital technologies in both their personal lives and academic pursuits. They dedicate approximately twice as much time to screen time outside of school compared to their time spent in the classroom.

In order for these tools to be truly useful, students need to receive appropriate support and training to enable them to understand how to work effectively with digital technologies. It is important that a student does not rely solely on these tools to solve all of their assignments, as this can be detrimental to the development of critical thinking and independent analysis. As the variety of resources available is vast, too much information can lead to overload, making it difficult to focus on key topics.

To address these issues, the use of intelligent tutors can be an effective solution, as they can help students' complete exercises in a gradual manner and provide resources that meet their individual needs. In addition, these tutors can detect moments of inattention, which allows teachers to respond in a timely manner to loss of motivation (reduced attention, decreased interest in learning). Thus, the integration of artificial intelligence into the educational process not only personalizes curricula but also increases student motivation, taking into account the psychological aspects of their learning.

DISCUSSION

This study undertakes a literature review encompassing a range of knowledge applications and diverse viewpoints on the integration of technology in education, including perspectives from both educators and students. This analysis provided an overview of the numerous perspectives of scientists and educators on the growing integration of artificial intelligence into the educational process, including personalised learning programs. Moreover, the connections between the opinions of scientists and their specific areas of expertise are revealed, which allows us to better understand how their views fit into the context of professional activity. [38]

These observations provide important information about the perception and use of artificial intelligence in practical and applied contexts, allowing us to combine different perspectives and understand the current situation in this area. Integrating AI into the educational system opens up new perspectives for the student experience in an effort to improve learning. [39] Traditional classrooms are transforming into dynamic learning environments where AI technologies play a key role. This transformation not only changes the way teachers teach, but also actively engages students in their learning process.

The use of artificial intelligence in education opens up new opportunities to support learning, in particular

through the integration of these tools into practical work. This enables you to offer students additional resources and feedback without needing to complete tasks for them. For instance, AI can generate questions and exercises based on the material presented and provide corrections, which is particularly useful for students.[40] Scientific notes in a tangential analysis that when introducing AI into the learning process, teachers will have to adapt their assessment methods by changing the format of assignments. In particular, they can focus on oral testing, expand the scope of material for written papers, or introduce open-ended questions that require critical thinking and analysis.[41]

When discussing the impact on learning, it is worth considering the differences between modern teaching methods and traditional approaches. Shakun's research has demonstrated that the introduction of artificial intelligence technologies has greatly altered the way information is presented to students, unlike the time before such technologies were accessible. The transition to the use of AI technologies in the learning environment leads to the optimization of the learning process.[42]

In a study by Shrivastava, Jain, Vishwakarma, Bhagyalakshmi, Tiwari, they point out that in the past, in order to learn about a particular topic, students would go to the library to find relevant books. Nowadays, information can be obtained by simply accessing the Internet or using artificial intelligence. Scientists note that the use of such technologies also raises certain challenges.[43] Starynskyi and Zavalna cite problems that may arise in the absence of AI, as well as possible solutions that include its integration. This makes it possible to identify the reasons why teachers should implement such tools and shows how AI can optimise the educational process.[44]

Tsekhmister points out in his study that the data that students enter into these tools will be tracked from various aspects.[45] When using such technologies, students have to provide data (e.g., questions, exercises, etc.), which allows AI to form a student profile. Thus, AI can categorise students according to their level of knowledge and type of interaction.[46] Depending on the current state of their learning (difficulty, grades, etc.), AI offers the most appropriate content.[47]

However, the introduction of new technologies can also lead to a phenomenon known as "ilextronism," which refers to the lack of knowledge required to use electronic tools effectively.[48] This is a projection of the concept of illiteracy in the digital realm.[49] Individuals lacking the essential skills to operate electronic tools may find themselves at a disadvantage in comparison to their peers.[50,51]

Therefore, the results of the study suggest that incorporating artificial intelligence into courses can enhance student engagement, personalise pedagogical strategies, and offer additional learning opportunities. The integration of AI into education opens up new opportunities to enrich the student experience, contributing to the improvement of the learning process, motivation, and thus learning outcomes.

CONCLUSIONS

In conclusion, the integration of artificial intelligence into education opens up significant opportunities for education. Based on the material reviewed, we can conclude that using artificial intelligence to personalise curricula and increase motivation to learn is an important and effective step for integrating AI into the educational process, both for students and teachers. To maximize the effect of implementing these technologies, teachers need to first answer a number of questions that will help them understand the possibilities of integrating AI into their courses. By identifying each stage of this process, individuals will be able to draw logical conclusions and make informed recommendations. Thus, proper integration of artificial intelligence can significantly improve the learning experience and motivation of students.

To summarise, the integration of artificial intelligence into the educational process opens up significant prospects for rethinking teaching and learning methods. Indeed, AI is already being actively implemented in the educational sphere. Some teachers are not yet ready to use this tool due to existing shortcomings and limitations, but they realize that its integration is inevitable in the near future. Others perceive artificial intelligence as a tool that can increase student engagement, personalize pedagogical methods, and expand learning opportunities, although research does not always confirm its effectiveness at the moment. However, educating teachers and students on the responsible use of these technologies can significantly increase the benefits of AI. This helps students to realise where they should focus to get what machines cannot offer. It is important to consider the use of AI as an additional support. This educational transformation will require an in-depth examination of the values and goals that the education system promotes. Ethical and practical issues, such as data protection, assessment adequacy, and the importance of human interaction, must also be considered. An analysis of various studies and articles has revealed numerous aspects of the introduction of artificial intelligence in modern classrooms.

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CONFLICT OF INTEREST
The authors declare that there is no conflict of interest

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