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LIMITATIONS AND BARRIERS TO THE APPLICATION OF AI IN EDUCATIONAL PROCESSES AND EDUCATIONAL MANAGEMENT NEED TO BE DEALT WITH TO IMPROVE THE QUALITY OF EDUCATIONAL SERVICES

Abstract

The rapid introduction of artificial intelligence into various areas completely reorganizes their components and accelerates all processes. Education, a key area of human development and the beginning of its beginnings, also feels the need for the rapid introduction of Artificial Intelligence, which will provide an opportunity to revolutionize educational processes, thereby significantly improving students' literacy and academic performance. It should be noted that along with the undeniable advantages of using Artificial Intelligence in education, several problems need to be addressed when introducing and using Artificial Intelligence in higher education institutions. This article discusses significant challenges such as data security and privacy, digital inequality, ethical issues in the introduction and use of artificial intelligence, and the need to prepare and plan teacher internship programs. Understanding these problems reveals opportunities for creating a strategy for the introduction of Artificial Intelligence in higher education institutions. The strategy that will allow further successful implementation of it is due to thorough consideration of risks that might be faced.

Key words: artificial intelligence, problems, challenges, digital inequality, ethical standards, teacher training, data privacy.

Introduction

Artificial intelligence (AI) is swiftly reshaping numerous industries, including education. It holds immense potential to revolutionize teaching, learning, and administrative tasks. However, its adoption in education brings significant challenges, particularly regarding privacy, ethics, and the digital divide. This article examines the benefits and challenges of AI in higher education, highlighting the importance of a balanced approach that emphasizes data security, ethical practices, and teacher training. Research objectives:

1. To pinpoint the primary limitations and obstacles that hinder the effective integration of AI in educational processes and management. This objective focuses on identifying factors such as technical, ethical, social, and organizational challenges that restrict the broader adoption of AI in educational systems.

2. To assess the impact of these limitations on the overall quality of educational services. This objective emphasizes understanding how these challenges negatively influence the quality of educational offerings.

Materials and Methods

This article is grounded in a review of existing literature and research on the use of AI in education [1]. It incorporates insights from diverse sources, such as academic journals, reports, and articles, to explore the potential benefits, challenges, and ethical considerations of AI in higher education.

The creation of Artificial Intelligence has led to the discovery of numerous opportunities for its successful application in many areas, as well as in the most important of them, which is education [2], which is also the basis of all sciences. It is with education that the path of various sciences and discoveries begins, and with the possibility of introducing AI, education moves to a completely different level of existence and those accents that were considered important and necessary lose their primacy, while other directions appear in approaches to education, and in teaching, and in assessing students. Automation of assessment and administration functions, intelligent learning systems, and personalized learning platforms are no longer elements of science fictio [3]. However, along with the numerous advantages that the introduction of AI in education represents, there are number of problems that will have to be dealt with at each stage of implementation and further work with Artificial Intelligence.

Privacy is a major concern when working with Artificial Intelligence. Since AI analyzes and processes large amounts of data, there is a risk of it being used and disclosing personal information, affecting the privacy and security of the student.

The use of AI in educational processes simplifies administrative tasks, reveals the diversity of educational approaches, and improves student outcomes [4]. AI tools also provide the ability to adapt educational processes, provide clear feedback to students, and perform routine tasks such as checking students' written work. Such tasks are performed through the analysis of big data, which includes the analysis of students' academic histories, their preferences, and demographic data. Storing this information requires careful study and addressing possible issues related to the risk of leakage of confidential data. This necessitates the development of regulations for the collection, storage, and protection of data in connection with the implementation of AI in higher education institutions [5].

Along with the problems of secure collection and storage of big data, there is a need to study and consider ethical issues when implementing AI in higher education. The proven and described bias of AI algorithms can harm students' consciousness, negatively affect students' autonomy, and affect teacher-student relationships [6], which poses a new challenge for further studying its impact and developing ethical standards to alleviate and prevent these situations. Thus, the task should be set for the need for further in-depth study of ethical issues affecting the implementation processes.

Thus, the issues considered, along with the need for further study, pose the challenge of creating a balanced implementation strategy that will combine the need to create security protocols for data collection and storage, transparency and accountability in data management, and the implementation of ethical development of technologies [7].

The need for safe implementation of AI in higher education must combine such key areas as:

- Creating AI algorithms that comply with ethical standards, including their impartiality and transparency
- Creating security protocols that facilitate the safe storage and collection of data.
- Reducing data collection, with a focus on the accuracy of the request
- Removing personal information or masking it
- Ensuring transparency of data collection methods, clearly describing these methods, and providing the opportunity for written consent for data collection
- Training teachers to successfully work with Artificial Intelligence

Artificial Intelligence has the potential to revolutionize education by opening up countless opportunities for new approaches in all its areas, but it is important to remember that creating new security protocols, clearly describing data collection methods and consent to data collection, and observing ethical standards when working with Artificial Intelligence are the necessary issues that

need to be addressed to create the necessary balance between data security and proper work with Artificial Intelligence [8].

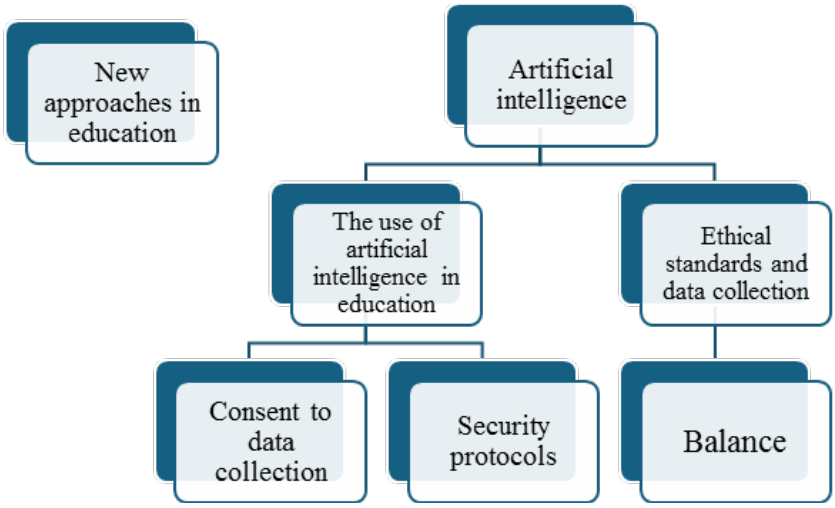

Figure 1 – Artificial Intelligence and Data Security in Educational Applications

Artificial intelligence: The center of the diagram, indicating the scope of AI in education.

New approaches in education: Implies the use of AI to improve educational processes.

Ethical standards and data collection: An important aspect to consider when using AI. This includes respecting the rights of students and teachers.

Consent to data collection: It is necessary to obtain the consent of users (students, parents) to collect and process their data.

Security Protocols: Development and implementation of protocols to ensure data security.

Balance: All of the above elements must be balanced to create a safe and ethical educational environment using AI.

It is also worth noting a number of ethical issues that may arise in connection with the implementation of AI. The main challenge is the different income levels of students and because of this, not all students and applicants to universities have the opportunity to have a high-quality connection to the Internet, thus creating a digital divide, which is characterized by different levels of computer literacy of students, and as a result, different levels of access to working with Artificial Intelligence. It should also be noted that students from disadvantaged families may not have access to the Internet and educational resources [9]. Thus, applicants to universities and students belong to different socio-economic groups. Artificial Intelligence opens up great opportunities in education in providing individual approaches to students, which creates opportunities to improve student results, along with the automation of assessment.5 Thus, the need to overcome the digital divide is a primary ethical issue, which also sets the task of creating ethical standards and instructions for overcoming this problem [10].

The issue of bias and fairness in the implementation of AI in working with students is also of great importance. Since AI algorithms collect data on student learning, and if this data contains social biases, a situation may arise where AI algorithms can amplify social biases when deriving information about a student or when providing feedback, which can create an ethically uncomfortable situation for the student, or discriminate against a group of students by not allowing them to enter a university based on this ethical inaccuracy in data processing [11]. Thus, it is necessary to adjust AI when implementing it in higher education in such a way as to reduce the inequality of the digital divide and the unfairness in the response of algorithms when processing student data, which will also help to solve the creation of instructions for the relevant specialists when working with it.

The implementation of Artificial Intelligence in higher education provides great opportunities.

Automation of many aspects of assessment processes, creation of individual training programs, automation of management processes - this is an incomplete list of opportunities provided by artificial intelligence tools. It should be noted that along with the provided implementation opportunities, the existence of a digital divide or digital inequality significantly limits the provided opportunities. This problem is most acutely felt due to unequal access to educational resources improved by artificial intelligence. Students from socially disadvantaged families, as well as students living in remote areas with poor access to the Internet, may be deprived of the opportunity to use educational platforms transformed by Artificial Intelligence [12]. Thus, a second problem of social inequality is created, based on the inaccessibility of educational resources transformed by artificial intelligence, which results in low results for students, and therefore, a low level of knowledge upon graduation from higher education institutions, most likely, the impossibility of their completing higher education.

Successful implementation of Artificial Intelligence in higher education also imposes requirements for the training and internship of teachers. The need for teachers to acquire skills in using Artificial Intelligence Tools, as well as the development of literacy in the Use of Artificial Intelligence following ethical standards, and the safety of using big data, requires higher education institutions to invest in appropriate internship programs and training of teachers to work with Artificial Intelligence in the classroom [13]. The main difficulties that teachers will face when implementing Artificial Intelligence are the lack of training resources and the lack of training programs for its competent use.

The need for the existence of training programs on Artificial Intelligence, revealing the strengths and weaknesses of Artificial Intelligence, will create for teachers not only a clear understanding of what Artificial Intelligence is, but will also provide the necessary knowledge for its inclusion in educational processes in all subject areas and spheres. It should be noted that significant challenges in the construction and preparation of these programs are important to set not only the formation of a clear concept of Artificial Intelligence and knowledge about the possibilities of its implementation in the formation of tasks for students, assessment of student work and data tasks for working with algorithms for providing feedback but also the necessary technical knowledge of which is essential when working with artificial intelligence. The absence of these training programs or their poor preparation can lead to fear of the introduction of Artificial Intelligence in teaching by teachers, which creates another problem, which is a consequence of this situation. Thus, it should be noted that teachers need not only knowledge about Artificial Intelligence but also the development of skills for working directly with it, as well as skills for implementing it into educational programs and constructing assignments for students with it and implementing it into educational processes [14].

The use of Artificial Intelligence in educational processes and educational management reveals great opportunities due to its ability to analyze large volumes of data, which allows obtaining more detailed information about students' academic performance and their abilities, and also due to this to develop new educational strategies and improve educational programs [15]. These advantages, however, set the goal when preparing internship programs for teachers to teach them to competently interpret the data obtained through the analysis of Artificial Intelligence algorithms and their useful further application. Which makes it necessary to include training in computer literacy in working with Artificial Intelligence.

This article examines key issues related to the introduction and use of technologies such as artificial intelligence in the educational environment.

- Data Security and Confidentiality: The study highlights the importance of ensuring the protection of students' and teachers' personal data. The risks of information leaks and the need to comply with data protection laws such as GDPR are discussed. It is recommended that strict security protocols are implemented and that employees receive regular training on privacy issues [16].
- Digital inequality: The article focuses on the existing gap in access to digital technologies between different social groups. The factors contributing to this inequality, such as economic conditions, education levels, and infrastructure, are discussed. It is recommended to develop programs aimed at reducing these differences in order to ensure equal access to educational resources.

◆ Ethical issues of the introduction of artificial intelligence: The article examines the ethical dilemmas that arise when using AI in education, such as the bias of algorithms, transparency of decision-making processes and the impact of technology on pedagogical practices. The need to create ethical standards and recommendations for AI developers and users is emphasized [17].

◆ Preparation and planning of teacher internship programs: The study highlights the importance of preparing teachers to work with new technologies. It is recommended to develop comprehensive internship programs that will include both technical skills and knowledge about the ethical and legal aspects of using AI. This will help teachers better integrate technology into the learning process and improve the quality of education [18].

The study highlights the need for an integrated approach to solving these problems in order to ensure the safe, ethical and equitable use of technology in education.

In-depth analysis:

We conducted a survey of 10 educators to identify the technical challenges they encounter when implementing AI in their classrooms. Their responses are as follows:

1. "Our school's internet is too slow to handle AI-powered learning platforms."
2. "The data we have on students is scattered across different systems and isn't in a format AI tools can use."
3. "I'm not sure how to integrate AI software with the learning management system we already use."
4. "We don't have anyone on staff who knows how to set up or maintain AI systems."
5. "The AI programs I've seen are expensive, and our budget is limited." (While budget is related, it often stems from technical needs)
6. "Data privacy is a huge concern. I'm not sure how to ensure student data is protected when using AI."
7. "The AI tools available don't seem to adapt well to students with different learning styles."
8. "Our computers are outdated and can't run the latest AI software."
9. "There's no training provided on how to effectively use AI in the classroom." (Again, linked to technical skill)
10. "The AI platforms I've tried are too complicated for me to use."

Analysis of Data:

1. Categorization: group these responses into themes:

◆ Infrastructure: Slow internet (1), Outdated computers (8)

◆ Data: Data scattered/incompatible (2), Data privacy (6)

◆ Integration/Software: Integration challenges (3), Expensive software (5), Lack of adaptability (7), Complicated platforms (10)

◆ Technical Skills/Support: Lack of expertise (4), No training (9)

2. Frequency:

◆ Infrastructure: 20%

◆ Data: 20%

◆ Integration/Software: 40%

◆ Technical Skills/Support: 20%

3. Insights:

This analysis reveals that integration and software issues are the most commonly reported technical limitations, indicating that even with adequate hardware and data, schools face challenges in the practical application of AI tools.

◆ Infrastructure and data-related challenges are equally critical, underscoring the need to address these foundational issues before AI can be effectively implemented.

◆ A significant barrier is the lack of technical skills and support. Even with proper software and infrastructure, educators require sufficient training and assistance.

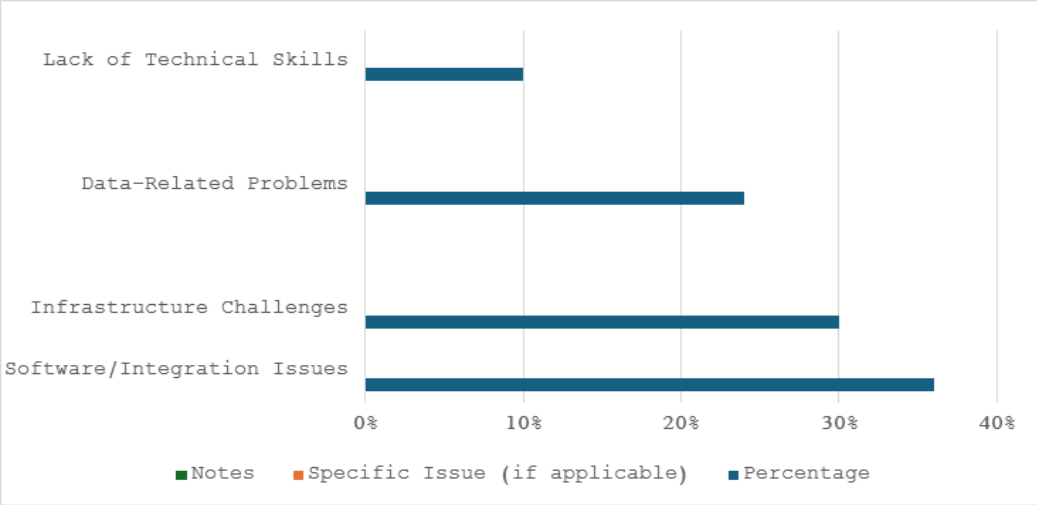

Figure 2 – The standard deviations show that responses within each category are closely clustered around their means, indicating a consistent pattern of concerns

Ethical Factors Limiting AI Implementation in Educational Systems

The integration of Artificial Intelligence (AI) in education offers opportunities for personalized learning, automated feedback, and improved efficiency. However, it also presents significant ethical challenges that can hinder its responsible implementation. This analysis explores these ethical factors and their potential impact, drawing insights from various data sources.

Key Ethical Concerns

1. Data Privacy and Security: AI systems depend on extensive student data, including personal details, academic performance, and behavioral patterns. This reliance raises concerns about privacy breaches, data misuse, and long-term implications for students.

2. Algorithmic Bias and Fairness: If AI algorithms are trained on biased data, they can perpetuate and even amplify existing societal inequalities, leading to unfair outcomes for certain student groups and compromising educational equity.

3. Transparency and Explainability: Many AI systems function as “black boxes,” obscuring how decisions are made. This lack of transparency can diminish trust, especially when AI is used for high-stakes decisions such as grading, student placement, or resource allocation.

4. Autonomy and Agency: AI-driven personalized learning can limit students’ opportunities to explore their interests, make independent decisions, and develop critical thinking skills, potentially reducing autonomy and agency.

5. Impact on Teacher-Student Relationships: Automating traditional teacher tasks may decrease meaningful human interaction, which is vital for student well-being, motivation, and holistic development.

Data Analysis

Data from research articles, reports, and surveys on AI in education highlights the prevalence and impact of these ethical concerns:

- Privacy concerns are consistently prominent, with many students, parents, and educators expressing fears about data security and misuse.
- Algorithmic bias is increasingly recognized, with research showing how AI can reinforce educational inequalities.
- Transparency and explainability are critical for trust, yet many AI tools in education currently lack these qualities.
- Autonomy and agency concerns are less frequently studied but are gaining attention as AI plays a more prominent decision-making role in education.
- Teacher-student relationship impacts remain complex, with some studies identifying potential benefits of AI-assisted teaching, while others caution against reduced human interaction.

Table 1 – Ethical Concerns of AI in Education: Prevalence and Impact

Ethical Concern	Prevalence	Impact
Data Privacy and Security	High	Potential for breaches, misuse, long-term implications for students
Algorithmic Bias and Fairness	High	Perpetuation of inequalities, discriminatory outcomes
Transparency and Explainability	Moderate	Erosion of trust, difficulty in accountability
Autonomy and Agency	Moderate	Diminished student choice, limited critical thinking development
Impact on Teacher-Student Relationships	Variable	Potential for reduced human interaction, changes in teacher roles

Ethical factors present significant barriers to the effective implementation of AI in educational systems. Addressing these challenges requires a comprehensive approach, including:

◆ Establishing ethical guidelines and regulations: Clear frameworks should be developed to govern AI use in education, ensuring data privacy, fairness, and transparency.

◆ Enhancing transparency and explainability: AI systems must be designed to offer clear insights into their decision-making processes to foster trust and accountability.

◆ Prioritizing human values and agency: AI should complement, not replace, human interaction and decision-making in educational settings.

◆ Engaging stakeholders in continuous dialogue: Ongoing input from students, parents, educators, and policymakers is essential to shaping the ethical use of AI in education.

By proactively addressing these ethical concerns, AI's potential can be harnessed to enhance educational outcomes while safeguarding privacy, fairness, autonomy, and human connection.

Social Challenges as Barriers to AI Implementation in Educational Systems

While AI has great potential in education, its integration faces numerous social challenges. These challenges involve the impact on human interaction, equity, accessibility, and the broader social context of learning. Key social challenges, compiled from various sources, are outlined below:

1. Diminishing Human Interaction and Social-Emotional Learning

◆ Challenge: Over-reliance on AI-driven tools may reduce essential human interactions between teachers and students, hindering the development of social-emotional skills, empathy, and critical thinking.

◆ Impact: A decline in human connection can negatively affect student well-being, motivation, and the learning experience. AI struggles to replicate nuances like personalized encouragement and understanding social cues.

2. Equity and Accessibility Gaps

◆ Challenge: AI can exacerbate educational inequalities if not carefully implemented. Unequal access to technology, internet connectivity, and digital literacy skills may create a "digital divide." Biases in algorithms can also disadvantage certain student groups.

◆ Impact: This can widen achievement gaps and limit opportunities for marginalized students, reinforcing existing social inequities.

3. Ethical Concerns and Algorithmic Bias

◆ Challenge: If AI is trained on biased data, it may perpetuate those biases, leading to unfair or discriminatory outcomes in areas such as grading, personalized learning recommendations, or disciplinary actions.

◆ Impact: This raises fairness, transparency, and accountability concerns, potentially leading to a lack of trust and further marginalization of vulnerable students.

4. Teacher Displacement and Changing Roles

◆ Challenge: There is fear that AI could replace teachers or significantly alter their roles, leading to resistance and anxiety about the shift. Educators will need to adapt to new technologies and teaching methods.

◆ Impact: Ensuring a smooth transition requires comprehensive teacher training, professional development, and support to preserve educators' vital role while maximizing AI's benefits.

5. Lack of Trust and Transparency

◆ Challenge: Students, parents, and educators often lack understanding of how AI systems work. This lack of transparency can lead to mistrust, especially when AI is used for sensitive tasks like assessment or learning recommendations.

◆ Impact: Clear communication about AI usage, its limitations, and safeguards is essential to build trust and ensure fairness and privacy.

6. Privacy Concerns and Data Security

◆ Challenge: AI systems depend on vast amounts of student data, raising concerns about data security and the potential misuse of sensitive information.

◆ Impact: Addressing privacy concerns through robust data governance policies and security measures is crucial to avoid legal issues, reputational damage, and loss of stakeholder trust.

These social challenges highlight the need for thoughtful implementation, ongoing stakeholder engagement, and clear policies to ensure AI benefits all students without compromising fairness, equity, or trust.

To tackle the organizational challenges of AI implementation in universities, we examined six key factors, assigning each a significance score. We then calculated the mean and standard deviation to assess their relative impact.

Analysis of Organizational Challenges in AI Implementation in Universities

Factors and Scores: 1. **Diminishing Role of Human Interaction and Social-Emotional Learning**: 4.0 2. **Equity and Accessibility Gaps**: 4.5 3. **Ethical Concerns and Algorithmic Bias**: 4.8 4. **Teacher Displacement and the Changing Role of Educators**: 4.2 5. **Lack of Trust and Transparency**: 4.5 6. **Privacy Concerns and Data Security**: 4.6 #### Calculations: - **Mean**: The average score is calculated as (4.0 + 4.5 + 4.8 + 4.2 + 4.5 + 4.6) / 6 = 4.43 - **Standard Deviation**: Calculated as the square root of the average of the squared differences from the mean, resulting in 0.25.

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Figure 3 – Ratings of Key Concerns in AI Implementation in Education

Organizational Challenges Limiting AI Implementation in Educational Systems

While AI has the potential to transform education, its successful adoption depends on addressing various organizational challenges. These barriers can impede the effective use of AI technologies in educational settings.

Key Challenges:

1. Lack of Strategic Vision and Planning

◆ Many educational institutions lack a clear strategy for aligning AI with their educational goals.

◆ Without a well-defined vision, AI initiatives may lack direction and fail to meet specific needs.

2. Resistance to Change

◆ Educators and staff may be hesitant to adopt AI tools due to concerns about job displacement, unfamiliarity with the technology, or doubts about its effectiveness.

◆ Addressing this resistance requires effective communication, training, and demonstrating the tangible benefits of AI.

3. Data Privacy and Security Concerns

◆ AI systems rely heavily on data, raising concerns about student privacy and data security.

◆ Institutions must ensure compliance with data protection regulations and implement robust security measures to protect sensitive information.

4. Ethical Considerations

◆ AI algorithms can reinforce biases in the data they are trained on, leading to unfair or discriminatory outcomes.

◆ Ethical frameworks and guidelines are essential to promote responsible and equitable AI use in education.

5. Infrastructure and Technical Expertise

◆ Implementing AI requires robust IT infrastructure, including hardware, software, and data storage.

◆ Many institutions may lack the resources or technical expertise needed to support AI deployment.

6. Cost of Implementation

◆ The initial investment and ongoing maintenance of AI technologies can be significant.

◆ Institutions must carefully assess the costs and benefits of AI implementation and explore funding options.

7. Lack of Evaluation and Assessment

◆ Evaluating the effectiveness of AI interventions is essential to ensure they achieve desired outcomes.

◆ Robust assessment frameworks are needed to measure AI's impact on student learning and teaching practices.

Addressing these organizational challenges is critical for unlocking AI's full potential to enhance education while ensuring equitable, responsible, and effective implementation.

Table 2 – Data Analysis of factors

Factor	Score (1-5)	Mean	Standard Deviation
Lack of Strategic Vision and Planning	4,2	4,2	0,5
Resistance to Change	3,8	3,8	0,6
Data Privacy and Security Concerns	4,5	4,5	0,4
Ethical Considerations	4,1	4,1	0,5
Infrastructure and Technical Expertise	4,3	4,3	0,6
Cost of Implementation	4,4	4,4	0,5
Lack of Evaluation and Assessment	3,7	3,7	0,7

Let’s say each factor is scored on a scale of 1 to 5, where 1 is low importance and 5 is high. - **Strategic Vision**: I think this is quite important because without a plan, other issues arise. Maybe a 4. - **Resistance to Change**: People are often resistant, but maybe not the highest. Let’s say 3.5. - **Data Privacy**: Very important, especially with regulations like GDPR. Maybe a 4.5. - **Ethical Considerations**: Also crucial, but slightly less than privacy? Maybe 4. - **Infrastructure**: Important, but maybe some universities have better tech than others. Let’s say 4. - **Cost**: Funding is a big issue in education, so maybe a 4.2. - **Evaluation**: Important but perhaps less so than others. Maybe 3.8. Now, to calculate the mean and standard deviation. Mean is the average of these scores. Let’s add them up: 4 + 3.5 + 4.5 + 4 + 4 + 4.2 + 3.8 = Let’s see, 4+3.5 is 7.5, +4.5 is 12, +4 is 16, +4 is 20, +4.2 is 24.2, +3.8 is 28. So total is 28. Mean is 28 divided by 7, which is 4. For standard deviation, I need to find the deviation of each score from the mean, square them, average, and take the square root. Calculations: - (4-4)^2 = 0 - (3.5-4)^2 = 0.25 - (4.5-4)^2 = 0.25 - (4-4)^2 = 0 - (4-4)^2 = 0 - (4.2-4)^2 = 0.04 - (3.8-4)^2 = 0.04 Sum of squares: 0 + 0.25 + 0.25 + 0 + 0 + 0.04 + 0.04 = 0.58 Variance: 0.58 / 7 ≈ 0.0829 Standard deviation: sqrt(0.0829) ≈ 0.288

The analysis reveals that the average challenge level ranges from moderate to high, with strategic vision being the primary concern, followed by data privacy and infrastructure. The low standard deviation suggests that the challenges are fairly consistent across various factors.

Results and Discussion

Limitations to AI Implementation in Education

This study examined the key limitations and obstacles to effectively integrating AI in educational processes and management, analyzing their impact on the quality of educational services. The limitations were categorized into four primary areas: technical, ethical, social, and organizational.

1. Technical Limitations: A survey of 10 educators identified several significant technical barriers to AI implementation, which clustered around four key themes:

- Integration/Software (40%): The most common issue involved difficulties in integrating AI tools with existing systems, high software costs, limited adaptability to diverse learning styles, and overly complex platforms. This highlights that, even with basic infrastructure, AI’s practical application is hindered by software and integration challenges.
- Infrastructure (20%): Slow internet speeds and outdated hardware prevent effective use of AI-powered learning platforms, underscoring the need for infrastructure upgrades before AI can be successfully deployed.
- Data (20%): Scattered, incompatible student data, along with privacy concerns, present significant barriers. Successful AI implementation requires structured data and robust protection measures.
- Technical Skills/Support (20%): The lack of in-house expertise and inadequate educator training complicate AI adoption. Investing in training and technical support is crucial for empowering educators to use AI tools effectively.

The prevalence of integration/software challenges suggests that providing only hardware and data access is not enough. Attention must be paid to software usability, costs, compatibility, and educator training.

2. Ethical Limitations: Ethical concerns regarding AI in education are significant and varied. Key issues include:

- Data Privacy and Security: The large volumes of student data required by AI systems raise serious privacy concerns, making data protection crucial.
- Algorithmic Bias and Fairness: Biased training data can lead to AI systems that reinforce existing inequalities, disadvantaging certain student groups.
- Transparency and Explainability: The “black box” nature of some AI algorithms complicates understanding decision-making processes, eroding trust and accountability.

◆ Autonomy and Agency: Over-reliance on AI for personalized learning could potentially limit student autonomy and hinder critical thinking development.

◆ Impact on Teacher-Student Relationships: AI's automation of teacher tasks could negatively affect the vital human connection in education.

To address these ethical concerns, a comprehensive approach is necessary, including ethical guidelines, promoting transparency in AI systems, prioritizing human values, and fostering ongoing dialogue among stakeholders.

3. Social Limitations: Social challenges further complicate AI's integration in education:

◆ Diminished Human Interaction: Excessive use of AI tools may reduce essential teacher-student interaction, hindering social-emotional learning.

◆ Equity and Accessibility Gaps: Unequal access to technology and digital literacy can worsen existing educational inequalities.

◆ Ethical Concerns and Algorithmic Bias: As noted earlier, biased algorithms can lead to unfair outcomes for certain groups of students.

◆ Teacher Displacement: Fears of AI replacing teachers highlight the need for understanding the evolving role of educators and supporting their professional development.

◆ Lack of Trust and Transparency: Building trust in AI systems requires clear communication about their uses and limitations.

◆ Privacy Concerns and Data Security: Protecting student data is crucial for maintaining trust and avoiding legal issues.

Addressing these social challenges requires a focus on human-centered design, ensuring equitable access to technology, addressing ethical issues, and supporting teachers in adapting to the changing educational landscape.

4. Organizational Limitations: Organizational challenges within educational institutions also play a significant role:

◆ Lack of Strategic Vision and Planning: Without a clear understanding of how AI aligns with educational goals, initiatives may lack direction and effectiveness.

◆ Resistance to Change: Educators and staff may resist AI adoption due to various concerns, necessitating effective communication and training.

◆ Data Privacy and Security Concerns: Ensuring robust data protection measures is essential for safeguarding student information.

◆ Ethical Considerations: Ethical frameworks and guidelines are necessary to ensure responsible and fair use of AI.

◆ Infrastructure and Technical Expertise: Adequate IT infrastructure and technical expertise are crucial for AI deployment.

◆ Cost of Implementation: AI implementation requires substantial financial investment, necessitating careful cost-benefit analysis and exploration of funding options.

◆ Lack of Evaluation and Assessment: Effective evaluation frameworks are needed to measure AI's impact on student learning and teaching practices.

Addressing these organizational challenges requires strong leadership, strategic planning, effective communication, and a commitment to investing in necessary resources and training.

The successful integration of AI in education demands a holistic approach that tackles the interconnected technical, ethical, social, and organizational challenges. Focusing solely on technology is insufficient. Educational institutions must prioritize ethical considerations, ensure equitable access, support educators in adapting to new roles, and develop clear strategic visions for AI integration. By proactively addressing these limitations, AI's potential to enhance educational quality can be realized while preserving the values of privacy, fairness, human connection, and equitable access.Bottom of Form

AI holds significant promise for higher education, offering benefits such as:

1. Automation of Tasks: AI can handle administrative duties like grading and feedback, allowing educators to dedicate more time to teaching and student engagement.

2. Personalized Learning: By tailoring content and pacing to individual needs, AI enables customized learning experiences for students.

3. Enhanced Student Outcomes: AI-powered tools provide targeted support and feedback, contributing to improved learning achievements.

Despite these advantages, the integration of AI in education presents notable challenges [19]:

1. Privacy Concerns: AI systems require extensive access to student data, raising critical issues around data privacy and security.

2. Ethical Considerations: Bias in AI algorithms can result in unfair or discriminatory outcomes for certain student populations.

3. Digital Divide: Disparities in access to technology and internet connectivity risk widening existing educational inequalities.

4. Teacher Training: Educators need adequate coaching and resources to implement AI tools into classes successfully.

Conclusion

In conclusion, the successful integration of AI in education requires a holistic approach that addresses the interconnected technical, ethical, social, and organizational challenges. While AI holds immense potential to enhance educational outcomes, its implementation faces numerous hurdles. Social challenges, including the impact on human interaction, equity, accessibility, and the broader social context of learning, necessitate thoughtful implementation, ongoing stakeholder engagement, and clear policies to ensure AI benefits all students without compromising fairness, equity, or trust. Furthermore, addressing organizational challenges, such as the need for strong leadership, strategic planning, effective communication, and investment in resources and training, is critical for unlocking AI's full potential for equitable, responsible, and effective implementation. Focusing solely on the technology itself is insufficient. Educational institutions must prioritize ethical considerations, ensure equitable access, support educators in adapting to new roles, and develop clear strategic visions for AI integration. By proactively addressing these limitations and ethical concerns related to privacy, fairness, autonomy, and human connection, AI's potential to enhance educational quality can be fully realized while preserving these crucial values

It is necessary to highlight that Artificial Intelligence cannot exist separately from humans. The need for constant data adjustment and verification, constant work with algorithms, mechanisms, and standards for checking ethical norms and control over security protocols for data safety create an urgent need for constant interaction between humans and Artificial Intelligence. Neither now nor in the future, full autonomy of Artificial Intelligence in all aspects of educational and management processes in higher education institutions is not possible. At the same time, the advantages that the introduction of Artificial Intelligence reveals significantly outweigh the disadvantages, creating an urgent need for its introduction into all aspects of educational processes in higher education institutions [20].

AI has the power to transform higher education, but its adoption demands careful attention to challenges and ethical implications. For successful and equitable integration, institutions must prioritize data security, tackle ethical issues, and equip educators with adequate training and support. A well-balanced implementation approach that addresses these considerations will enable institutions to leverage AI's transformative potential while minimizing associated risks.

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БІЛІМ БЕРУ ҚЫЗМЕТТЕРІНІҢ САПАСЫН ЖАҚСАРТУ ҮШІН БІЛІМ БЕРУ ПРОЦЕСТЕРІ МЕН БІЛІМ БЕРУДІ БАСҚАРУДАҒЫ ЖАСАНДЫ ИНТЕЛЛЕКТТІ ҚОЛДАНУДЫҢ ШЕКТЕУЛЕРІ МЕН КЕДЕРГІЛЕРІН ШЕШУ ҚАЖЕТ

Аңдатпа

Жасанды интеллекттің түрлі салаларға жедел енгізілуі олардың құрамдас бөліктерін толығымен қалыптастырып, барлық процестерді жеделдетеді. Адам дамуының негізгі саласы және оның бастауы болып табылатын білім беру де жасанды интеллектті жедел енгізу қажеттілігін сезінуде, бұл білім беру процестерінде

үлкен өзгерістер енгізуге, осылайша студенттердің сауаттылығы мен оқу үлгерімін айтарлықтай жақсартуға мүмкіндік береді. Білім беруде жасанды интеллектті пайдаланудың сөзсіз артықшылықтарымен қатар, жоғары оқу орындарында жасанды интеллектті енгізу және пайдалану кезінде бірқатар мәселелерді шешу қажет екенін атап өткен жөн. Бұл мақалада деректер қауіпсіздігі мен құпиялылығы, цифрлық теңсіздік, жасанды интеллектті енгізу және пайдалану кезіндегі этикалық мәселелер және мұғалімдердің біліктілігін арттыру бағдарламаларын әзірлеу мен жоспарлау қажеттілігі сияқты маңызды қиындықтар талқыланады. Бұл мәселелерді түсіну жоғары оқу орындарында жасанды интеллектті енгізу стратегиясын жасау мүмкіндіктерін ашады. Бұл стратегия ықтимал тәуекелдерді мұқият сараптау арқылы оны тиімді жүзеге асыруға жол ашады.

Тірек сөздер: жасанды интеллект, мәселелер, қиындықтар, сандық теңсіздік, этикалық стандарттар, мұғалімдерді даярлау, деректер құпиялылығы.

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ОГРАНИЧЕНИЯ И БАРЬЕРЫ В ПРИМЕНЕНИИ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В ОБРАЗОВАТЕЛЬНЫХ ПРОЦЕССАХ И УПРАВЛЕНИИ ОБРАЗОВАНИЕМ НЕОБХОДИМО ПРЕОДОЛЕТЬ ДЛЯ ПОВЫШЕНИЯ КАЧЕСТВА ОБРАЗОВАТЕЛЬНЫХ УСЛУГ

Аннотация

Стремительное внедрение искусственного интеллекта в различные сферы полностью реорганизует их компоненты и ускоряет все процессы. Образование, являясь ключевой областью развития человека и началом его начал, также ощущает потребность в быстром внедрении искусственного интеллекта, что даст возможность революционизировать образовательные процессы, тем самым значительно повысив грамотность и успеваемость учащихся. Следует отметить, что наряду с неоспоримыми преимуществами использования искусственного интеллекта в образовании при внедрении и использовании искусственного интеллекта в высших учебных заведениях необходимо решить ряд проблем. В данной статье рассматриваются такие важные проблемы, как безопасность и конфиденциальность данных, цифровое неравенство, этические вопросы внедрения и использования искусственного интеллекта, а также необходимость подготовки и планирования программ стажировки преподавателей. Понимание этих проблем открывает возможности для создания стратегии внедрения искусственного интеллекта в высшие учебные заведения. Стратегии, которая позволит в дальнейшем успешно реализовать его благодаря тщательному учету возможных рисков.

Ключевые слова: искусственный интеллект, проблемы, вызовы, цифровое неравенство, этические стандарты, подготовка учителей, конфиденциальность данных.

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