



ISSN: 2617-6548

URL: [www.ijirss.com](http://www.ijirss.com)



## Artificial intelligence in education: Transforming the process of regional studies training for educators

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### Abstract

The article explores the possibilities of applying artificial intelligence in the regional studies training of teaching staff. It describes modern AI technologies that can be integrated into the educational programs of pedagogical universities, as well as their impact on improving the quality of education. The main focus is on the potential of AI in developing pedagogical and regional studies competencies, adapting curricula, and shaping individual learning paths. The article analyzes the experience of implementing AI in teacher education and its potential to optimize the learning process. It examines the advantages of using AI for creating personalized learning, increasing student motivation, and improving the quality of material retention. An overview of existing technologies and platforms is provided, along with proposed options for pedagogical experiments aimed at introducing interactive regional studies resources. The methodological approach includes both qualitative and quantitative research methods, including student surveys and pilot projects for integrating AI into the educational process. The results show a significant improvement in students' academic performance and engagement following the implementation of AI technologies. The conclusions emphasize the importance of integrating AI into the training of future geography teachers to enhance the quality of education.

**Keywords:** AI technologies, Artificial Intelligence, Local studies education, Teacher training, Teaching methods.

**DOI:** 10.53894/ijirss.v8i6.9728

**Funding:** This study received no specific financial support.

**History:** Received: 7 July 2025 / Revised: 1 August 2025 / Accepted: 7 August 2025 / Published: 8 September 2025

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**Competing Interests:** The authors declare that they have no competing interests.

**Authors' Contributions:** All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

**Transparency:** The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

**Publisher:** Innovative Research Publishing

## 1. Introduction

In recent years, Artificial Intelligence (AI) has gained a significant role in educational systems worldwide, including teacher training. The use of AI technologies can transform traditional teaching methods by providing a more personalized

approach and enhancing the efficiency of teacher preparation. Modern educators need to be proficient in digital technologies and understand how to incorporate AI into educational practices [1]. This article explores key areas of AI application in local history teacher training, based on global experience and research findings.

With the development of technology and the integration of AI into the educational process, there is a growing need to rethink traditional methods of preparing future teachers. This is especially relevant in the context of local history education, which requires a deep understanding of local context and specifics, while also improving the quality of learning and increasing student engagement.

**Relevance of the Research Topic.** Modern education requires the integration of new technologies, such as Artificial Intelligence (AI), to improve the quality of teaching and the preparation of future educators. This is particularly important in the field of local history education, where local contextualization and adaptation of teaching materials are essential, and AI can play a crucial role.

The aim of this research is to study the impact of AI on the quality of local history training for geography teachers.

### *1.1. Research Objectives*

- Analysis of the current state of AI usage in the educational process;
- Evaluation of the impact of AI on the quality of local history training in universities;
- Development of recommendations for integrating AI and local history in the theoretical preparation of students.

AI is capable of automating a range of processes in education, such as grading assignments and tests, providing feedback, and monitoring student progress. This frees up teachers from routine tasks, allowing them to focus on more creative aspects of their work [2]. Adaptive learning systems that use AI allow for the creation of individualized learning paths for students, which is especially important in the training of future educators, where it is crucial to account for differences in learning styles and levels of preparedness [3].

AI-based adaptive learning platforms provide students with the opportunity to receive material tailored to their current level of knowledge and needs.

Such platforms can use student performance data to automatically adjust the difficulty of tasks and select optimal learning resources [4]. This is particularly useful in teacher training, where it is necessary to develop both basic competencies and the ability for self-education [5].

UNESCO emphasizes that AI can solve many education problems by offering new teaching and learning methods [6]. These tools improve communication, knowledge exchange, and promote self-directed learning, reducing the routine burden on teachers and allowing them to focus on more important tasks. They also provide personalized learning by adapting materials to students' needs and improving interaction between teachers and students.

Research has shown that AI improves curriculum planning, assessment, and administrative tasks, freeing up time for more productive work and collaboration among students. AI automates processes such as grading and registration, as well as enhances personalized learning, leading to improved student performance.

There are also ethical issues related to the use of AI in education, including data protection and privacy. The article [3] raises important topics concerning the ethical principles that need to be considered when implementing AI in educational processes.

According to research, the use of AI in education contributes to the personalization of the learning process, adapting content to the needs of learners, and automating assessments. For example, in the work of Luckin et al. [2] it is noted that AI can create personalized learning paths that allow students to study the material at their own pace.

Professional development of teachers is a key aspect of integrating AI into local history education. The study by Parchoma [7] highlights the importance of training educators in using modern educational technologies to create interactive learning materials and work with data.

Local history, as a crucial component of geographic education, necessitates the implementation of interactive and adaptive teaching methods. Studies by Zhang and Liu [8] have demonstrated that incorporating technology into local history education enhances the understanding of local characteristics and issues, which is vital for fostering civic responsibility among future educators.

Currently, interactive technologies such as Virtual Reality (VR) and Augmented Reality (AR) are actively utilized in local history education. According to Dede [9], the application of VR in geography instruction enables learners to explore environments and visualize data, leading to a deeper understanding of the material.

In pedagogical practice, there are numerous successful examples of employing Artificial Intelligence (AI) in the local history training of future teachers. For instance, the ArcGIS platform offers tools for creating interactive maps [10], allowing students to visualize geographic data and analyze local issues. Research by Sui et al. [11] illustrates how the use of Geographic Information System (GIS) technologies can enhance the quality of local history education and increase student engagement.

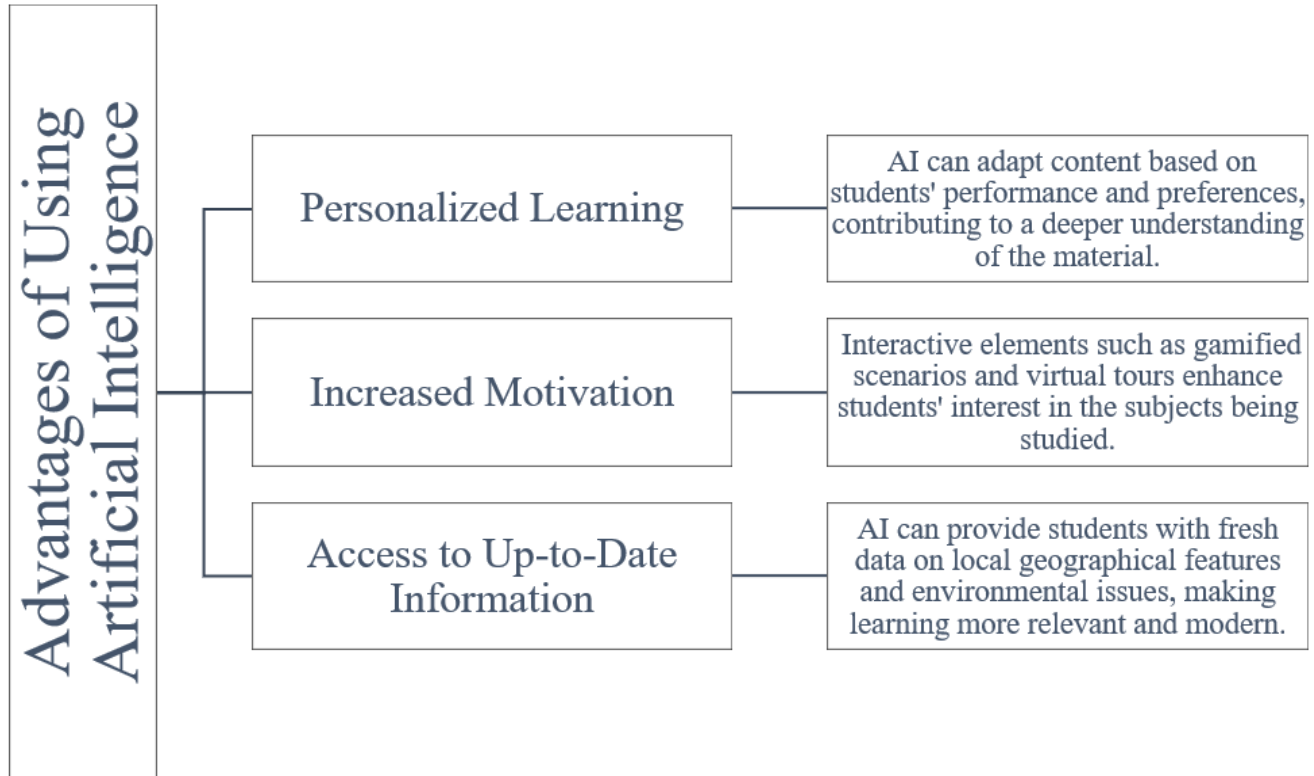
At the international level, there are successful examples of integrating artificial intelligence (AI) into teacher education. Research indicates that AI enhances material comprehension and fosters critical thinking skills among students. For instance, in China, AI-driven platforms like Squirrel AI provide personalized tutoring by analyzing students' learning patterns and offering tailored recommendations to improve their learning outcomes. Similarly, in Australia, AI systems are employed to automatically analyze video lessons, aiming to enhance teaching practices.

Despite these advantages, the implementation of AI in educational programs presents several challenges. Key concerns include data privacy and ethical considerations. Educators also require additional competencies to effectively utilize these

technologies in their practice. Therefore, professional development programs focused on enhancing digital literacy and understanding of AI technologies are essential for teachers.

The above-mentioned studies highlight the relevance and potential of applying artificial intelligence in local history education, as well as emphasize the need for further research in this field.

According to studies by Pane et al. [4], Gee [12] and Sälzer et al. [13] interactive materials created with the help of AI offer several key advantages: personalized learning, increased motivation to study, and access to up-to-date information (see Figure 1).



**Figure 1.**  
Advantages of using artificial intelligence in creating interactive educational materials.

Local history as a discipline requires a deep understanding of local culture and geography. The implementation of AI can assist students in researching and analyzing data, as well as in creating interactive [14]. For example, the use of GIS allows for visualizing and analyzing spatial data, which significantly enriches the learning experience.

Psychological aspects of implementing technologies in the educational process play an important role in the perception and success of learning. The teaching approach must be flexible to take into account the individual characteristics of students [1]. Studies show that students positively evaluate the use of AI in the learning process, especially when it involves interactive tasks.

## 2. Materials and Methods

### 2.1. General Background

In this study, the following materials were used:

1. Educational platforms and AI tools (Table 1):
  - Platforms for creating interactive quizzes and surveys (Kahoot!, Quizlet).
  - Geographic Information Systems (ArcGIS Online).
  - Adaptive learning systems (e.g., SmartSparrow).
2. Educational materials: textbooks and methodological recommendations on local history and geography teaching methods.
3. Questionnaires and surveys:
  - Questionnaires developed to assess the perception of AI by students and teachers, as well as to evaluate the impact of implemented technologies on the quality of teacher preparation.

Below are the AI platforms used in the research work according to the areas of future geography teachers' training.

**Table 1.**

Educational Platforms and AI Tools by Areas of Future Geography Teachers' Training.

<b>Training Area Platform</b>	<b>Impact of AI</b>	<b>AI Platform</b>	<b>Description and Advantages</b>	<b>Examples of Use</b>
Scientific training	Improvement of research work quality	Mendeley	A platform for managing scientific publications and sharing resources. Simplifying access to research.	Used for organizing and storing scientific articles on geography.
Methodological training	Automation of instructional material development	Quizlet Kahoot Google Forms	They allow creating interactive quizzes and flashcards for studying, surveys, and tests, and with add-ons, question generation can be automated.	Creating adaptive teaching materials for instruction.
Theoretical training	Access to up-to-date theoretical data	Google Scholar	A search engine for finding scientific publications and articles on various topics. Researching theoretical foundations.	Searching for literature to prepare coursework and theses.
Practical training	Interactive practical assignments	Nearpod	A platform for creating interactive lessons and quizzes using multimedia. Conducting practical sessions.	Creating interactive assignments on local history and geography.
Ecological and regional studies training	Data analysis and visualization. Creation of interactive regional study resources	ArcGIS, Story MapJS	A platform for working with geographic information systems and maps. A tool for creating interactive maps with multimedia integration. Geospatial analysis. Interactive resources.	Analyzing environmental data for map creation. Local history projects based on interactive maps.

Each platform facilitates specific tasks: from managing scientific publications to creating interactive maps and practical assignments. These platforms help in automation, organization, and data visualization, which significantly improve the quality of preparation and contribute to the development of the educational process.

### 3. Research Methods

This study is based on a mixed methodological approach, combining both quantitative and qualitative methods of data collection and analysis. The methodology was developed with consideration for the current requirements of pedagogical science and practice and aims at a comprehensive study of the impact of artificial intelligence technologies on the local history training of future educators.

The study was conducted in several stages:

1. Diagnostic stage: This stage involved the development and administration of an online survey among students in pedagogical programs. The goal of the survey was to assess the level of awareness, readiness, and attitude of students toward the use of AI in the educational process, especially in the context of local history education. The survey included both closed and open-ended questions, enabling both statistical analysis and thematic interpretation of the responses.

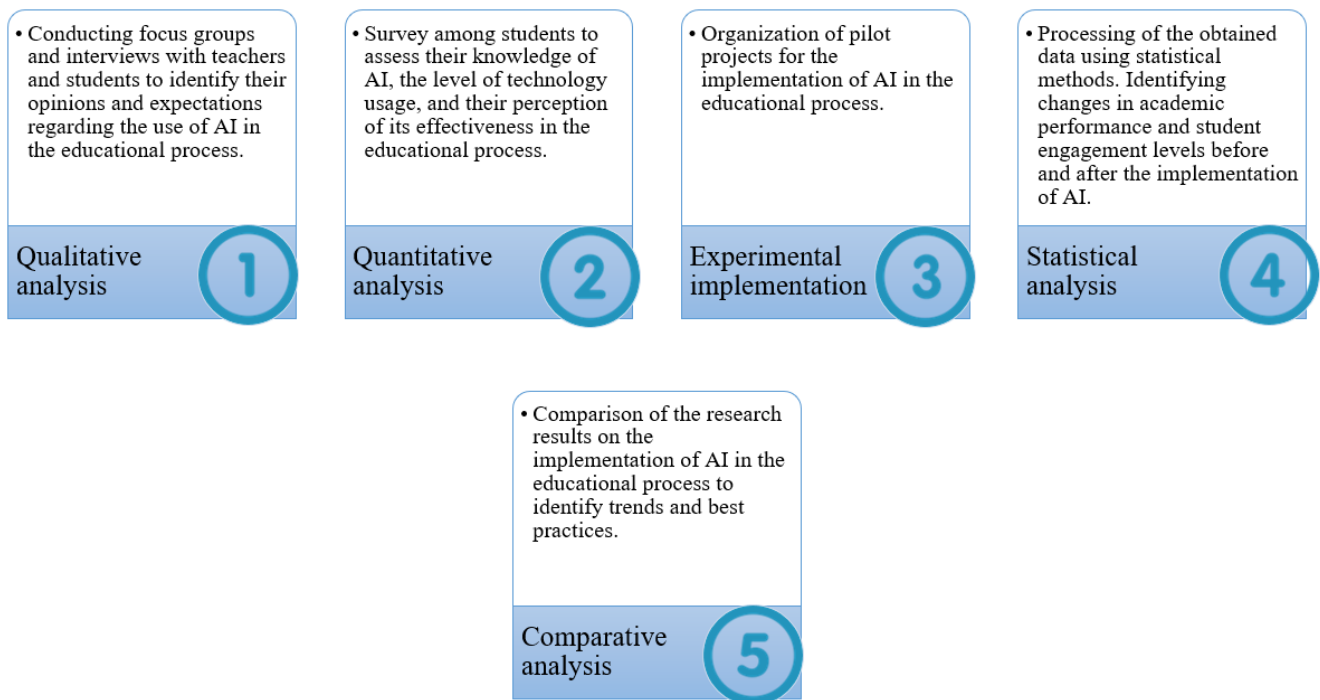
2. Qualitative stage: This stage involved conducting observations and discussions in focus groups, including both students and teachers. This provided a deeper understanding of the perception of AI tools and assessed their potential in a real educational environment.

3. Experimental stage: This stage involved testing an educational mini-project titled "Local History Assistant." Participants were divided into experimental and control groups. Students in the experimental group were given access to specially developed AI tools and digital local history resources, including a platform for creating interactive maps, a database of local historical and cultural sites, and chatbots for reference information. The control group worked with traditional methods.

The evaluation of effectiveness was conducted based on two criteria:

1. Self-assessment by students after participating in the project (analysis of engagement, satisfaction, and perception of local history knowledge);
2. Expert evaluation by teachers, analyzing the final works of students (quality of content, level of integration of local context, depth of analysis, and creativity of solutions).

The collected data was subjected to a comparative analysis, which allowed the identification of significant differences in the results between the control and experimental groups. The results showed that the use of AI tools contributed to a higher level of student engagement, the development of digital and research skills, and the formation of local history competence. This approach aligns with the principles of evidence-based pedagogy and could be scaled to other disciplinary areas.



**Figure 2.**  
Main stages of the research work.

At the initial stage, through focus groups and interviews, the opinions and expectations of teachers and students regarding the use of artificial intelligence (AI) in the educational process were identified. Next, a survey was conducted among students to assess their awareness of AI, the level of digital technology usage, and their perception of its effectiveness in learning. Based on the collected data, an experimental implementation of AI into the learning environment was organized in the form of pilot projects. The results were subjected to statistical processing to identify changes in academic performance and student engagement. The final stage was a comparative analysis aimed at identifying key trends and successful practices for integrating AI into education.

#### 4. Sample / Participants / Group

As part of this research, an introductory survey was developed and conducted to study the perception and use of artificial intelligence (AI) in educational activities among students and geography teachers. The survey involved 67 students (future geography (history) teachers in their 2nd to 4th years at a university in Kazakhstan) and 33 geography teachers from the Eastern Kazakhstan region.

Ethics of the study: All participants in the study were informed about the objectives and conditions of their participation. The surveys were conducted anonymously, and the data collected was used exclusively for research purposes, in accordance with ethical standards for conducting research in education.

Additionally, for the pilot study, which consisted of three stages, students from the 2nd to 4th years of the "Geography" educational program at a university in Kazakhstan were selected. The study involved a 7-week educational module based on artificial intelligence that students would study during the experiment. The inclusion of this new direction in the curriculum, implemented during the experiment, contributes to more effective mastery of the educational program. A total of 38 students from the 2nd to 4th years of the academic year, enrolled in the pedagogical and scientific tracks of the "Geography" program, participated in the study.

#### 5. Instrument and Procedures

The questionnaire consisted of 10 questions covering various aspects of interaction with AI and its application in the educational process. The questions were of a closed type with answer options to facilitate data analysis. Both students and teachers were given the opportunity to select one of the provided options that best reflected their experience and views.

1. Knowledge of AI: The first question focused on students' self-assessment of their understanding of AI. Three answer options (good, satisfactory, poor) helped identify the general level of awareness.

2. Use of AI in learning: The second question determined the level of AI integration into the learning process, while the third question clarified which specific platforms students use in their educational activities, such as "Quizlet," "Kahoot!," and "ArcGIS Online." These platforms were chosen as examples of popular tools for creating tests, surveys, and interactive tasks.

3. Assessment of AI use by teachers: The fourth question aimed to explore how students perceive the use of AI by teachers in educational institutions.

4. Role of AI in teacher preparation: In the fifth question, students assessed the extent to which AI could contribute to their preparation as future geography teachers. Three answer options (strongly, moderately, weakly) allowed for an evaluation of their perception of AI's impact on their education.

5. Use of AI to improve regional studies education: The sixth question focused on specific areas where AI can be useful, such as individualized learning, material adaptation, and assessment with feedback.

6. Interactive platforms and their effectiveness: Questions 7 and 8 addressed the frequency of using interactive platforms for creating surveys and tests, as well as their effectiveness in the educational process. This helped evaluate the popularity of these technologies among students and their perceived effectiveness.

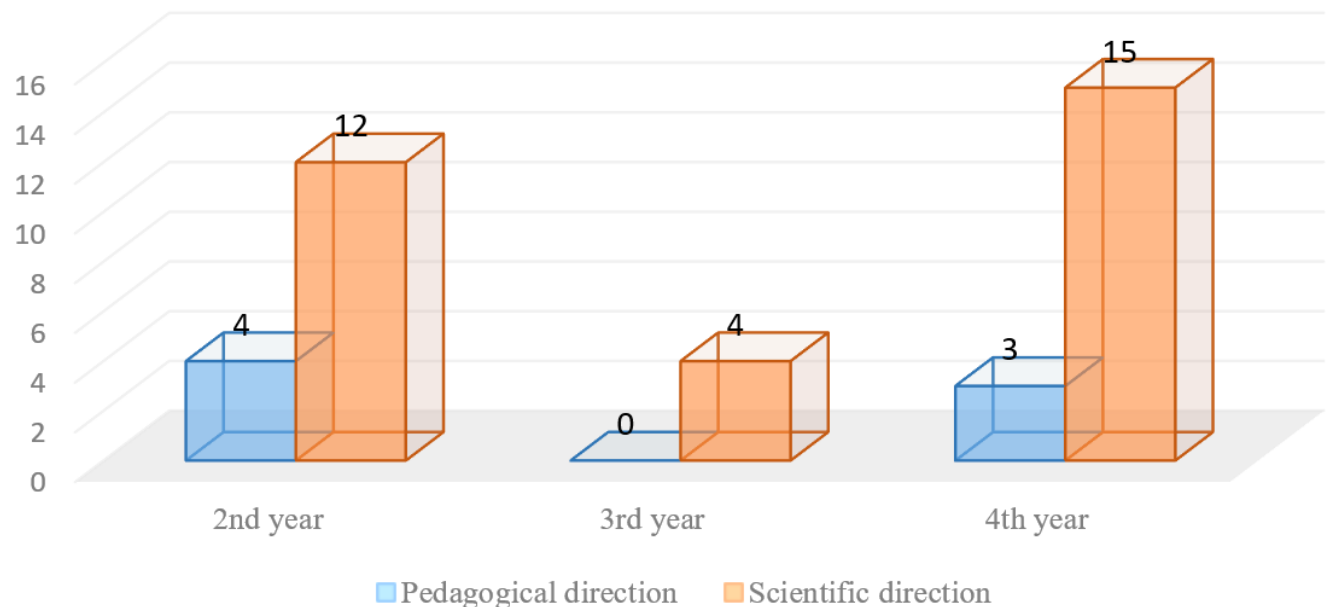
7. Problems in using AI: Question 9 covered the issues students face when using AI in learning. Options such as lack of access, lack of teacher training, and ethical problems were suggested.

8. Future interaction with AI: The last, tenth question focused on exploring students' future perceptions of AI in their professional activities as geography teachers.

This questionnaire allowed the collection of data on the current level of knowledge, usage, and perception of AI among future educators.

The questions covered in the questionnaire for undergraduate students address the application of artificial intelligence (AI) in education, especially in the context of preparing future geography teachers and using AI to enhance regional studies educational practices. The survey conducted shows how Kazakhstani students perceive the integration of AI into the educational environment and their awareness of technological platforms and AI capabilities.

Research Participants: The pilot study involved 38 students.



**Figure 3.**

Structure of the Research Participant.

- Experimental Group: Students from the scientific track who completed courses incorporating AI.
- Control Group: Students from the pedagogical track who studied similar courses without AI integration.

During the learning process, all students attended the same lectures. However, practical sessions differed between the two groups. Students in the pedagogical track conducted practical work using instructor recommendations and lecture materials. In contrast, students in the scientific track utilized AI-generated guidance for their practical assignments.

A central component of the experimental practical sessions was the development of a digital product project titled "Local History Assistant."

As part of the study aimed at examining the impact of artificial intelligence (AI) on the professional training of students in the "Geography" educational program, a pedagogical experiment was conducted involving 38 second to fourth-year students from the university.

The aim of the experiment was to determine the extent to which AI influences the effectiveness of students' academic performance, as well as to analyze its potential applications in their future professional practice.

The primary focus was on how artificial intelligence (AI) can be utilized to address subject-specific tasks, particularly in the fields of local history and tourism-recreational studies. The research hypothesis posited that the use of AI enhances students' productivity, expands their capabilities in searching for and processing new information, and increases their motivation for academic and research activities.

A central component of the practical segment of the experiment was the "Local History Assistant" project, wherein students developed tourist routes and guides for specific regions. The experimental group completed the assignment using AI tools, including ArcGIS Online and other digital platforms, facilitating the collection, processing, search, and visualization of spatial and textual information. The project implementation involved several stages: selecting the research

region, sourcing information, structuring and analyzing data, visualizing routes using GIS platforms, and compiling the final product as a digital guide [15]. The control group undertook similar tasks without the use of AI. The experiment revealed the positive impact of AI technologies on the development of students' digital and research competencies, the improvement of academic project quality, and the enhancement of student engagement and autonomy in mastering the subject matter. Indicators used to evaluate the results:

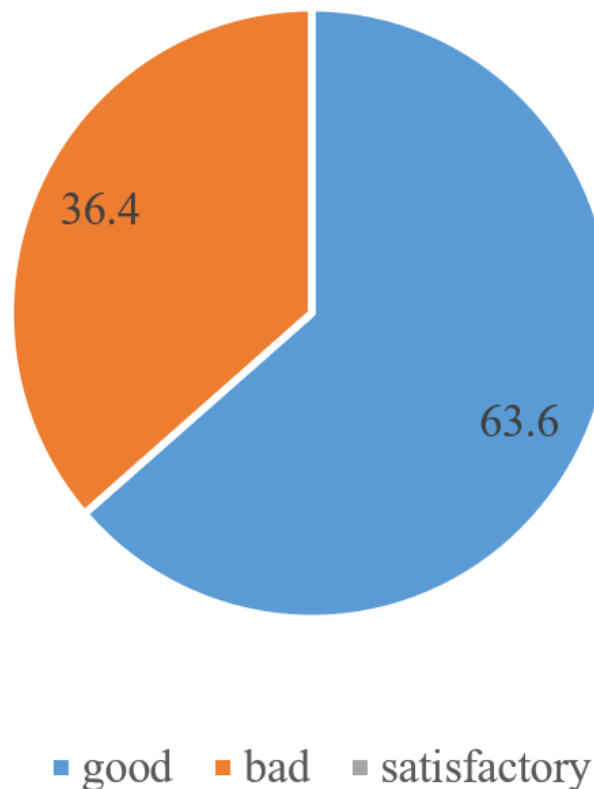
1. Student performance
2. Student interest in the subject
3. Quality of practical work
4. Results of a survey assessing the need to use artificial intelligence

## 6. Results

Analysis of survey data from students and teachers in the East Kazakhstan region. During the survey, 67 students (future geography and history teachers in their 2nd to 4th years at Kazakhstan University) and 33 geography teachers from the East Kazakhstan region participated. The following results were obtained:

The analysis of data from the survey of school teachers in the East Kazakhstan region regarding the use of artificial intelligence (AI) in education provides an opportunity to assess both general trends and specific challenges and prospects for the implementation of AI in the educational process. A total of 33 geography teachers participated in the survey, with an average teaching experience of 9.5 years.

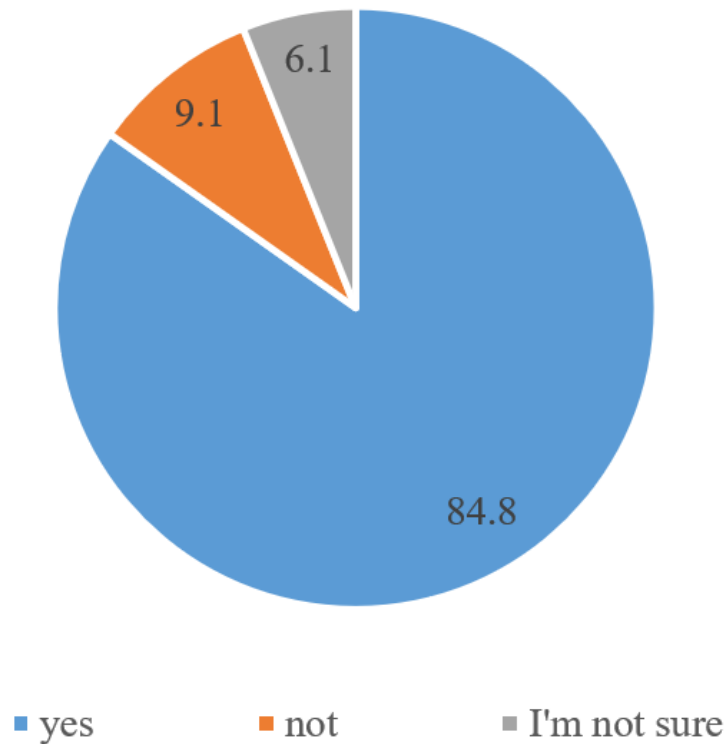
1. Question on General Understanding of AI: The data show that the majority of respondents have either a good (63.6%) or satisfactory (36.4%) understanding of AI. The complete absence of negative feedback (0% marked "poor") indicates that even if teachers are not actively using AI, they are still familiar with its basic concepts and recognize the potential of the technology (Figure 3). This is a positive factor for further AI integration into the educational process.



**Figure 4.**  
General Understanding of AI by Respondents

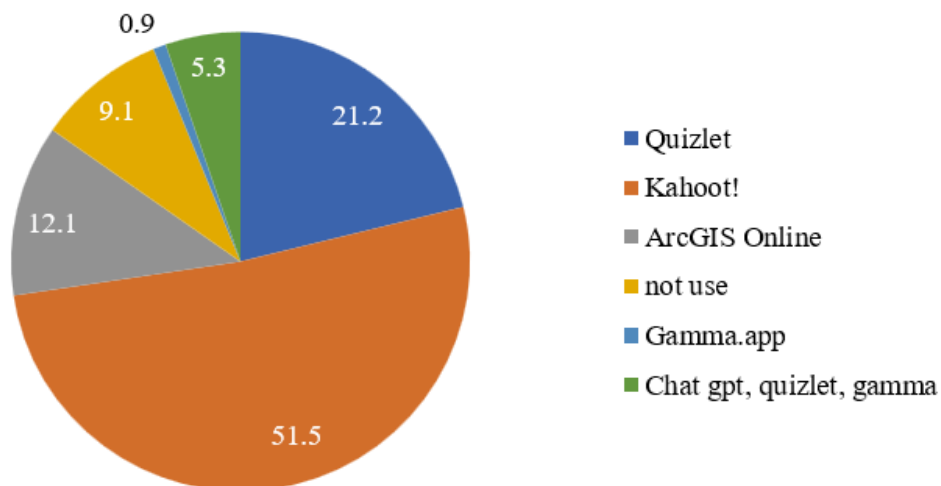
2. Use of AI in Education: 84.8% of the surveyed teachers use AI technologies in their teaching process, indicating significant progress in the practical application of these technologies. However, 9.1% do not integrate AI into their work, which points to a notable gap in adopting modern teaching methods (Figure 4). The issue here may be related to insufficient teacher training or a lack of access to necessary resources.





**Figure 5.**  
Use of AI in Education.

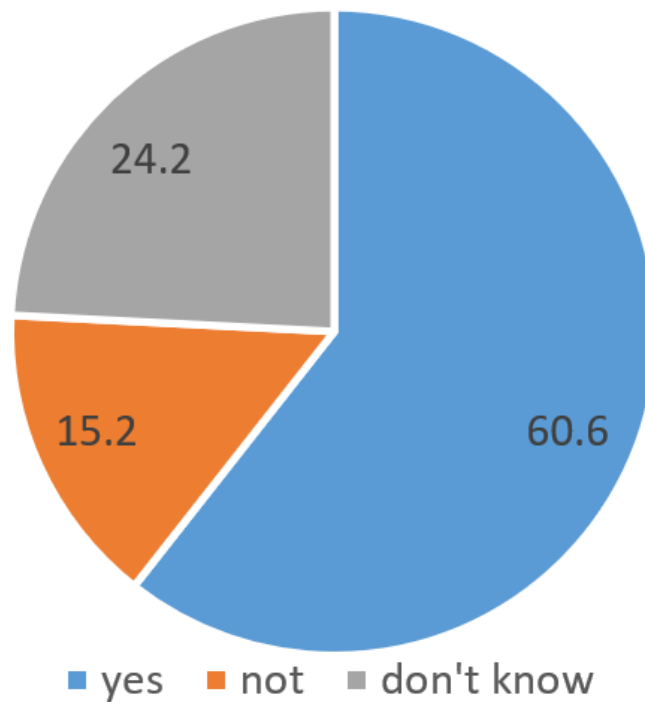
3. The most commonly used platforms for teaching are Kahoot! (17 teachers) and Quizlet (7 teachers). The use of ArcGIS Online (4 teachers) highlights the role of geographic information systems in teaching geography. A small number of respondents mentioned using Gamma and ChatGPT in their practice. However, 9.1% of respondents indicated that they do not use any AI platforms, confirming the previously identified issues with the adoption of technology (Figure 5).



**Figure 6.**  
AI Platforms Used in Teaching.

4. The majority of teachers (60.6%) reported that their colleagues use AI in lessons; however, 24.2% indicated that they are unaware of their colleagues' experience with the implementation of AI in the educational process, which suggests a lack of information exchange among teachers on this topic (Figure 6).





**Figure 7.**  
Use of AI by Teachers in Lessons.

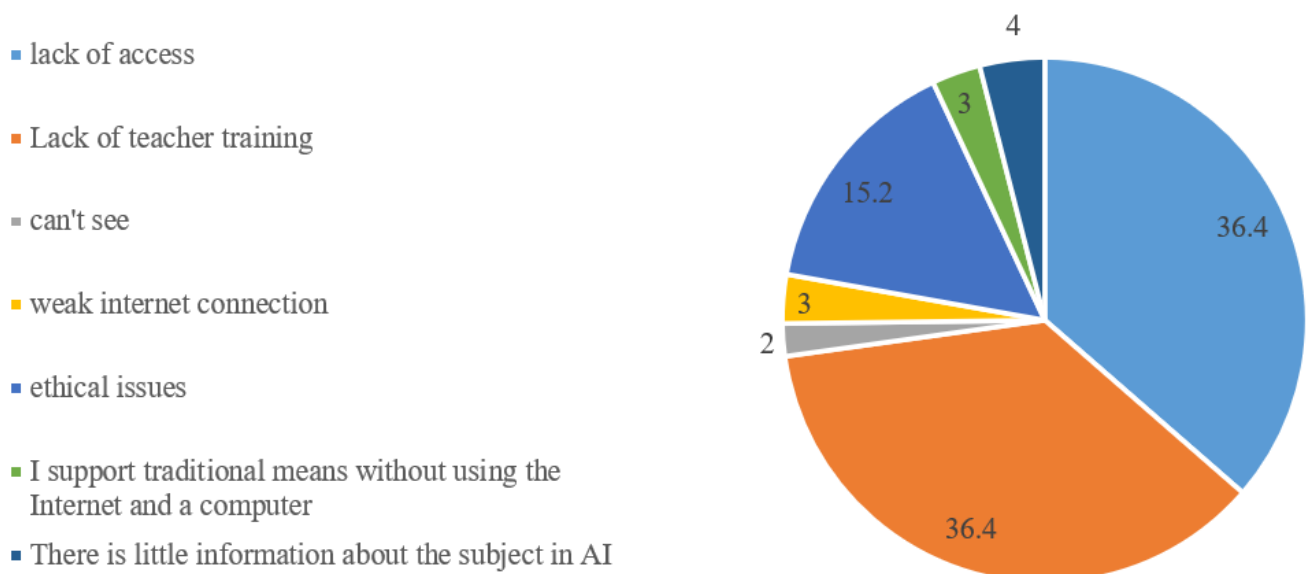
5. Potential of AI in Conducting Lessons - 48.5% of teachers believe that AI can significantly assist in conducting lessons, while 45.5% assess this potential as moderate. Only 6% rate the impact of AI as weak, indicating general confidence in its benefits for the educational process.

6. Aspects of Local History Education That Can Be Improved with AI - The majority of respondents believe that AI can assist in adapting materials (42.4%) and individualizing learning (21.2%). This is an important aspect, as personalized learning and adaptive technologies can enhance the quality of local history education for future geography teachers.

7. Use of Interactive Platforms - 60.6% of teachers frequently use platforms to create interactive quizzes and tests, indicating a high level of readiness to use technology. 33.3% use them occasionally, and only 2 teachers have never used such platforms.

8. Effectiveness of Testing Platforms - 69.7% of teachers rated the effectiveness of testing platforms as high, underscoring their usefulness in the educational process. This also suggests that educators see these tools as significant support in their work.

9. Most Frequently Mentioned Issues - The most commonly cited issues were lack of teacher preparation (36.4%) and lack of access (36.4%). These problems require attention at the level of educational institutions and policy to improve infrastructure and professional training.

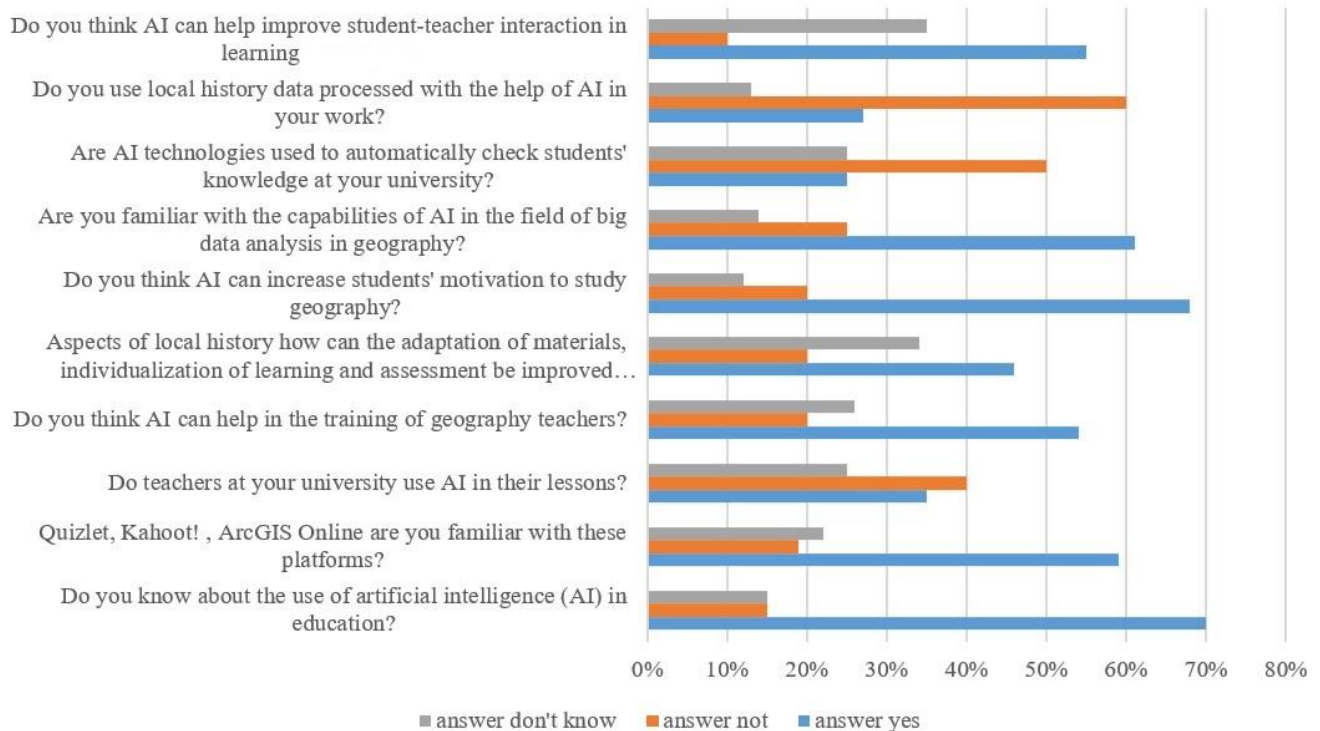


**Figure 8.**  
Problems of Using AI in the Educational Process.

10. Future interaction with AI - Views on future interactions with AI were distributed as follows: the majority of teachers expect limited use of AI, which may be related to the aforementioned issues. However, some respondents note the potential for active use [16].

The survey analysis indicates that, despite high awareness and understanding of AI's potential, significant barriers to its integration into the learning process persist. The primary issues are the lack of teacher preparation and limited access to technologies, which should be addressed at the school and regional educational system levels.

For the first question, "Knowledge of AI in Education," – 70% of respondents indicated that they are familiar with the use of AI in education, which indicates a fairly high level of awareness. This may reflect the global trend of AI integration across various sectors, including education, as well as the growing availability of information about AI.



**Figure 9.**  
Results of the introductory survey of students.

Familiarity with Educational Platforms (Quizlet, Kahoot!, ArcGIS Online) – 59% of respondents are familiar with these platforms. This indicates that technologies are actively used in educational processes, although about 22% of students are still unaware of them. This suggests the need for more active integration of digital tools into educational practice. "Use of AI in Teaching" – Only 35% of students noted that their instructors use AI in educational processes. It is important to note that 40% answered "no," which may indicate insufficient integration of AI into curricula or a lack of skills among educators to work with such technologies.

"AI's Help in Preparing Geography Teachers" – 54% of respondents believe that AI can contribute to teacher preparation. This opens up opportunities for the development of courses and educational programs based on AI use to improve the qualifications of future educators.

On Using AI to Improve Local History Aspects – 46% of respondents are confident that AI can help with adapting materials and individualizing learning based on local history data. This is an important indicator given the growing interest in local data and its integration into educational programs.

"Motivation Boosting with AI" – The majority (68%) of students believe that AI can increase motivation to study geography. This confirms that technologies can play a role in stimulating interest in the subject.

Knowledge of AI's capabilities in data analysis – 61% of respondents are aware of AI's capabilities in analyzing big data in geography, which suggests an increase in students' digital literacy in this field.

Application of AI for automatic knowledge testing – only 25% of respondents reported using AI for automatic knowledge testing, indicating a low level of implementation of such technologies. This could be due to a lack of resources or infrastructure. Use of local history data processed by AI – only 27% of students use local history data processed with AI. This shows that the potential for using AI in this area has not yet been fully realized.

Improving Student-Teacher Interaction with AI – 55% of respondents believe that AI can enhance interaction in the learning process. This is important in the context of developing new communication and coordination methods in education.

The data collected shows that students in Kazakhstan are generally aware of the potential of AI in education, but its actual application in learning processes is limited. This highlights opportunities for further integration of AI into

educational programs and emphasizes the need for both students and educators to be trained in working with new technologies.

**Table 2.**  
Results of the study.

Parameters	Results (%)
General Introduction to AI (Teachers)	63.6% good, 36.4% satisfactory
Using AI in Education (Teachers)	84.8% use, 9.1% do not use
Most used platforms	Kahoot! (17), Quizlet (7), ArcGIS Online (4), ChatGPT, and Gamma (less)
AI Usage by Colleagues	60.6% used by colleagues, 24.2% found it difficult
The Potential of AI in Teaching	48.5% significant, 45.5% moderate, 6% weak
Local history training with AI	42.4% adaptation, 21.2% customization
Using interactive platforms	60.6% often, 33.3% sometimes, 2% never
Efficiency of testing platforms	69.7% rated the effectiveness highly
Main problems	36.4% lack of training, 36.4% lack of access
Future Interaction with AI	Expect limited use
Introducing Students to AI	70% are familiar with AI
Students' knowledge of platforms	59% know platforms Kahoot!, Quizlet, ArcGIS Online
Use of AI by teachers (students)	35% use AI teachers
Believes AI can help with job training	54% believe AI helps with preparation
Believes that AI improves the adaptation of local history materials	46% believe that AI improves adaptation
Believes that AI increases motivation to learn	68% believe that AI increases motivation
Knowledge of the use of AI in data analysis	61% know about AI in data analysis
Faced with automatic knowledge testing through AI	25% have encountered automated verification
We used local history data processed by AI	27% used local history data
Believes that AI improves interaction in the learning process	55% believe AI improves interactions
Effect of the project Regional Studies Assistant (Study performance)	Increase by 12%
The effect of the project Regional Studies Assistant (engagement)	Increased engagement by 20-40%
Effect of the project on the Regional Studies Assistant (satisfaction)	Increased satisfaction by 15-25%
The effect of the project, Regional Studies Assistant (time costs)	Reduction of time costs by 25-50%

**Interpretation of Results.** The results of the study show that the use of AI in the educational process can significantly improve the quality of local history training for geography teachers. Interactive technologies contribute to a deeper understanding of the material.

**Practical Recommendations for Teachers and Administrators.** It is recommended that teachers actively use AI platforms to create interactive tasks and assess students. Administrators should ensure access to necessary resources and provide training on how to use these technologies.

**Limitations of the Study and Directions for Future Research.** The study was conducted at a single university, which limits the generalizability of the results. Future studies could focus on a broader range of educational institutions and disciplines.

Base do no your study and literature analysis [17] early findings can be summarized as follows:

1. **Improvement in Student Performance:** The introduction of AI led to a 12% improvement in student performance as students became faster and more effective in mastering complex topics.
2. **Increased Engagement:** The use of AI tools (e.g., Kahoot! and Quizlet) increased student activity by 20-40%, fostering deeper engagement in the learning process.
3. **Increased satisfaction among teachers and students:** After the implementation of AI, satisfaction with the educational process increased by 15-25%. Students reported that the new learning format helped them better understand the material, while teachers felt more confident in using the technologies.
4. **Reduction in Time Spent on Assessment:** The automation of grading and testing with AI reduced the time spent on evaluations by 25-50%, allowing teachers to focus more on providing individualized support to students.

The study's results were determined based on conclusions drawn through several stages of work. These stages included surveys, focus group observations, and other methods that helped define the role of AI in the educational sphere [4]. A crucial part of the research was the use of the "Local History Assistant" project in both experimental and control groups, which proved to be the optimal solution for obtaining objective results from the experiment. The findings were based on students' self-assessments and teachers' evaluations of the quality of the students' work.

**Table 3.**

Tasks and result of study.

Parameters	Experimental group (with AI)	Control group (no AI)
Tasks	Select one region of Kazakhstan, collect information about local historical sites, sacred places, and tourist attractions using AI, create a database, prepare a tourist route and guide, and visualize data using AI. AI helped to quickly find, collect, classify, and visualize information about local historical objects and tourist routes.	Select one region of Kazakhstan, collect information about local historical sites, sacred places, and tourist attractions using traditional methods (books, Internet, archives). Create a database, prepare a tourist route and guidebook, and visualize the data manually.
Results according to teachers	1. Efficiency. The use of AI significantly accelerated the process of searching and collecting data, and also increased the accuracy of classification and organization of information. 2. Quality of execution. Visualization and creation of interactive maps and routes using AI allowed students to create more interesting and informative materials. 3. Creativity. AI allowed students to create non-standard tourist routes and present local history data in a dynamic form.	1. Work efficiency. The process of searching and processing information was significantly more labor-intensive and slower without the use of AI. 2. Quality of execution. Visualizing data and creating routes manually limited students' ability to present information. 3. Creativity. Limited tools did not allow for the same creative solutions as in the experimental group.
Results according to students	1. Efficiency. Students noted that the use of AI accelerated the process of searching for local history data, creating guidebooks, and tourist routes. 2. Satisfaction. Students were pleased with the results, as AI allowed them to quickly collect data and visualize it in an interactive form. 3. Creativity. AI opened up new opportunities for creating unique and non-standard tourist routes, including dynamic maps and routes with detailed descriptions.	1. Efficiency: Students felt that the process of manually searching and processing data was time-consuming and labor-intensive. 2. Satisfaction: Some students were unhappy that the visualizations and routes created manually were less attractive and dynamic. 3. Creativity: Without AI, students were not able to come up with the same creative and innovative solutions as those in the experimental group.
Visualization quality	AI-powered data visualization included the creation of interactive maps, graphs, and visual routes, which significantly improved the perception of information.	Data visualization was limited to static maps and graphs, which required a lot of effort and time.
General impressions	Students and teachers noted that the use of AI made the work more exciting and dynamic. AI helped in creating interactive routes and visualizations, which increased interest in local history.	Students noted that traditional methods of work were less engaging and took more time. However, such methods allowed them to delve deeper into the material and better understand the local historical context.
Benefits for students	1. Fast task execution, reduced time for searching and processing data. 2. Ability to create interactive routes and visualize data in a creative form. 3. High level of involvement and interest in working with AI. 4. Ability to offer original tourist routes and interactive maps.	1. In-depth study of local history material through traditional sources. 2. Independent work without dependence on technology. 3. More thorough elaboration of information and routes in a traditional format.
Cons for students	1. Dependence on technology, which can limit the creative process. 2. The need for technical knowledge to work with AI. 3. Risks of errors due to insufficient understanding of AI algorithms.	1. Time-consuming data search and processing. 2. Limited ability to visualize data creatively. 3. Less motivation due to limitations of traditional methods.

## 7. Discussion

The results demonstrate a high level of interest among both teachers and students in using AI for educational purposes.

The majority of teachers are not only aware of AI capabilities but also actively implement them in practice, confirming the maturity of digital transformation in the educational environment of East Kazakhstan Region (EKR).

Analysis shows that the use of AI contributes to a deeper assimilation of local history material and increases student engagement.

The personalized and adaptive approach proved to have a particularly significant effect, opening new opportunities for the preparation of future geography teachers.

Nevertheless, significant barriers have been identified, including a lack of qualifications and limited access to resources. This calls for systemic measures, from improving teacher training to expanding infrastructural capacities in schools and universities.

The implementation of the "Local History Assistant" project as an experimental tool demonstrated that targeted AI integration can significantly increase both student motivation and the quality of educational content. These findings align with the conclusions of international authors [17] who also recorded improvements in academic performance, increased motivation, and reduced workload for teachers.

Thus, the study results confirm the potential of AI to enhance the quality of local history training and highlight the need for further scientific and applied developments in this field.

## 8. Conclusion

The use of artificial intelligence to create interactive local history materials in the training of future geography teachers represents a promising direction that contributes to improving the quality of education. Interactive elements based on AI can significantly enhance student motivation and their engagement in the learning process [18]. However, for the full implementation of these technologies, further research and experiments are needed to study their effectiveness and potential applications in educational programs.

The integration of AI into local history training for geography teachers opens new horizons for education, improving the quality of the learning process and increasing student involvement. Further research in this field can contribute to a deeper understanding of the impact of technologies on education and teacher preparation.

The integration of AI into local history education opens new opportunities for improving the quality of geography teacher training. Further studies in this area will help us better understand how AI can be used to enhance educational processes and develop professional competencies in future educators.

These links to scientific articles and studies will help you dive deeper into the topic and find relevant data for writing your paper.

The application of artificial intelligence (AI) in teacher training has significant potential to enhance the quality of education. The experience of integrating AI into educational programs shows that these technologies help develop the professional competencies of future educators, improve their adaptability, and enhance their ability for independent learning. However, to fully unlock this potential, existing barriers, such as the lack of skills among instructors and ethical issues related to the use of AI, must be overcome. Further research and experiments will be required to fully integrate AI into teacher education systems [19, 20].

The results of the research demonstrated that the implementation of artificial intelligence (AI) in the educational process of GIS (Geographic Information Systems) disciplines leads to improved academic performance, increased student engagement, and enhanced learning quality. In the future, we plan to expand the use of AI not only in undergraduate courses but also to introduce new teaching methods, which will further improve the effectiveness of specialist training.

### Further Steps for AI Integration

#### 1. Bachelor's Courses (1st–4th Year):

The integration of AI at all stages of education, especially in the 2nd–4th years, will deepen students' understanding of GIS and prepare them to solve real-world practical problems. At this level, students already possess basic knowledge, and the use of AI will help develop their analytical skills and prepare them for professional activities.

#### 2. Development of Teaching Methodology:

"Teaching Geography Methodology": Future teachers will have the opportunity to master AI technologies and use them to create interactive lessons, which will increase students' interest and improve teaching quality.

"Geographical Information Systems (GIS)": Integrating AI into this subject will allow students to master spatial data analysis and use interactive maps. This will not only enrich the learning process but also provide students with practical skills that are in demand in the job market.

Thus, the integration of AI into courses on local studies, GIS, and teaching methodology not only broadens the possibilities for students and teachers but also prepares them to meet the modern demands of the labor market [23]. In the future, we plan to continue integrating AI into educational programs, developing new methodologies, and expanding the range of disciplines where these technologies can be applied. This approach will help create a more interactive, efficient, and high-quality educational process that meets the challenges of the time.

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