Virtual Tours and Digital Libraries in History Education at the University: How to Make the Study of History Attractive to Students?

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***Abstract*—The purpose of this research is to analyze the effectiveness of virtual tours and digital libraries in learning history based on student perceptions. The study employed survey methods and statistical analysis, complemented by historical methods, along with virtual tours for the recreation and modeling of specific historical conditions to explore their potential consequences. The study involved two surveys developed by teachers: the first was before the experiment and the second took place after its completion. Each student received the questionnaire by mail. Thus, 60 bachelor students of the "History" specialty took part in the experiment. The average age of the participants was 21 years old. According to the survey results, the majority of the students (58%) noted that they rarely used digital technologies during history lessons. At the same time, 30% said that they did not use digital libraries and virtual tours when studying history and only 12% reported that they used them in lessons. Following the study, a majority of the students (85%) observed that the utilization of digital technologies impacted their motivation to study history. Meanwhile, 10% found it challenging to respond to this question, and 5% indicated that digital tools had no influence on their motivation levels. The improvement in students' academic performance was evident when comparing the responses to control assessments conducted before and after the experiment. Based on the standard deviation data, the average score was 77.5 before training and increased to 81.9 afterward. Based on a comparison of the results obtained in two surveys, the researchers can conclude that electronic libraries and virtual excursions are effective for studying history. All the indicators increased, in particular those related to the level of motivation.**

***Keywords*—educational resources, electronic library, study of history material, knowledge archive, virtual tour**

I. Introduction

Throughout its history, libraries have played many important roles in the context of knowledge archiving, information retrieval, and knowledge dissemination [1, 2]. Nowadays, libraries have different technical, social, and educational functions [3]. For many people, libraries are the only educational resources after their traditional formal education. Engaging in digital reading has become an increasingly common educational practice [1, 4]. To support the educational process, university libraries acquire mainly electronic books and electronic periodicals [4]. There is a consistent trend to use digital books. Electronic libraries become an integral part of the educational environment, which confirms the relevance of the chosen research issue.

Together with archives, libraries have always been the main institutions authorized to manage—collect, preserve and disseminate—human knowledge and culture [5]. As advancements in computer science enabled the handling of digital representations of documents, libraries became actively involved in leveraging the potential of the digital revolution. This shift allowed for the collection of human knowledge and culture in digital formats, surpassing the limitations of traditional printed documents. Thus, "digital libraries" soon became a term denoting the digital analog of traditional libraries and became relevant. However, electronic library systems have undergone significant changes since their introduction [6]. Nowadays, they have become complex network systems capable of maintaining communication and cooperation between various communities distributed around the world dealing with "digital objects", including not only digital analogs of printed documents. Researchers note the importance of the digitalization of personal archives. Thus, such types of documents as "letters, postcards, and diaries" have been replaced by their electronic versions and have been transferred to the "digital format" [7].

The development of digital libraries has not followed a straightforward trajectory, as multiple disciplines have played a role in shaping them. This diversity has given rise to various concepts of digital libraries, each influenced by the primary discipline of study or the specific requirements for which it was created [8]. Consequently, the "history" of digital libraries, spanning approximately two decades, encompasses a multitude of information systems that have been labeled as "digital libraries" [9, 10]. These systems vary widely in terms of size and functionality, and their evolution diverges along different paths. In particular, when changes took place, it meant not only that a better system was conceived to replace the "previous ones", but also that a new concept of electronic libraries was born, corresponding to the new increased needs [9, 11].

A virtual tour is a structured form of educational training that differs from a physical excursion in that it presents real-life objects (such as museums, parks, city streets, etc.) through virtual displays, enabling independent observation and the gathering of relevant information [12]. The enjoyment and engagement of students in the learning process are heightened when they actively interact with the learning material rather than passively receiving it [12, 13]. Allowing students to manage virtual tours is expected to increase their level of engagement in the learning process and

enable them to focus on elements that interest them the most [14]. Although giving students more freedom to explore and direct their learning may seem unconventional to history teachers, it can provide students with the flexibility and control they desire and ultimately serve as a gateway to further study of the subject [15]. Additionally, virtual tours grant students access to historical sites that may otherwise be inaccessible to them.

The concept of virtual tours is akin to the historical grand tour, where students virtually follow in the footsteps of their predecessors on an educational adventure to immerse themselves in the places they have learned about [12–14]. A physical journey of this magnitude would be financially unfeasible for many students and educational institutions. However, through the use of virtual tours, it has been determined that students can reap many of the same benefits as physically visiting attractions without incurring financial costs.

It should be noted that the "History of Russia" module is fundamentally important to revealing different parts of the historical process, which includes a state's economy, policy, and culture, history of religions, spiritual life, and national traditions [16]. Based on these insights, it is hoped that virtual tours will aid students in better understanding history by virtually placing them at the site of the object. This immersive experience is expected to enhance their comprehension and assessment of the spatial structure of historical objects, as well as deepen their understanding of how historical events and trends have shaped global relationships [15].

Modern digital technologies not only convert resources into digital formats but also create integrated environments that encompass collections, information services, and academic activities, thereby preserving knowledge and effectively supporting learning [17]. While there is little doubt about the potential of digital libraries and virtual tours to offer unprecedented access to information and ideas, there remain uncertainties about their ability to provide an optimal learning environment. The greatest strengths of digital technologies—such as their vast information resources, diverse formats, limitless navigation possibilities, and support for combining materials in numerous ways—also contribute to these uncertainties within formal learning settings [18–20]. While there is considerable knowledge about promoting higher-level learning using traditional collections of printed and non-printed materials, the effective utilization of digital technologies for this purpose remains an area of ongoing exploration.

Most literature focuses on assessing the usability of digital libraries, rather than whether they effectively support learning. To fill the gap in research, the following research questions were raised: would it be possible to use digital libraries in teaching history? Does employing the digital library approach prove to be effective in educating students?

The purpose of this research is to analyze the effectiveness of virtual tours and digital libraries in learning history based on student perceptions.

To accomplish this objective, the study employed various historical research methods. One of these methods was the analysis of historical literature, including a review of existing research and theoretical materials related to the use of digital libraries in education. This method showed the current state of research in this field. Research objectives:

- To introduce digital technologies into the curriculum, namely digital libraries and virtual tours;
- To determine the effectiveness of electronic libraries and virtual tours using indicators of student motivation and creative thinking.

II. Literature Review

Traditionally, information research has focused on providing access to information rather than exploring how it contributes to learning. However, the advent of electronic information resources has spurred numerous studies on the relationship between these resources and learning [21]. Additionally, the accumulated knowledge about learning and media within the field of educational technologies offers valuable insights into learning within an electronic environment. Research and theories in both fields highlight both concerns and opportunities associated with teaching students in a digital library setting [19].

Placing these ideas within the broader framework of "information literacy" serves as a foundation for understanding and addressing many challenges associated with learning through electronic libraries. An electronic library is an integrated information system that allows people to accumulate, store, and effectively use various collections of electronic full-text and multimedia documents available in a user-friendly form [18, 20]. Databases, maps, user maps, links, other ELs, etc. are also objects of processing in the EL in addition to electronic documents.

Currently, there are several examples of e-learning supported by digital libraries. For example, the USA National Scientific Digital Library website contains a series of educational materials related to science for teachers using the Internet and for students continuing their independent studies [17]. Furthermore, the Digital Library for Teaching the Earth System has been developed to provide a comprehensive collection of materials on Earth sciences. This library was curated by a collaborative effort involving teachers, students, and scientists with the aim of enhancing the quality of Earth sciences education across various academic levels. It offers instructors access to high-quality educational resources and archives to support their teaching endeavors [8].

To study how digital libraries effectively support e-learning and increase learning efficiency, it is necessary to clearly understand the interaction between students and digital libraries in the learning process. Digital libraries should provide high-quality information organization and reliable information retrieval systems for the convenience of students when searching and viewing digital collections to gain knowledge through reading and learning [22]. Well-organized information can help students create, integrate, and manipulate knowledge rather than just passively accept knowledge [23].

History teaching has been transformed because of digitalization and the informatization of society [24]. The effectiveness of studying any subject, including history, hinges on the teaching methods employed by educators.

Consequently, traditional approaches used in history instruction, such as reading paragraphs, taking notes, memorizing dates, and utilizing printed maps or atlases, are considered outdated and ineffective in today's educational landscape. The use of old methodological approaches indicates the unwillingness of teachers to use modern interactive technologies actively [25]. Modern interactive technologies are effective in studying history because practice-oriented teaching is one of the actual methods [26].

For a more comprehensive understanding, let us examine examples of electronic libraries and virtual tours [1, 2, 13–15]. Electronic Libraries: 1) Google Scholar: This library allows students to access scholarly articles, books, and other academic resources in digital format, distinguished by broad coverage and quick search capabilities. 2) PubMed: A specialized digital library dedicated to medical and scientific articles, offering access to databases containing extensive medical research, peer-reviewed journals, and other resources in the fields of biology and chemistry. 3) Project MUSE: This digital library specializes in humanities research, providing access to a wide range of academic journals, books, and electronic resources in the social and humanities sciences. Virtual Tours: 1) Google Arts & Culture: A platform that facilitates virtual visits to museums and art galleries worldwide, allowing users to explore collections and exhibitions through virtual reality technology. 2) 360Cities: A specialized platform for virtual tours offering 360-degree exploration of various locations, including historical landmarks and natural wonders. 3) AirPano: Virtual tours presenting panoramic shots from different corners of the world, encompassing places of historical significance and cultural objects.

In contemporary historical education, scholars increasingly utilize digital tools to conduct diverse research endeavors [27]. Digital technologies offer historians rapid access to necessary sources, as archives are digitized and made available on library websites or online learning platforms [28]. New methods of analyzing historical data (digitization of materials, 3D visualization) and studying history appear based on digital information technologies [29]. Some Polish researchers conducted a similar study on the significance of digital documents [30]. However, it is important to acknowledge that many historical documents have not been digitized, posing challenges for historians, particularly during a pandemic when access to physical libraries is restricted. Consequently, the issue of digital archives remains pertinent.

Students can use digital archives with photographs and documents as visualizations in history lessons, attracting their attention and increasing their motivation to learn [31]. The influence of visualization and interactive technologies on the motivation of students to study history is analyzed while improving academic performance and perception of distance learning [32].

Virtual tours have the potential to mitigate student disengagement, as evidenced by previous studies indicating that the utilization of panoramas and virtual artifacts enhances students' engagement with the learning material and enhances their enjoyment of the learning experience [12, 14]. Another paper used a virtual tour as a means of studying history during classes [33]. Its data were collected through interviews, observations, and documentary research. Based on the findings of the study, teachers utilize virtual tours with the objective of acquainting students with historical heritage and encouraging them to participate in educational excursions. They organize teaching and learning well when using virtual tours. Students are enthusiastic about the implementation of virtual tours as a method for studying history because it allows them to become familiar with historical heritage and locations without the need for direct visits.

Like every teaching method, using digital Libraries and Virtual tours has its pros and cons. Modern digital libraries and tours not only digitize resources, they also offer integrated environments with collections, information services, and academic activities to preserve knowledge and effectively support learning [17, 34].

The greatest strengths of digital libraries and virtual tours lie in their ability to offer limitless information, diverse formats, unlimited navigation possibilities, and support for combining materials in numerous ways [18–20]. Moreover, such technologies have more efficient, accurate, and guaranteed authenticity. They provide easier plagiarism control. Teachers can also prepare educational materials without digging through piles of books on the shelves [34]. Students can easily access knowledge from digitally stored materials. Authors will be proud that their articles are highly cited. People can access such technologies from anywhere, which makes them easier to use [35].

The lack of clarity is one of the main cons regarding copyright, and the digital transmission of readable materials through computer networks. It is impossible to access in case of technical problems, such as internet damage and blackout [34, 36].

III. Methods and Materials

A. Study Design

This study employs a one-group experiment design. In this type of research, there is no control group for comparison, and researchers analyze the impact of factors or phenomena on a single group of participants without using a control group.

In the study, a survey method was utilized to assess the effectiveness of learning by measuring students' motivation indicators to study history when using digital libraries and virtual tours during classes. Additionally, to measure the effectiveness of student learning, researchers employed a statistical analysis method—examining students' creative thinking both before and after the program. For this purpose, Williams' "Cube" model was employed to assess students' creative thinking [36].

To validate the effectiveness of the teaching and the methods employed, students completed two assessments: one before and one after the study material. The first assessment highlighted existing knowledge of history acquired through traditional teaching methods before the experiment. The second assessment focused on the knowledge gained by students during the experiment, incorporating the use of innovative technologies.

Several historical research methods were also utilized in this study: the analysis of historical sources and literature—to identify existing knowledge regarding the use of electronic libraries and virtual tours in history instruction; the method of historical observation and experimentation, coupled with virtual tour technology, aided in reproducing and modeling certain historical conditions to study their potential consequences.

B. Sampling

The study was conducted at the Department of History of Russia, Peoples' Friendship University of Russia named after Patrice Lumumba (RUDN University). 60 bachelor students of the "History" specialty took part in the experiment. The average age of the participants was 21 years old. 45 males and 15 females participated in the study. Four teachers of history in the same department also participated in the survey process together with the students of history. The teachers had higher education (Candidate of Historical Sciences degree) and work experience of more than 5 years. Participation in the study was voluntary.

C. Procedure

The students were invited to take a 3-month course of study on the subject of "History" using digital libraries and virtual tours (Figs. 1–3). All classes were held in university classrooms. Before the experiment, all the students received a questionnaire form by mail (Appendix 1). To answer the questionnaire, the students had a day before and after the experiment.

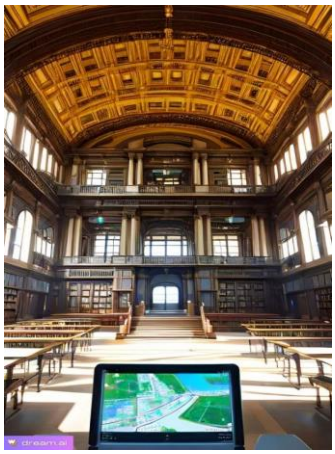

Fig. 1. View of the virtual library.

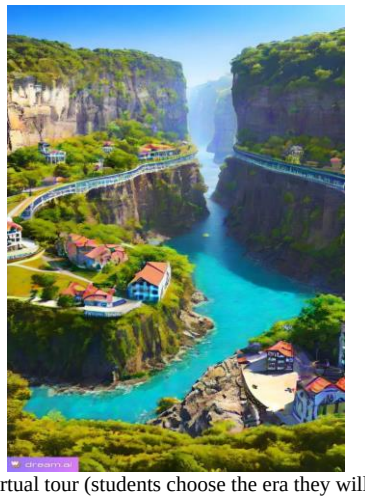

Fig. 2. Virtual tour (students choose the era they will study).

Fig. 3. Virtual Tour on the topic "Attempts to falsify the Great Patriotic War and the role of the USSR in World War II".

The training program comprised a thematic module titled "Digital Technologies in the Study of History," which was subdivided into classes designed to introduce students to digital technologies, enhance motivation for studying, and improve knowledge levels in history (Table 1). History classes took place 3 days a week and lasted 1 academic hour.

Table 1. Course outline for history students

Subject	History
Number of classes per week	3
Duration of classes	1 academic hour
Participants	Teachers, students
Topics studied	1. Attempts to falsify the Great Patriotic War and the role of the USSR in World War II. 2. The partisan movement during the Great Patriotic War. 3. The Cold War and the collapse of the world colonial system. 4. The Soviet atomic project and the scientific and technical revolution. 5. International relations in the XXI century and the formation of a multipolar world order.
Equipment	Computers, headphones, an interactive whiteboard, the Internet, screen projection units, 3D printing, an electronic library, textbooks.

The researchers used specially selected materials for the course to familiarize the students with digital libraries, virtual excursions, and the peculiarities of their use in the study of history. They chose the newest period of the development of world history for the study. Therefore, the topics of the curriculum aimed to study various aspects of the history of different countries.

The digital technology application program offers students a high level of material clarity by providing various supplementary resources in addition to text. Respondents have the opportunity to access accompanying audio, media, and graphic materials related to the topic, enhancing their understanding and engagement with the material. To study the curriculum, the students needed computers and headphones to view materials and access educational platforms. Implemented digital technologies allowed the students to view images, videos, and dates of events. In

particular, the students had to find common and distinctive features of participation in the scientific and technological revolution of Western states and countries of the socialist camp in the 1950s–1980s after studying the relevant materials.

To assess the impact of virtual tours and libraries on student learning, regular lessons incorporated a traditional presentation format, which consisted of static images depicting historical places and events projected using a projector. Each image was overlaid onto a map of the historical site, with an arrow indicating the location and direction of view, allowing students to navigate in space. Navigation between different panoramas was facilitated by movement arrows displayed on a separate panorama, connecting to neighboring locations.

The virtual tours utilized in this study comprised a series of interconnected 360-degree photographic panoramas captured at specific locations. These panoramas featured information hotspots that, when clicked, provided viewers with text, photographs, or video information. The selection of objects for inclusion in the virtual tours was based on their availability on the website of the Electronic Library of History and access to high-quality photographs. Additionally, objects were chosen to offer a diverse range of historical events representation.

Before the experiment, the teachers, and all the students had access to the electronic library and virtual tours. To be acquainted with the technology and view all its components, they had to log in using a Google account. The researchers sent everyone an invitation to join the course and provided them with an access code by email. To log in, each teacher or student had to enter his or her email address and the access code. The platform page contained the program, materials, and links to all the sites for familiarization with digital technologies or downloading applications necessary for training.

D. Data Collection

To collect the data, the researchers applied historical research methods aimed at evaluating the effectiveness of digital technologies in teaching history. In particular, they used the survey method, which is a widely used tool in social science research. The study involved two surveys developed by teachers: the first was before the experiment and the second took place after its completion. The surveys measured the effectiveness of electronic technologies for learning history according to the curriculum. Each student received the questionnaire by mail. Appendix 1 presents the questions included in the questionnaire. The teachers provided clear explanations to the students regarding the anonymity of the survey and the absence of a requirement to provide "correct" answers. This approach aims to reduce socially desirable responses and enhance openness in the students' answers. Efforts were made by the teachers to ensure diversity and balance in the questions, mitigating the impact of research expectations on student responses.

In addition, the researchers evaluated the creative thinking of students before and after the program based on the Williams "Cube" model. This historical method measures creative thinking and awakens the historical imagination of students. It also evaluates the ability of students to analyze and interpret historical events, express their thoughts and ideas, as well as generate new ideas based on historical knowledge. Hence, the researchers employed a combination of surveys and historical methods to evaluate the effectiveness of digital technologies in history instruction and students' creative thinking. These methodologies yielded data on the perception and efficacy of electronic technologies for both learning and teaching history.

E. Statistical Data Processing

The respondents' answers were processed in Statistica and Microsoft Excel. The students were asked to evaluate the effectiveness of the teaching method using digital technologies on the 5-point Likert scale. The frequency of the students' answers to the questionnaire was recorded in the SPSS application (Version 26) by assigning the highest score of 1 (5/5 = 1) "very good" and 0.8 (4/5 = 0.8) points "good", etc. The answers were coded to provide clarity in the analysis.

The Analysis of Variance (ANOVA) was employed to determine whether there were statistically significant changes in students' knowledge between groups (pre-test and post-test). Significant differences between groups could indicate the effectiveness of the teaching. Standard Deviation (SD) analysis was applied to assess the degree of variability in the data; a large standard deviation may indicate a wide range of results, which can also be of interest in evaluating the effectiveness of the teaching.

F. Ethical Issues

After approval by the administration of the educational institution, the researchers arranged and conducted this study. Before the start of the research activity, they drew up a research report, mandatory for all the participants and administrators. The study was carefully coordinated with all the participants. The personal data of the participants were anonymous to other participants of the research process and were not distributed outside the experiment. All the participants gave their written consent to participate in the study.

IV. Results and Discussion

At the end of the experiment, the researchers obtained the results, summed up in Tables 2 and 3.

Table 2. The students' answers to the questionnaire before the experiment, evaluated on the 5-point Likert scale

Questions	5-point Likert scale				
	1	2	3	4	5
What approaches to studying history does your educational institution employ: Traditional or modern?	65%	0%	0%	35%	0%
Are digital libraries utilized in the classroom for studying history?	30 %	0%	0%	58%	12%
Does the use of digital tools impact your motivation to study history?	7%	0%	18%	0%	75%
Do you believe it is essential to integrate modern digital technologies into the educational process?	10%	5%	5%	10%	70%

In the initial survey, the majority of students (65%) reported the use of traditional methods, while 35% indicated the use of modern ones. These findings suggest a low level of technical competency and digital skills among students, indicating the need for the integration of such skills into the educational process. Traditional teaching methods, which teachers use, based on reading, memorization, and mechanical reproduction of educational material, as well as the low level of technical competence of teachers may be the influencing factors.

The majority of the students (58%) noted that they rarely used digital libraries during history lessons. At the same time, 30% said that they did not use digital libraries to study history and only 12% reported they used such libraries during lessons. These findings highlight a lack of familiarity with modern digital technologies and their application by teachers in the classroom. As a result, there is a pressing need to update and enhance history teaching methods to incorporate these technologies effectively. Modern digital technologies, such as electronic libraries, increase the technical competence of students and the effectiveness of teaching.

A. The Impact of Digital Technologies on Student Motivation

In the first survey, 40% of the students rated their motivation to study history as average, 45% as low and 15% as high. These data indicate an average level of motivation of the students to study history. Several factors may contribute to students' general disinterest in learning, including the use of outdated teaching methods by teachers, the uninteresting presentation of educational material, and the limited utilization of modern teaching methods and digital technologies.

Furthermore, 75% of the respondents indicated that the use of digital libraries had positively impacted their motivation to study history, while 18% found it challenging to respond to the question, and 7% stated that the use of digital technologies had not influenced their motivation to study history. Since the number of those who did not catch the motivational impulse from the use of digital learning tools (7%) is limited compared to those who realized the benefits (75%), the researchers can conclude that the use of digital libraries helps to increase students' motivation to study such a subject as history.

Table 3. The students' answers to the questionnaire after the experiment, evaluated on the 5-point Likert scale

Questions	5-point Likert scale				
	1	2	3	4	5
What approaches to studying history does your educational institution employ: Traditional or modern?	65%	0%	0%	35%	0%
Are digital libraries utilized in the classroom for studying history?	30%	0%	0%	58%	12%
Does the use of digital tools impact your motivation to study history?	2%	0%	10%	3%	85%
Do you believe it is essential to integrate modern digital technologies into the educational process?	5%	3%	3%	8%	80%

At the end of the history course using the digital technology method, the second survey took place and showed an increase in all the indicators (Table 3). As a result, following the experiment, the majority of students (85%) reported that the use of digital technologies had indeed influenced their motivation to study history. However, 10% found it challenging to respond to this question, and 2% stated that digital means had not impacted their motivation level. When comparing the results obtained during the first and the second surveys, 20% of the students rated their motivation to study history as high, 50% as average, and 30% as low.

The instructors identified several potential foundations for the positive impact of digital tools on student motivation:

Interactivity: The incorporation of interactive elements into digital tools makes classes more engaging and interesting. Interaction with historical material through virtual instruments promotes active student participation in the learning process.

Multimedia Content: Integrating visual and auditory elements into history education helped create deeper and more vivid understandings of the past. The use of visually appealing materials enhanced students' interest in learning.

Open Access to Resources: Providing students with open access to digital resources, such as e-books and virtual tours, increased their independence in learning and stimulated their research endeavors.

B. The Influence of Digital Technologies on the Students' Creative Thinking

Prior to the experiment involving the use of digital technologies for studying history, approximately 44% of history students exhibited an average level of creative thinking. This underscores the significant potential of creative thinking as a key competency in the field of study, highlighting the importance of its development through the digitalization of education.

The respondents' answers were as follows to the question "What professional competencies and skills are developed when using digital tools?" before and after the experiment, respectively: "modern technologies"—52%, "creativity"—55%, "critical thinking"—50%, "strategic thinking"—45% and "practical skills"—68%; "modern technologies"—71%, "creativity"—69%, "critical thinking"—71%, "strategic thinking"—58%, "practical skills"—80%.

Thus, the indicators increased by more than 10% compared to the first survey. Such results indicate the need to expand the course being implemented to obtain larger-scale shifts in history teaching. At the same time, almost all the students (80%) advocated the introduction of digital libraries into their educational process of studying history, considering it an integral part of the development of higher education. Only 5% of the students surveyed did not feel a special need for this. These students were proponents of traditional history teaching methods from textbooks, expressing concerns that the extensive information available on the internet could distort the essence of the material. However, nearly 75% of the students expressed the belief that the history teaching system would benefit from the

integration of digital technologies, while 70% believed that the digitalization of historical education would positively impact students' creativity.

The results of the Williams method of creative thinking testing show that only 15% of the students had a high level of divergent thinking before the experiment, and their share increased to 51% after the experiment. This testifies to the beneficial effect of digital technologies on the creative thinking of the students of history. That is, the growth of divergent thinking of university students is one of the arguments in favor of the digitalization of history teaching.

C. The Students' Performance Results

The improvements in student performance were quite noticeable when comparing the responses from the pre-experiment and post-experiment control tests (Table 4).

Table 4. Statistical analysis of the students' answers before and after the course of digital libraries and virtual tours

Survey	Number of students	Value	SD
1 academic work	60	4.22	77.5
2 academic work	60	6.21	81.9

From the standard deviation data, it can be seen that the average score was 77.5 before training, and 81.9 after. This indicates a significant improvement in the student's academic performance against the background of the introduction of digital technologies. When comparing the results obtained in the two control works, the researchers can conclude that using electronic libraries and virtual excursions is effective for studying history and increases motivation to learn history.

All the indicators experienced an increase, particularly those related to motivation and creative thinking (creativity, critical thinking, and strategic thinking). This suggests the feasibility of integrating digital technologies into the educational process.

Therefore, the researchers can conclude that virtual libraries and tours enable students to access archival documents online, and digital technologies, especially visualization tools, facilitate the study of history, making it more engaging and thus increasing students' motivation to learn.

D. Integration of Electronic Libraries and Virtual Tours in Education

The authors of this study provide the following recommendations for educators and educational institutions seeking to integrate digital tools into the educational process:

- Offer teachers ample training courses and workshops focused on utilizing electronic libraries and virtual tours in the educational process.
- Support the creation of high-quality educational resources, including electronic materials and virtual tours specifically adapted for particular subjects and courses.
- Incorporate digital tools into curricula, ensuring students have access to modern educational technologies within academic programs.
- Guarantee the availability of essential technical infrastructure, including high-speed internet, computer labs, and trained technical personnel.
- Integrate digital tools into distance learning methodologies, creating interactive educational platforms for the learning process.
- Facilitate the exchange of experiences among teachers within and outside the educational institution, establishing mechanisms for discussing successful practices.
- Create conditions for students to conduct research using digital tools for data collection and analysis.
- Regularly assess the effectiveness of the integration of digital tools by collecting feedback from students and analyzing the results.

Based on these recommendations for educators, the authors emphasize the possibility of integrating electronic libraries and virtual tours not only for historians but also for other educational disciplines. For instance, integration into literature courses: students can use electronic libraries to access texts of classical literature, and virtual tours for exploring places related to authors and events in literary works; incorporation into biological sciences: biology students can study ecosystems through virtual tours, and electronic libraries provide access to current research and guides on biological topics; utilization in the field of "Economics": virtual tours can give economics students an understanding of the operations of various enterprises, while electronic libraries can be used to study current data and articles; integration into medical education: electronic libraries offer medical students access to medical research, and virtual tours can help explore the history of the development of medicine in specific medical institutions; integration into social sciences: social science students can use virtual tours to study sociocultural aspects, and electronic libraries for analyzing historical research.

However, the authors of the study are aware of the implications for education when employing innovative technologies in teaching. Therefore, the following aspects need to be considered in education:

1) Technical Limitations: Currently, there is limited availability of technical resources for both students and educational institutions. Furthermore, challenges related to network stability and internet speed persist, particularly for students residing in remote regions.
2) Digital Divide: Inequality in access to digital technologies may lead to the creation of a digital divide among students, as some may be more accustomed to using electronic resources.
3) Educational Strategies: Integrating digital technologies into a traditional history course may pose challenges for educators, particularly if they lack adequate training or resources.
4) Security and Privacy: Addressing issues related to the collection and storage of students' data when using digital tools is essential.
5) Lack of Standards: The absence of a unified system or standard for evaluating and implementing digital technologies in history education can result in a diversity of approaches.
6) Technological Dependence: Relying on digital tools may lead to problems in case of technical failures or if there is a decision to discontinue their use.

7) Infrastructure Costs: Ensuring adequate technical infrastructure may require significant financial investments from universities and educational institutions.

Nowadays, interactive digital tools for visualization of theoretical material accompany the teaching of various subjects, in particular history, in the framework of higher education [37]. Digital libraries and virtual tours are one of such methods.

The literature explores the potential of using digital games as a tool for studying history [38]. Researchers developed a game based on real historical events, which resulted in increased cognitive abilities among players, as demonstrated by the experiment. A similar study was conducted in Portugal, where a mobile game was developed to explore the history of the country [39]. Its user-friendly interface made it accessible not only to students but also to schoolchildren. Additionally, this approach opens up possibilities for developing new games to study the history of other countries.

Researchers from Finland investigated the effectiveness of 3D immersive learning environments, in online: archives and libraries in history education, examining their impact on students' motivation for reading [40]. Their findings indicated that the motivational characteristics of students increased due to the interactive learning environment, online archives, and online libraries. These results corroborate the findings mentioned earlier, as the students' motivation levels increased, and indicators of professional skills and competencies improved by more than 10% following the experiment utilizing digital technologies, online archives, and online libraries.

Researchers from the USA examined the utilization of online archives and libraries in the study of history, determining that modern digital technologies had an impact on students' motivation to learn [41]. Similar to the study described in this paper, the benefits of using online libraries and archives included ease of access, visualization of historical events and figures, digitized documents spanning various historical periods, maps, films, videos about historical events, and other resources.

Innovative technologies are employed not only in the study of history. In two universities in Russia and one university in Kazakhstan, a blended learning system has been implemented for teaching econometrics. The aim of the research was to analyze the effectiveness of fostering general cultural competencies among economics students within a blended learning environment [42]. To assess the effectiveness of fostering general cultural competencies, a questionnaire was developed and administered. The analysis of the research results confirmed a number of hypotheses, including that blended learning contributes to the formation of professional identity and the development of communicative skills, fosters self-organization, and self-education skills, and does not lead to a decrease in academic performance. This study aligns with the latest hypothesis that innovative teaching does not result in a decrease in academic performance: from the standard deviation data, it is evident that the average test score was 77.5 before the experiment and 81.9 after. The results of this work demonstrate a significant improvement in students' academic performance in the context of implementing digital technologies.

E. Limitations

The limitations of the study are associated with a small sample of 60 people. Moreover, only one university participated in the experiment. Therefore, the results are not relevant for the whole country. The researchers did not consider the gender of the participants.

Moreover, the survey method, as a data collection tool, has its limitations:

1) Bias and Socially Desirable Responses: Students may provide answers they consider socially desirable or align with researchers' expectations, potentially affecting the credibility of the results and introducing bias towards a more positive attitude toward the use of digital technologies.
2) Subjectivity in Evaluation: Assessing attitudes can be subjective and subject to individual interpretation by researchers. Different scholars may evaluate responses differently, impacting the objectivity of the study.
3) Responses with Specific Expectations: Some survey questions may embed certain expectations from researchers, influencing students' responses and leading to data skewing in a direction favorable to the research.
4) Future research should consider these limitations for a better analysis of the influence of digital libraries used to study history.

V. Conclusions

The effectiveness of the utilized technologies in the educational process was determined based on students' perceptions, using indicators of their motivation and creative thinking. According to the survey results, 75% of respondents indicated that the use of electronic libraries influenced their motivation to study history, 18% of students were unable to respond to the question, and 7% indicated that the use of digital technologies did not affect their motivation to study history. Given that the proportion of those who did not perceive a motivational impulse from the use of digital learning tools (7%) is limited compared to those who recognized the benefits (75%), researchers can conclude that the use of electronic libraries contributes to an increase in students' motivation to study subjects such as history.

The results of the creative thinking test show that only 15% of students had a high level of creative thinking before the experiment, and their share increased to 51% after the experiment. This indicates the beneficial impact of digital technologies on the creative thinking of history students. Regarding students' academic performance, from the standard deviation data, it is evident that the average score was 77.5 before innovative teaching and 81.9 after. This demonstrates a significant improvement in student performance in the context of implementing digital technologies.

The novelty of this study lies in the substantiation of a significant reform of higher historical education through the introduction of digital tools in teaching. Given the limitations of traditional methods of teaching history, digital tools represent an innovative approach that helps modern students

assimilate the material more effectively. In addition, it increases their motivation and interest in the subject. Thus, the use of historical methods within the introduction of digital tools into the teaching of history is a key feature of this study and confirms its novelty and relevance.

The authors also identified potential areas for further research: it is necessary to conduct studies with a larger group of participants from various specialties and educational levels to obtain more accurate and generalized results; Extending observation periods will allow for a more comprehensive assessment of the long-term impact of digital technologies on student learning and motivation; Performing in-depth interviews can provide additional context and insight into individual students' experiences with using digital technologies in education; Research is also needed to assess other factors that may affect learning outcomes.

The possibility of studying history using digital libraries and virtual tours at other universities located in different countries explains the practical significance and prospects for further research. The practical significance of the results obtained lies in the possibility of introducing digital libraries and virtual tours not only into history teaching but also into teaching other academic disciplines at universities around the world.

APPENDIX

Appendix 1: Student survey

1) What approaches to studying history does your educational institution employ: traditional or modern?
2) Evaluate your level of motivation to learn: high, medium, low.
3) Are digital libraries utilized in the classroom for studying history?
4) Does the use of digital tools impact your motivation to study history?
5) In your opinion, what professional competencies and skills are developed when using digital tools?
6) Will the system of teaching historical subjects improve when using online libraries and virtual tours?
7) Was it convenient for you to work with the teachers using online libraries and virtual tours?
8) Will digitalization of teaching affect the level of your creative thinking?
9) How do you think digital libraries and virtual tours affect your motivation to study history?
10) Do you believe it is essential to integrate modern digital technologies into the educational process?

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

S.T. and M.M. conducted the research; S.T. analyzed the data; M.M. wrote the paper; all authors had approved the final version.

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