

DOI: <https://doi.org/10.34069/AI/2024.82.10.6>

How to Cite:

Halukha, L. (2024). Analysis of achievements and prospects for the use of innovative technologies in the study of the history of Ukraine. *Amazonia Investiga*, 13(82), 81-90. <https://doi.org/10.34069/AI/2024.82.10.6>

Analysis of achievements and prospects for the use of innovative technologies in the study of the history of Ukraine

Аналіз досягнень та перспектив використання інноваційних технологій у вивченні історії України

Received: August 28, 2024

Accepted: October 26, 2024

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Abstract

The current trends in digitalisation of education have a significant impact on the study of the humanities, including history. The purpose of this article is to analyse the achievements in the use of innovative technologies in the study of Ukrainian history and to determine their impact on the quality of education. The realisation of this task is based on the use of the method of content analysis of scientific literature selected using the PRISMA methodology. The results of the study show that interactive technologies are quite effective in teaching the history of Ukraine. VR and AR are important tools that allow students to more effectively perceive complex historical material. The use of online platforms and social media contributes to the dissemination of historical knowledge, providing access to lectures by leading historians, interactive tasks, online conferences, etc. A number of problems have also been identified on the way to introducing innovative technologies in history teaching. First of all, it is the high cost of equipment and maintenance, the resistance of some teachers to innovations, etc. The conclusions note that the use of innovative information technologies in the study of the history of Ukraine significantly expands the possibilities of the educational process.

Keywords: historical research, digital technologies, educational innovations, virtual resources, interactive learning, history of Ukraine.


Introduction

Given the rapid development of digital tools, multimedia resources and interactive platforms, new opportunities for teachers are now available. This makes learning history more engaging and accessible to

Анотація

Сучасні тенденції діджиталізації освіти мають значний вплив на вивчення гуманітарних дисциплін, зокрема історії. Метою цієї статті є аналіз досягнень у використанні інноваційних технологій при вивченні історії України та визначення їх впливу на якість освіти. Реалізація цього завдання ґрунтується на використанні методу контент-аналізу наукової літератури, відібраної за допомогою методології PRISMA. Результати дослідження показують, що інтерактивні технології є досить ефективними у викладанні історії України. VR та AR є важливими інструментами, які дозволяють учням більш ефективно сприймати складний історичний матеріал. Використання онлайн-платформ та соціальних мереж сприяє поширенню історичних знань, надаючи доступ до лекцій провідних істориків, інтерактивних завдань, онлайн-конференцій тощо. На шляху впровадження інноваційних технологій у викладанні історії виявлено також низку проблем. Насамперед, це висока вартість обладнання та його обслуговування, опір деяких вчителів нововведенням тощо. У висновках зазначається, що використання інноваційних інформаційних технологій при вивченні історії України значно розширює можливості навчального процесу.

Ключові слова: історичні дослідження, цифрові технології, освітні інновації, віртуальні ресурси, інтерактивне навчання, історія України.

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students. Therefore, a thorough analysis of the prospects for using innovative technologies in the study of Ukrainian history is important for further study through the prism of digitalisation. An analysis of the achievements and prospects of using innovative technologies in the study of Ukrainian history is relevant, as it will help identify key barriers and point to new opportunities for their use to implement effective learning.

Specificity of the problem

Despite the significant potential of innovative technologies, their use in the study of Ukrainian history remains limited due to a number of problems. In particular, there is uneven access to modern tools and technologies, insufficient teacher qualifications, and limited content. All of these problems affect the quality of modern teaching and learning of special topics in Ukrainian history. Moreover, the teaching of history in educational institutions in many aspects depends on the combination of the skill of teachers and the possibilities of the educational environment. The modern educational environment is shaped by the use of innovative digital technologies that ensure accessibility and flexibility in the process of acquiring knowledge. In addition, the modern market of educational technologies offers a wide range of opportunities for improving the organisation of the educational process. In the field of history, the competent use of these tools and technologies makes it possible to bring to life certain historical events that are necessary for studying, to transport students to different eras and events. At the same time, they also make it possible to make the information more visual and thus more accessible, more understandable (Challenor & Ma, 2019). In addition, according to current research, interactive approaches promote critical thinking and creativity, as they allow for alternative versions of events and engage students in innovative active learning (Kaldygozova, 2024; Hamidi & Chavoshi, 2018). Thus, modern technologies open up new opportunities to support innovative development of education. Thus, in the scientific discourse, there is an ambiguous attitude towards the use of modern digital technologies for the study of history. For this reason, this issue needs to be studied in more detail and further strengths and weaknesses in the use of digital technologies in history education should be identified.

The aim of this study is to analyse the achievements in the use of innovative technologies in the study of Ukrainian history and determine their impact on the quality of education. The main research questions are as follows:

1. What are the main technologies for innovative teaching of Ukrainian history?
2. What opportunities does the use of information technology in the educational process offer?
3. What are the obstacles to the use of information technology in the study of Ukrainian history?

Therefore, the main objectives of the study are as follows: 1. Identification of the main technologies used in innovative teaching of Ukrainian history. 2. Analysing the main opportunities and strengths of digitalised history teaching. 3. Characterising the main problems of using digital resources and formulating potential recommendation solutions to address the identified challenges.

Literature Review

The impact of digitization on history teaching

Modern researchers have characterized the impact of digitalization on the development of modern education. The works of modern scientists have proved the importance of introducing innovative teaching approaches to the educational system (Raja & Nagasubramani, 2018). The study by Al-Ansi et al. (2023) characterized the role of augmented and virtual reality in education. The authors of the article emphasized that these technologies contribute to the interest and greater involvement of students. This is confirmed by the results of Asencio et al. (2019), who described the technical capabilities of virtual reality in the space of modern education.

Online platforms and interactive learning

In addition, Bernacki et al. (2020) characterized various mobile technologies used in education. The authors drew attention to their advantages and described their impact on the development of modern education. Bobro (2024) described the features of the introduction and use of artificial intelligence in education. The author claims that it is crucial while evaluating and testing pupils. The adoption of a person-centered

approach, which is desired in contemporary education, is also guaranteed by this technology. Bonfield et al. (2020) described the main transformational changes in education in connection with the introduction of the 4.0 system, which is designed to make the digitalization process more widespread. At the same time, the use of modern digital and information technologies influences on the process of formation of new opportunities for modernizing and optimizing the learning process (Pokharel et al., 2024; Kaldygozova, 2024; Raja & Nagasubramani, 2018).

Granić & Marangunić (2019) reviewed the main technologies used in modern innovative education. The studies by Falqueto et al. (2019) emphasized the importance of implementing approaches to the education system that develop practical skills in students. In particular, the authors emphasized the importance of stakeholder engagement. Kaldygozova (2024) described the role of using mobile technologies to optimize the learning process. Challenor, & Ma (2019) reviewed the possibilities of augmented reality in the history learning system. The authors drew attention to the fact that these technologies allow for historical tours and quests.

Moreover, modern researchers also emphasized the importance of introducing modern technologies in the study of history, the authors mainly identified the impact of 3D technologies on the study of history. Wright-Maley et al. (2018) described the main possibilities of digital simulation in the process of studying history. The authors paid special attention to the role of gamification in this process. Thus, these works form an important theoretical basis for the article. However, given the current trends, it is important to demonstrate the role of these technologies in the study of Ukrainian history.

Methodology

Data design

The realisation of the proposed purpose of the article requires the use of certain scientific methods. The study is based on a qualitative approach, and therefore it is based on proven scientific sources. Among them are scientific articles (published in scientific journals included in international scientific and scientific metric databases), certain methodological manuals, statistics, monographs, chapters in collective research projects, texts of speeches at conferences, and preprints of individual publications. Taking into account the different positions of scholars on the problematic issues of studying the history of Ukraine through the prism of interactive digital technologies allowed us to achieve the desired level of impartiality in the formation of the proposed results and conclusions.

Data selection

The work of collecting the necessary scientific literature required several stages. At the first stage, the work on the article required collecting the necessary information by searching for scientific sources. This search was carried out by analysing publications indexed in scientific and metric databases, in particular, Elsevier (Scopus), Web of Science, and Google Scholar. To update the search for the necessary information, a set of keywords was used: historical research, digital technologies, educational innovations, virtual resources, interactive learning, history of Ukraine. The search yielded 432 results. This list excluded those scholarly publications that were repeated, and excluded works written by Russian or Belarusian scholars (due to their possible bias in relation to Ukrainian history). As a result of this selection, the list of scientific literature was reduced by 161 items.

During the second stage, a thorough analysis of the abstracts of scholarly publications was carried out. This made it possible to remove those articles that did not contain information on the use of interactive technologies in the study of Ukrainian history (despite the coincidence of keywords). Thus, another 143 search results were eliminated on this basis. At the third stage, to take into account the relevance of the information provided, a range of dates for scientific research. First of all, the works created since 2018, i.e. within the last 6 years, should be taken into account. This approach allowed us to remove 36 papers from the list. This low number is explained by the fact that the research topic is quite new: the active use of digital technologies in education generally began as a result of the COVID-19 pandemic, and then it came to the understanding of new technologies in the field of historical education.

During the fourth stage, additional criteria were introduced to exclude those papers that did not contain important information about the purpose of the study. These criteria were the following:

1. The scientific publication deals with the use of digital technologies for teaching the history of Ukraine.
2. The scientific publication is devoted to the problems of using interactive technologies in education in general, including history teaching.
3. The topic of the scientific publication is related to historical research, digital technologies, educational innovations, virtual resources, interactive learning, and the history of Ukraine.

Taking into account these selection criteria, 30 scientific publications were left for further analysis. Another 3 articles were added by the authors, as they were the basis for previous studies, so they generally meet the proposed search criteria (see Table 1).

Table 1.
Data Collection and Selection Process

Data Processing Stage	Number of Publications
Total Results	432
Removal of Duplicates	-161
Removal of Irrelevant Studies	-143
Date Range Reduction	-36
Filtering by the Criteria	
Criterion 1	-15
Criterion 2	-16
Criterion 3	-14
Number of Included Sources	30
Additional Sources	3
Total	33

Source: Author's development

Data analysis

The scientific literature was processed using the method of content analysis of scientific literature. Content analysis is the most appropriate method to address the research questions in this article. In particular, it makes it possible to implement a systematic approach to the analysis of sources and to structure a large array of information related to the teaching of history. This method allowed us to reveal the views of scholars on the existing issues, to highlight the main opinions of researchers on the importance of digitalising history as a science and an academic discipline.

However, it is also worth pointing out the limitations of this methodological approach. Since the qualitative approach often relies on the researcher's interpretation of the data, bias or subjectivity may occur. This should be taken into account when interpreting these results.

Results and Discussion

The Russian-Ukrainian war proved the necessity of studying history and the importance of forming a strong national identity (Halukha, 2024). Studying the history of Ukraine allows us to reveal the rich cultural heritage and important stages of the struggle for independence, which in turn will influence the formation of civic consciousness and critical thinking among students. Within the modern educational paradigm, information technology in the process of learning and teaching history allows us to expand the scope of students' historical knowledge and resolve the issue of lack of interest or rejection of complex historical material (Brennan, 2018; Cowling et al., 2022).

At the same time, the use of modern information technologies helps to unlock the potential of students' scientific outlook, critical and creative thinking, and social consciousness. In particular, in the process of using these tools, students develop such important skills as digital literacy, digital communication and collaboration in online environments, which are components of information competence (Kulish et al., 2020). These skills are becoming increasingly important in the current labour market (Leshchenko et al., 2020). Within the modern educational paradigm, information technologies in the process of teaching history are becoming increasingly important and allow students to expand the scope of historical knowledge.

Among the main technologies that help teach the history of Ukraine are virtual and augmented reality. Their application is important when studying the problematic issues of the struggle for Ukrainian statehood, and especially in the conditions of the Russian-Ukrainian war since 2014. The use of VR is important for creating or showing virtual tours of historical sites, battles, or reconstructions of everyday life events in different eras. These tools allow students to immerse themselves in the past and ‘see’ certain historical events with their own eyes (Parong & Mayer, 2021). For example, these technologies are used to show reconstructions of the life of Rus-Ukraina, the Battle of Kruty, or the everyday life of Ukrainian cities in different eras. At the same time, the possibilities of augmented reality are also vast. These technologies allow us to overlay digital objects on the real world (Villena Taranilla et al., 2019). We are talking about interactive maps or museum exhibits that come to life with the help of smartphones or tablets. In addition, special QR codes placed on various educational materials have begun to play an important role in Ukraine. Such tools can provide additional information about historical events (see Figure 1).

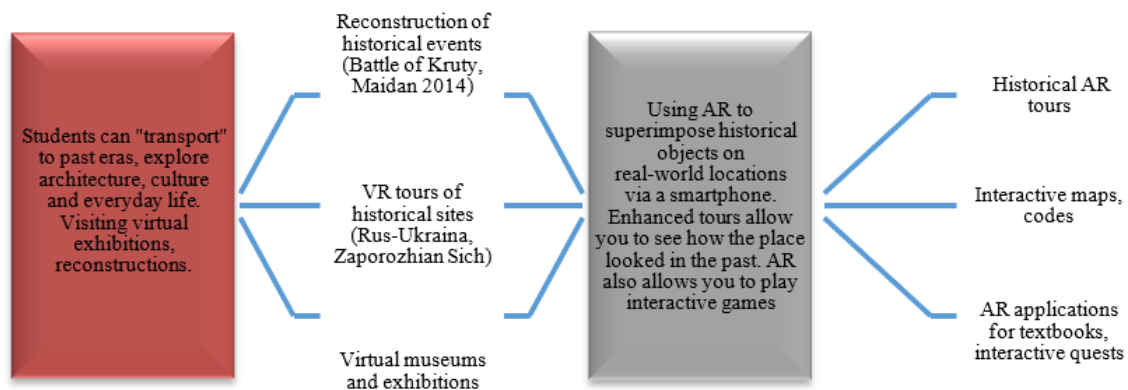


Figure 1. The role of VR and AR in the study of Ukrainian history.

Source: Author's development

Interactive multimedia platforms with supplementary learning materials are also important for learning about Ukraine's history. Interactive digital maps allow for real-time tracking of territorial changes, military campaigns, and population migration. Such tools help students to better understand the dynamics of certain complex historical processes. Interactive platforms in education can enable the creation of real-time mind-maps, charts, diagrams and illustrations, online conferencing, collaborative project activities, online tests and assessments. In particular, Quizlet has the ability to create quizzes and flashcards. The online tool Padlet allows users to create digital whiteboards with a collection of materials. For history teachers, Padlet is important for creating special interactive whiteboards where you can collect and organise historical sources (photos, pictures, videos and documents).

Gamification is an important innovative approach to teaching the history of Ukraine. Educational games based on specific topics in the history of Ukraine allow students to become participants in events and better understand the material. Often, such games can involve different strategies where you have to make decisions as a ruler (Michala et al., 2018). In addition, they can be in the form of quests, where you need to explore historical sites while solving problems.

Online platforms can also play an important role in innovative learning. In particular, Coursera, EdX, or local university educational platforms have various courses on the history of Ukraine. They may include lectures from leading historians and interactive assignments. Importantly, such platforms often feature joint discussions in online groups, which allows students to develop their communication skills (see Figure 2).

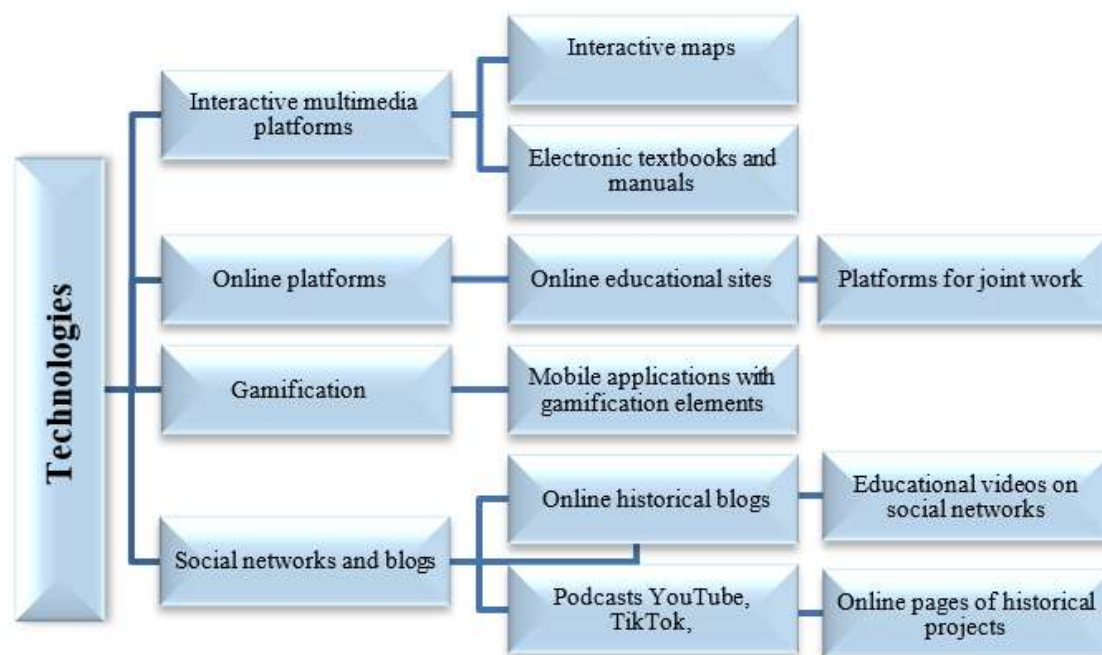


Figure 2. Technologies of interactive collaboration.

Source: Author's development

The role of social media and educational blogs is also worth noting from Figure 2. Educational videos and podcasts allow for a broader exploration of certain topics and can make the learning process more interesting and informative for learners. Networks such as YouTube, Instagram can be used to create special learning channels. In particular, YouTube channels such as 'WAS: Popular History', 'Local History', 'History without Myths', etc. They are important because they often contain short educational videos that explain historical events or biographies of famous people. In addition, modern educational blogs and social media pages have a general impact on the promotion of history among young people and provide information in an easy and accessible format (Näykki et al., 2019). Thus, these technologies contribute to making the study of Ukrainian history more interactive and accessible. Table 2 presents the main technologies and their capabilities in the system of teaching Ukrainian history.

Table 2.

Main interactive technologies and its possibilities in learning of the history of Ukraine

Technology	Possibilities
VR	Immersion in historical conditions and events Reconstruction of historical sites Allows you to see battles, life in cities and villages of different countries Provide access to virtual museums and exhibitions
AR	Provide access to interactive maps, multimedia tutorials Allow you to conduct AR tours Implement various quests
Gamification	They allow you to implement: interactive tasks Competing tasks Tasks with game elements
Online-platforms	Quick access to the right learning materials Access to lectures by leading historians Mobility of learning
Social networks	Promoting historical knowledge Attracting additional information from experts Presenting knowledge in an easy and accessible format

Source: Author's development

Thus, these technologies have various capabilities that contribute to making learning more interactive, more accessible and mobile. In addition, these technologies develop students' creative thinking and creativity. However, there are a number of problems that arise on the way to introducing innovative technologies in teaching the history of Ukraine. These difficulties are caused by various factors, but can have a real negative impact. In particular, the insufficient level of technical training of teachers may become an important challenge. In particular, tools such as virtual or augmented reality require a high level of digitalisation knowledge, which not all teachers have. It is also worth paying attention to the limited access to resources. Educational institutions may not have the necessary technical equipment, access to quality internet or specialised technical tools (Ratheeswari, 2018; Shpykuljak & Mazur, 2014).

Furthermore, these instruments need excellent technical assistance, which can be costly to maintain. Cybersecurity compliance is another crucial problem. Specifically, there may be dangers associated with using different online platforms and applications, including those pertaining to the security of the data of participants in the learning process. These issues are widespread and might apply to all educational establishments. To overcome obstacles, though, a methodical approach to integrating cutting-edge technologies into Ukrainian history classes should be taken, with special focus on preparing educators to adopt and utilize these technologies.

Modern technological solutions have a significant impact on the teaching of Ukrainian history, which makes it necessary to reconsider certain paradigms of perception of this subject. The purpose of this article is to analyse the achievements in the use of innovative technologies in the study of Ukrainian history and to determine their impact on the quality of education. The realisation of this goal required consideration of several educational issues, first of all, the main technologies for innovative teaching of the history of Ukraine, determination of the possibility of using information technologies in the educational process, consideration of obstacles to the use of information technologies for the study of the history of Ukraine. This issue is also being addressed due to the Russian aggression against Ukraine, as the destructive actions of Russian propaganda require a critical response and knowledge of basic facts, including those related to the history of Ukraine.

With regard to the main research problem, namely the determination of the main achievements and prospects for the use of innovative technologies in the study of the history of Ukraine, this study demonstrated the importance of using modern mobile technologies for teaching history. Moreover, according to the results, the using information technology encourages students to become more familiar with the course material, fosters the growth of critical thinking skills, and makes teaching Ukrainian history more approachable. Such results confirm the findings of other researchers who have empirically established that teaching the history requires the use of innovative technologies as much as any other discipline. This reveals the heuristic potential of history as a science, which contributes to the general interest of students. Accordingly, motivation forms an interest in deeper knowledge, and in the long run, a desire to master the subject and study the history of Ukraine on their own.

The proposed results indicate the importance of virtual and augmented reality as elements of interactivity in the study of Ukrainian history. In particular, we are talking about interactive maps or museum exhibits that come to life with the help of smartphones or tablets. Special QR codes have begun to play an important role. Gamification is an important innovative approach to learning the history of Ukraine. Online platforms are relevant for innovative learning (Coursera, EdX, local university educational platforms have various courses on the history of Ukraine, etc.) This confirms scholars' opinions that digital tools in teaching the history of Ukraine are diverse and allow for different ways of covering educational issues (Del Campo, 2021; Yildirim et al., 2018). For example, the work of Del Campo (2021) also confirmed the effectiveness of virtual reality, especially when studying the history of the Middle Ages and antiquity. At the same time, the results correlate with a study by Challenor & Ma (2019), which demonstrated the importance of augmented reality when learning history.

The results also emphasize the importance of gamification, a trend that is particularly popular in modern scientific discourse. Many modern scientists have confirmed that game technologies or the use of platforms with game elements make learning more interesting and cognitive, which in general optimizes the process of acquiring knowledge about history (Gautschi, 2018; Xipnitou et al., 2019). Modern scholars have also drawn attention to the effectiveness of using such technologies, given the empirical evidence of improved learning with the use of digital elements (Petousi et al., 2022). Given such assessments, it is important to emphasise the importance of further using the interactive capabilities of modern learning tools.

The proposed results show that the use of innovative technologies in the study of Ukrainian history has its drawbacks. In particular, these difficulties are caused by various factors, but can have a real negative impact. Still relevant challenges include the lack of appropriate technical training for history teachers, who may not have all the necessary skills, and restrictions on access to relevant online resources due to lack of funding or other administrative problems. Given the cost of educational technologies, innovations in this area require investment - historical science is no different from other fields of knowledge in this regard. It is pointed out that the use of innovative technologies may face resistance from teachers who are guided by traditional teaching methods.

At the same time, scientists also emphasise the importance of competent and timely adaptation of curricula, which should take into account both modern theoretical achievements and the capabilities of digital systems (Criollo et al., 2021; Lutsiak et al., 2020). Updating educational content in such circumstances also becomes an important element of learning that requires appropriate attention. On the other hand, other researchers consider the use of innovative technologies in modern education quite reliable, since visualization and digital resources can lead to increased criticality and attention (Dzhurynskyi et al., 2023; Marusynets et al., 2022). In fact, it is about forming a simplified perception of Ukraine's historical past through the active use of visual or interactive elements. A good 'picture' under such conditions can shift the emphasis from analytical comprehension of the material to its primitive assimilation. The proposed remarks, although they require additional empirical confirmation, are quite fair, since practical work with the use of innovative technologies in history education confirms the difficulties proposed by researchers.

Obviously, overcoming these problems in teaching Ukrainian history will require systemic solutions, including the development of a strategy for their further integration. On the other hand, it is difficult to agree with the conclusions of researchers who believe that innovative technologies (primarily user-generated) can lead to the dissemination of distorted information (Núñez-Canal et al., 2022). As far as it was possible to establish, the educational content is at least developed by the teachers of the discipline, and therefore the possibility of disseminating inaccurate information does not exceed the statistical error and is not possible on a threatening scale.

The proposed research methodology has some limitations. First of all, it involves the selection of a sample of scientific sources, which includes relevant English-language publications of recent years. On the one hand, this approach meets the requirements of the times, since verified English-language publications are a kind of summary of long-term research published in professional peer-reviewed journals. However, important thoughts on the interactivity of teaching history written in languages other than English may have been left out of the research focus (given the general focus of the proposed study, which is on studies written in Ukrainian). This problem does not affect the overall level of the study, but forms a new topic for further research related to a deeper study of national experiences of using interactive technologies in teaching history in general and the history of Ukraine in particular.

Conclusions

Thus, various information technologies should be used in the process of studying the history of Ukraine. They provide access to educational material, make the learning process more interactive and interesting for students. The use of VR and AR allows students to immerse themselves in the past by studying historical events and places in virtual reality. This contributes to a better understanding of complex historical materials and stimulates the development of creative thinking. Online platforms and social media are important tools for disseminating historical knowledge, as they provide access to lectures by leading historians, interactive assignments, and collaborative discussions. They promote the development of digital literacy, communication and collaboration skills in online environments.

However, the findings also identified a number of challenges to their implementation, including the fact that these technologies can be expensive to support and maintain. In addition, not all teachers are sufficiently trained to use them. However, despite these difficulties, within the modern educational paradigm, the use of innovative information technologies in the study of history significantly expands the possibilities of the learning process, making it more interactive, accessible and engaging.

Despite the theoretical value of this research, there are certain issues that will need to be addressed in future works. In particular, it is worth conducting an empirical examination of the features of the use of the identified technologies for the study of history. Such an empirical study will make it possible to characterize

not only the main technologies, but also to identify the most effective ones. Accordingly, the research questions will be as follows: 1. What are the necessary conditions for using modern mobile applications for teaching history? 2. Which technology is the most effective for teaching history?

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