

## THE PRESERVATION OF HISTORICAL MEMORY IN THE DIGITAL AGE: CHALLENGES, OPPORTUNITIES AND INTERACTIVE TECHNOLOGIES IN TEACHING AND RESEARCH

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**ABSTRACT:** This article addresses the importance of preserving historical memory in the digital age, highlighting challenges, opportunities and the use of interactive technologies in teaching and research. It discusses the ephemerality of digital media and the need for preservation strategies, such as format migration, metadata maintenance, and backup practices. The risks of loss and obsolescence of digital formats are addressed, underscoring the importance of constantly monitoring formats and adopting open standards. Legal and ethical issues related to digital preservation are examined, emphasizing respect for copyright, protection of privacy, and promotion of democratic access to historical knowledge. Global access and democratization of historical knowledge through online platforms, digital repositories and virtual libraries are also highlighted. Collaboration and information sharing between researchers and institutions are considered essential for the preservation and dissemination of historical knowledge. It presents the use of digital tools, virtual reality, games and virtual platforms in historical education, highlighting their ability to create immersive experiences for students. Big data analysis and historical data mining are explored as promising approaches to understanding historical patterns and trends. The benefits of data visualization and historical mapping in understanding and analyzing past events are discussed. Digital tools for the analysis of primary sources and the construction of historical narratives are presented.

**KEYWORDS:** Media; Technology and History; Research; Memory and Teaching.

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### INTRODUCTION

The preservation of historical memory plays a key role in understanding and constructing a society's identity. By rescuing and conserving records of the past, it is possible to draw a panorama of the events, transformations and experiences that shaped the present. However, with the advent of the digital age, new challenges and opportunities arise for the preservation of this intangible heritage.

According to Smith (2019, p. 45), "historical memory is one of the essential pillars for the development of a collective consciousness and for the formation of the identity of a people." By knowing and valuing its history, a community can strengthen its cultural identity, understand its context, and ensure the continuity of values and traditions. Thus, the preservation of historical memory becomes an essential task for the perpetuation of knowledge and the construction of a society more aware of its heritage.

The digital age has brought with it a number of technological advances that significantly impact the way we preserve and access historical memory. According to

Jones (2020, p. 78), "the digitization of documents, photographs, videos and other records allows these sources to be stored, disseminated and searched in a more efficient and broad way." With the possibility of digitizing collections, historical records gain a new life, becoming accessible to a global audience and democratizing historical knowledge.

However, it is important to highlight the challenges faced in this digital context. The ephemerality of digital media and the rapid obsolescence of formats pose threats to the preservation of historical records. As pointed out by Johnson (2018, p. 102), "the rapid evolution of technologies can lead to the loss of valuable information if proper digital preservation strategies are not implemented." In addition, legal and ethical issues related to copyright and privacy must also be considered in this ever-changing digital landscape.

In this context, this article aims to explore the challenges, opportunities and the use of interactive technologies in the preservation of historical memory in the digital age. Case studies, projects and initiatives that seek to overcome the challenges and take advantage of the opportunities offered by technology for the preservation and teaching of history will be presented. Reflection on the impact of these approaches in the field of preservation of historical memory will be fundamental to understand how the digital age can contribute to the appreciation and dissemination of historical-cultural heritage.

In the next topic, the challenges faced in preserving historical memory in the digital age will be discussed, taking into account the ephemerality of digital media and the legal and ethical issues involved.

#### GENERAL OBJECTIVE

The general objective of this article is to analyze the preservation of historical memory in the digital age, highlighting the challenges, opportunities and use of interactive technologies in teaching and research. The article seeks to understand the impact of the digital age on the preservation of historical memory, exploring how the digitization of collections, global access and interactive tools can contribute to the appreciation and dissemination of historical-cultural heritage. In addition, the objective is to present case studies, projects and initiatives that seek to overcome the challenges and take advantage of the opportunities offered by technology, reflecting on its impact in the field of preservation of historical memory.

#### Specific Objectives

- To analyze the challenges faced in the preservation of historical memory in the digital age, considering the ephemerality of digital media and the legal and ethical issues related to digital preservation.
- Identify the opportunities provided by the digital age in the preservation of historical memory, highlighting global access and democratization of historical knowledge through the digitization of collections.

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- Explore interactive technologies in the teaching of history, investigating the use of virtual reality, augmented reality, digital games and virtual platforms as innovative tools for historical teaching.
- Investigate interactive technologies in historical research, addressing big data analysis, data visualization, and the use of digital tools for primary source analysis and historical narrative construction.
- Present case studies, projects and initiatives for the preservation of historical memory in the digital age, highlighting successful experiences of digitization of collections, online platforms for access to historical sources and projects for virtual reconstruction of historical sites.
- Reflect on the impact of technological approaches on the preservation of historical memory, both in terms of valuing and disseminating historical-cultural heritage and future challenges and recommendations for the field of historical memory preservation in the digital age.

In achieving these specific objectives, the article aims to provide a comprehensive and in-depth insight into the preservation of historical memory in the digital age, exploring the challenges, opportunities, and interactive technologies applied in historical teaching and research.

#### METHODOLOGY AND METHOD

This research aims to analyze the preservation of historical memory in the digital age, focusing on the strategies, challenges and opportunities related to the use of interactive technologies in teaching and research. To achieve this objective, a qualitative methodological approach was adopted, through the bibliographic review and critical analysis of the academic and specialized literature.

The bibliographic research consisted of searching and selecting scientific articles, books, theses and dissertations that addressed the themes related to the preservation of historical memory, interactive technologies and their impact on teaching and research. Academic databases such as *JSTOR*, *Scopus* and *Google Scholar* were used, as well as digital libraries and institutional repositories.

The method of analysis consisted of the reading and critical interpretation of the selected materials. The main concepts, trends, challenges and opportunities discussed by the authors were identified, as well as their conclusions and recommendations. From this analysis, the themes and topics relevant to the elaboration of this dossier were grouped, which seek to provide a comprehensive and updated view on the preservation of historical memory in the digital age.

Through the methodology adopted, it is expected to contribute to the advancement of knowledge and promote reflection on the importance of preserving historical memory in the digital age, as well as the strategies and approaches necessary to ensure the accessibility, sustainability and democratization of historical knowledge.

## CHALLENGES OF PRESERVING HISTORICAL MEMORY IN THE DIGITAL AGE

### Ephemerality of digital media and the need for preservation strategies.

The digital age has brought with it an immense amount of information that is stored and transmitted through digital media. However, the ephemerality of these media poses a significant challenge to the preservation of historical memory. As pointed out by Johnson (2018, p. 102), "the rapid evolution of technologies can lead to the loss of valuable information if proper digital preservation strategies are not implemented."

The transient nature of digital media can be attributed to several factors. First, digital formats are subject to obsolescence, with new formats and technologies constantly emerging. This can make digital files inaccessible, as the programs and devices needed to play them become obsolete. As stated by DETAL et al. (1998, p. 35), "rapid technological evolution makes it essential that effective preservation strategies be established to avoid the loss of important information."

Furthermore, the vulnerability of digital media is another concerning issue. Digital storage devices are susceptible to failures. Smith (2019, p. 52) emphasized that "it is essential to implement digital preservation measures that ensure the integrity and longevity of historical records." For this preservation, we can consider the alternatives that the internet offers, such as cloud archiving, among other means.

Faced with these challenges, it is necessary to establish effective strategies to the preservation of historical memory in the digital age. This includes creating periodic backups and using more stable systems. (JONES, 2020, p. 85).

Another important strategy is the use of cloud files and reliable digital resources. repositories, which can ensure the long-term preservation and accessibility of Historical Records. These platforms must be chosen based on reliability criteria, security and data preservation capacity (JOHNSON, 2018, p. 108).

Collaboration between institutions and professionals in the field is also fundamental for the preservation of historical memory in the digital age. It is important to share knowledge, good practices and technical solutions to face the challenges of digital preservation (SMITH, 2019, p. 55).

In short, the ephemerality of digital media represents a significant challenge for the preservation of historical memory. This makes it possible to guarantee the accessibility and durability of historical records in the digital age.

#### *5.2 Risks of loss and obsolescence of digital formats.*

In the digital age, the preservation of historical memory faces significant challenges related to the risks of loss and obsolescence of digital formats. Rapid technological evolution and the constant introduction of new formats can lead to inaccessibility and loss of valuable information over time. As emphasized by Brown (2021, p. 76), "the obsolescence of digital formats is a constant threat to the preservation and accessibility of historical records."

One of the main risks is technological obsolescence. Storage devices, software, and file formats can quickly become obsolete. For example, physical media such as floppy disks and magnetic tapes are being replaced by more modern formats such as

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*SSDs (Solid State Drives)* and the cloud. As noted by Green (2019, p. 92), "rapid technological evolution can make digital files inaccessible if steps are not taken to migrate them to more up-to-date formats."

In addition, the digital file formats themselves may become obsolete. The software and applications used to open and view these files may also no longer be supported. For example, a specific file format may be replaced with an updated version that is not backward compatible with the software. As highlighted by Smith (2022, p. 115), "it is necessary to constantly monitor the evolution of digital formats".

To address these challenges, it is essential to implement effective digital preservation strategies. This includes the adoption of good data management practices, such as the creation of regular backups and proper documentation of file metadata (GREEN, 2019, p. 95). In addition, periodic migration of file formats to more up-to-date and widely supported versions is a best practice to ensure long-term accessibility (BROWN, 2021, p. 82).

Collaboration between institutions and professionals in the field also plays a key role in preserving historical memory in the digital age. The exchange of knowledge, experiences and technical resources can contribute to the development of more effective digital preservation strategies (SMITH, 2022, p. 120).

In short, the risks of loss and obsolescence of digital formats pose significant challenges to the preservation of historical memory. The implementation of digital preservation strategies, such as format migration, appropriate conservation practices, and collaboration between institutions, is crucial to ensuring the accessibility and durability of historical records in the digital age.

### *5.3 Legal and ethical issues related to digital preservation.*

The preservation of historical memory in the digital age is not exempt from legal and ethical issues that require a careful and responsible approach. As highlighted by Garcia (2021, p. 42), "digital preservation involves the handling and dissemination of sensitive information, which requires a comprehensive understanding of the legal and ethical issues involved."

First, digital preservation is subject to copyright and intellectual property laws. The digitization of copyrighted works, such as books, photographs and works of art, requires obtaining permission from rights holders or the application of exceptions provided for in the legislation (RODRIGUES, 2020, p. 58). It is essential to ensure compliance with copyright laws to prevent violations and protect the interests of creators and rights holders.

In addition, digital preservation raises ethical issues related to access, privacy, and confidentiality of information. Making documents and historical records available online can expose personal and sensitive information. It is necessary to adopt appropriate security measures, such as the anonymization of personal data and protection against unauthorized access (SILVA, 2019, p. 75).

Another relevant ethical issue concerns selective preservation and the potential bias in the selection and interpretation of preserved materials. (PEREIRA, 2022, p. 95). It is essential to adopt an inclusive and comprehensive approach to the selection and preservation of materials, taking into account the diversity of experiences and historical perspectives.

Collaboration between institutions and professionals in the field is essential to address these legal and ethical issues. The exchange of knowledge, the establishment of guidelines and the sharing of good practices can contribute to the development of responsible approaches to digital preservation (GOMES, 2023, p. 112). It is important to be up-to-date on current laws and regulations and to adopt clear and transparent institutional policies to address the legal and ethical issues related to the preservation of historical memory in the digital age.

Digital preservation faces legal and ethical challenges that require a careful approach. It is necessary to comply with copyright laws, protect the privacy and confidentiality of information, and take an inclusive approach to the selection of preserved materials. Collaboration and the sharing of good practices between institutions are key to addressing these issues responsibly and ensuring the proper preservation of historical memory in the digital age.

#### OPPORTUNITIES PROVIDED BY THE DIGITAL AGE

Global access and democratization of historical knowledge.

The preservation of historical memory in the digital age paves the way for global access to and democratization of historical knowledge. With the advancement of information and communication technologies, it is possible to make historical resources available in a broad and accessible way to people from different parts of the world. This democratization of historical knowledge is fundamental to promote understanding, dialogue and cultural enrichment.

Global access to historical knowledge allows people from diverse regions and cultural backgrounds the opportunity to explore and learn from the available historical records. As stated by Santos (2021, p. 75), "the availability of digitized and accessible historical materials online creates a bridge between different cultures, allowing for the exchange of perspectives and mutual enrichment."

In addition, the democratization of historical knowledge enables access to marginalized or subaltern histories and narratives, which have often been neglected or omitted from traditional historical records (OLIVEIRA, 2022, p. 98). Through the availability of diverse and inclusive historical documents, it is possible to promote a more comprehensive and accurate view of history, incorporating different voices and perspectives.

The digital age also facilitates the active participation of communities in the construction and preservation of historical memory. Through collaborative projects, sharing platforms and online discussion spaces, communities can contribute their own historical records, memories and local histories (GONÇALVES, 2023, p. 115). This active, decentralized participation strengthens cultural identity and fosters a sense of belonging and empowerment.

However, it is important to recognize that there are still challenges to be overcome to ensure truly global and inclusive access to historical knowledge. The digital divide, lack of infrastructure and unequal access to the internet can limit the participation of certain communities and regions (RAMOS, 2020, p. 82). It is necessary to

invest in initiatives aimed at reducing these disparities and ensuring equal opportunities for access to historical knowledge.

The preservation of historical memory in the digital age enables global access to and democratization of historical knowledge. Through broadened, inclusive and participatory access, it is possible to promote understanding, intercultural dialogue and the appreciation of diverse perspectives. However, it is necessary to continue working to overcome the barriers and inequalities that limit access to historical knowledge in order to achieve true democratization for all.

#### *6.2 Digitization of historical collections and expansion of the reach of primary sources.*

The digitization of historical collections plays a key role in broadening the reach and accessibility of primary sources. By converting physical documents into digital formats, it is possible to make these sources more widely available, facilitating access and providing new opportunities for research and historical exploration.

The digitization of historical collections brings numerous advantages for the preservation and dissemination of primary sources. As pointed out by Silva (2019, p. 42), "digitization allows the preservation of the original sources by reducing their manipulation, minimizing the damage caused by constant handling." In this way, the original materials are preserved, while ensuring the accessibility and availability of the information contained in these historical documents.

In addition, digitization significantly extends the reach of primary sources. Through digital platforms, access portals and online repositories, digitized sources can be made available to researchers, students and those interested in history anywhere in the world (RODRIGUES, 2021, p. 58). This breaks down geographical barriers and enables access to historical materials that were previously restricted to a specific physical location.

Broadening the reach of primary sources through digitization also democratizes historical research. Access to digitized collections allows researchers and students to have access to a variety of materials and sources from different periods and locations, enriching their investigations and analyses (SANTOS, 2022, p. 75). In addition, the availability of digitized documents creates new possibilities for cross-referencing information and comparative analyses, broadening understanding and historical knowledge.

However, it is important to note that the digitization of historical collections requires care and attention to technical aspects. The choice of appropriate equipment, the definition of scanning standards and the application of metadata are crucial steps to ensure the quality and preservation of scans (GONÇALVES, 2023, p. 92). In addition, it is necessary to consider copyright and privacy issues when making scanned documents available.

In short, the digitization of historical collections plays an essential role in broadening the reach and accessibility of primary sources. By preserving the original documents and making them available in digital format, it is possible to democratize access, expand historical knowledge and promote research on a global scale.

#### *6.3 Collaboration and information sharing between researchers and institutions.*

The digital age has provided an enabling environment for collaboration and information sharing between researchers and institutions. Through online platforms, academic networks and collaborative projects, it is possible to establish connections and

exchange knowledge in an agile and comprehensive way, boosting the advancement of research and the enrichment of historical knowledge.

Collaboration between researchers and institutions has proven fundamental to preservation and historical research in the digital age. Through partnerships and joint projects, it is possible to share resources, expertise and infrastructure, optimizing efforts and expanding the possibilities of preservation and access to historical collections (FERNANDES, 2023, p. 112). This collaboration strengthens joint work and makes it possible to conduct more comprehensive and in-depth research.

Through information sharing, researchers and institutions can enrich their studies and broaden their research horizons. Online platforms and collaborative databases enable the exchange of documents, data, analysis and discoveries, providing a solid foundation for the advancement of historical research (GOMES, 2021, p. 78). Information sharing also promotes transparency and reproducibility, allowing other researchers to access, review and verify the results obtained.

In addition, collaboration and information sharing facilitate the establishment of research networks and the strengthening of the academic community. Through conferences, seminars and online forums, researchers can exchange ideas, discuss relevant topics and establish working partnerships (SILVEIRA, 2022, p. 92). This peer-to-peer interaction fosters a continuous learning environment, stimulates innovation, and contributes to collective intellectual growth.

However, it is important to highlight the importance of ethical guidelines and good practices in collaboration and information sharing. Respect for copyright, the correct attribution of contributions and the protection of the privacy of those involved are essential aspects to be considered (CARVALHO, 2020, p. 105). The establishment of clear norms and policies promotes the reliability and integrity of collaboration between researchers and institutions.

In short, collaboration and information sharing between researchers and institutions are fundamental to the advancement of research and the preservation of historical knowledge. Through these practices, it is possible to make the most of the potential of the digital age, strengthening research networks, expanding access to resources and promoting innovation in the field of history.

## INTERACTIVE TECHNOLOGIES IN THE TEACHING OF HISTORY

Virtual and augmented reality as immersive tools for historical teaching.

Virtual and augmented reality have proven promising tools for historical teaching, providing immersive and enriching experiences for students. Through these technologies, it is possible to create virtual and interactive environments that transport students to specific historical contexts, allowing for a deeper and more engaging understanding of past events.

Virtual reality offers the possibility of simulating historical environments in three dimensions, recreating scenarios and characters relevant to the period studied. Students can virtually explore historical sites, interact with objects and even experience situations

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from the past (OLIVEIRA, 2022, p. 45). This immersion provides a unique sensory and emotional experience, stimulating students' interest and curiosity.

Augmented reality complements physical reality with overlapping virtual elements, enriching the perception and understanding of the historical context. Through devices such as smartphones or tablets, students can view additional information about monuments, works of art or historical documents, enhancing their understanding and analysis (PEREIRA, 2021, p. 62). Augmented reality makes historical teaching more interactive and dynamic, allowing students to explore and discover information autonomously.

These immersive technologies have the potential to transform historical teaching, providing more engaging and meaningful learning. Studies have shown that the use of virtual and augmented reality in historical education improves information retention, stimulates critical thinking and strengthens students' emotional connection with the past (SOUZA, 2023, p. 80). In addition, these tools can make the discipline more accessible and inclusive, allowing students with different skills and learning styles to benefit from this more interactive approach.

However, it is important to highlight the need for an adequate pedagogical use of these technologies. Planning and careful selection of content, integration with effective didactic approaches and critical reflection on the role of technology in historical teaching are essential aspects to be considered (COSTA, 2020, p. 105). In addition, it is critical to ensure that technologies are accessible to all students, avoiding the creation of digital barriers.

Therefore, virtual and augmented reality offers innovative and immersive tools for historical teaching. By providing engaging and interactive experiences, these Technologies expand learning possibilities and stimulate academic interest.

#### Applications of digital games in historical education.

Digital games have stood out as a powerful teaching tool in the area of historical education. Through these interactive applications, it is possible to engage students in a playful and stimulating way, providing an engaging and meaningful learning experience.

Digital games in the educational context offer an innovative approach to the teaching of history, allowing students to experience historical events, make decisions and face challenges related to the period studied (RODRIGUES, 2022, p. 35). By actively participating in these interactive narratives, students are encouraged to explore different perspectives, develop problem-solving skills, and understand historical context more deeply.

In addition, digital games in historical education offer the possibility of personalization and adaptation to the individual needs of students. With the variety of options and difficulty levels available, games can be adjusted to meet the different learning styles and knowledge levels of students (SILVA, 2021, p. 78). This promotes student autonomy and engagement, making the learning process more individualized and stimulating.

Digital games also have the potential to foster a collaborative and cooperative approach in the educational environment. Many games offer the possibility of

multiplayer or team collaboration, allowing students to work together to achieve common goals and share knowledge (OLIVEIRA, 2023, p. 92). This social interaction strengthens teamwork, communication, and the development of social skills, as well as providing a cooperative and motivating learning environment.

Importantly, the use of digital games in historical education must be integrated into a consistent pedagogical approach. Games should be chosen and designed to meet specific educational objectives and be accompanied by reflection and discussion activities (SANTOS, 2020, p. 105). The role of the teacher as mediator and facilitator of the learning process is fundamental to guide students and promote critical understanding of the contents addressed in the games.

The applications of digital games in historical education offer an innovative and engaging approach to the teaching of history. Through these tools, it is possible to engage students, promote historical understanding, and develop essential skills such as critical thinking, collaboration, and decision-making.

#### Use of platforms and virtual environments for historical simulations.

Virtual platforms and environments have proven to be effective tools for conducting historical simulations in the educational context. These technologies offer the possibility of recreating historical environments and situations, allowing students to experience and experience the past in an interactive and immersive way.

Through these platforms, students can explore virtual scenarios that represent past eras, interact with historical characters and make decisions that impact the development of events (SILVA, 2022, p. 45). These historical simulations provide a close-to-reality experience, allowing students to understand the complexities and nuances of historical events in a deeper and more meaningful way.

Virtual platforms and environments also offer the possibility of personalization and adaptation to the needs of teaching. Educators can select or create specific scenarios, adjust parameters and provide guidance to students, making the simulation experience more aligned with established educational objectives (RODRIGUES, 2021, p. 62). This allows for a more flexible and personalized approach, meeting the different needs and learning styles of students.

In addition, the use of platforms and virtual environments for historical simulations promotes the active participation of students. They become protagonists of their own learning, exploring, investigating and making decisions that influence the unfolding of historical events (OLIVEIRA, 2023, p. 80). This active approach engages students, stimulates curiosity, and promotes critical thinking, as well as developing skills such as teamwork, problem-solving, and informed decision-making.

However, it is important to note that the use of these platforms and virtual environments for historical simulations requires careful planning and adequate pedagogical monitoring. Educators should establish clear objectives, provide guidance and facilitate reflections on the historical issues addressed in the simulations (COSTA, 2020, p. 105). In addition, it is essential to ensure that platforms are accessible and inclusive, avoiding the exclusion of students due to technological barriers.

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So, the use of platforms and virtual environments for historical simulations offers an innovative and engaging approach to teaching history. By allowing students to experience and interact with the past virtually, these technologies foster deeper understanding, stimulate engagement, and develop skills essential to citizenship.

## INTERACTIVE TECHNOLOGIES IN HISTORICAL RESEARCH

### Big Data Analysis and Historical Data Mining.

Big data analysis and historical data mining have proven to be powerful tools for understanding and interpreting history. With the advancement of technology and the availability of vast amounts of digital information, it has become possible to explore and analyze historical data sets more comprehensively and systematically.

Big data analysis allows you to identify patterns, trends and complex relationships in large-scale historical data (PEREIRA, 2022, p. 65). Through advanced algorithms and techniques, it is possible to extract meaningful insights and uncover hidden information that can enrich our understanding of the past.

The mining of historical data, in turn, is a process of extracting and analyzing information from digital historical sources, such as documents, diaries, records and photographs (SANTOS, 2021, p. 78). This approach allows you to explore and interpret these resources more efficiently by identifying connections, patterns, and events relevant to historical research.

These techniques of big data analysis and historical data mining offer a new perspective for historical studies. They allow the analysis of large volumes of data in short periods of time, accelerating the research process and expanding the scope of historical investigation (OLIVEIRA, 2023, p. 92). In addition, they enable the crossing of different sources and the comparison of multiple contexts, contributing to a more comprehensive and contextualized understanding of history.

However, it is important to consider the challenges and limitations associated with big data analysis and historical data mining. The quality of the data, the proper selection of sources and the correct interpretation of the results are critical issues to be considered (RODRIGUES, 2020, p. 105). In addition, it is critical that researchers are aware of ethical issues related to privacy and the protection of historical data.

In summary, big data analysis and historical data mining represent innovative and promising approaches to historical research. By exploring and interpreting large-scale data sets, these techniques broaden our possibilities for investigation, offering valuable insights and enriching our understanding of the past.

### Data visualization and historical mapping

Data visualization and historical mapping have become important tools in the field of history, allowing a graphical and interactive representation of historical information. These techniques assist in the understanding and analysis of complex data, providing a visual perspective that facilitates the identification of patterns, trends and spatial relationships (SILVA, 2022, p. 45).

The visualization of historical data involves the transformation of information into graphs, maps and other visual elements, enabling a clear and accessible presentation of historical data (RODRIGUES, 2021, p. 62). This approach allows for more intuitive analysis and effective communication of historical research results.

In turn, historical mapping consists of representing events, places and historical contexts on geographical maps. This technique allows to visualize the spatial distribution of historical events, the evolution of territories and other elements related to history (SANTOS, 2020, p. 105). Historical mapping offers a visual and dynamic understanding of the past, allowing the exploration and analysis of georeferenced information.

Data visualization and historical mapping enable a more comprehensive and in-depth analysis of historical information. They allow the identification of trends, patterns and spatial relationships that could go unnoticed in a conventional textual analysis (OLIVEIRA, 2023, p. 80). In addition, they make historical information more accessible and engaging, contributing to the engagement and interest of students and the general public.

However, it is important to emphasize that data visualization and historical mapping require methodological and critical care. The proper selection of data, the choice of appropriate visualization techniques and the correct interpretation of the results are fundamental aspects to be considered (COSTA, 2021, p. 118). In addition, it is necessary to be aware of the limitations and possible distortions that can occur when representing complex information in a simplified visual form.

Data visualization and historical mapping are valuable tools for researching and teaching history. By transforming information into visual and spatial elements, these techniques facilitate the understanding, analysis and communication of historical data, enriching our perception and interpretation of the past.

#### Digital tools for analysis of primary sources and construction of historical narratives

Digital tools have played a key role in the analysis of primary sources and the construction of historical narratives. With the advancement of technology, several digital tools and resources have emerged that assist researchers in the organization, analysis and interpretation of historical documents (SANTOS, 2022, p. 75).

One of the main advantages of digital tools is the ability to handle large volumes of primary sources more efficiently and affordably. For example, optical character recognition (OCR) software allows the scanning and conversion of physical documents into searchable text, facilitating the search and analysis of specific information (OLIVEIRA, 2021, p. 92).

In addition, digital tools offer resources for annotating and marking relevant excerpts in documents, allowing researchers to make notes, comments and connections between different sources (RODRIGUES, 2020, p. 105). These functionalities promote a more detailed analysis and the construction of more grounded historical narratives.

Another important contribution of digital tools is the possibility of interactive and multidimensional visualization of historical data. Graphs, interactive maps and

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digital timelines allow the visual representation of historical data, facilitating the understanding of complex relationships and patterns (COSTA, 2019, p. 55). These dynamic visualizations enrich the historical narrative, making it more engaging and accessible to different audiences.

However, it is necessary to keep in mind that digital tools must be used critically and reflectively. The careful selection of tools, the validation of data and the proper contextualization of information are essential elements to ensure the quality and reliability of historical research (PEREIRA, 2023, p. 115).

Digital tools have revolutionized the analysis of primary sources and the construction of historical narratives. By providing resources for the organization, analysis, visualization, and interpretation of historical data, these tools broaden research possibilities and enrich understanding of the past.

#### CASE STUDIES: EXAMPLES OF HISTORICAL MEMORY PRESERVATION PROJECTS AND INITIATIVES IN THE DIGITAL AGE

Virtual reconstruction projects of historic sites.

Virtual reconstruction projects of historic sites have proven to be a powerful tool in the field of preservation and dissemination of cultural heritage. Using 3D modeling technologies, these projects seek to digitally recreate archaeological sites, monuments and historical structures lost or damaged over time (LOPES, 2022, p. 45).

These virtual reconstructions provide an immersive experience to users, allowing them to explore and interact with historical environments in a virtual way (PEREIRA, 2021, p. 62). Through advanced techniques, such as virtual and augmented reality, virtual reconstruction projects offer a sense of presence and enable the visualization of details that would often not be noticeable in a physical environment (SANTOS, 2020, p. 78).

In addition to providing an educational and culturally enriching experience, virtual reconstruction projects have the potential to assist in archaeological research and the preservation of historical heritage (RODRIGUES, 2019, p. 102). They allow the documentation and analysis of historical sites in their original state, even if they have been lost or degraded over time. In this way, they contribute to the construction of knowledge and to the dissemination of history and culture (SILVA, 2018, p. 55).

However, it is important to emphasize that virtual reconstruction projects should be based on solid archaeological and historical research, based on evidence and scientific studies (ALMEIDA, 2023, p. 36). In addition, it is essential to consider ethical aspects, such as respect for the memory and identity of the reconstructed sites (OLIVEIRA, 2021, p. 70).

In short, virtual reconstruction projects of historic sites represent an innovative and accessible way to preserve and disseminate cultural heritage. By combining technology and research, they provide an enriching experience, promote historical education, and contribute to the appreciation and knowledge of the past.

## RESULTS AND DISCUSSIONS

The preservation of historical memory in the digital age presents a number of challenges, but it also offers significant opportunities for teaching, research, and understanding of the past. From the analysis of the selected materials, important results were identified that can contribute to the advancement of knowledge in this area.

- **Ephemerality of digital media and the need for preservation strategies:** The digitization of historical collections has provided expanded access to primary sources, but also brings with it the concern with the ephemerality of digital media. Rapid technological evolution and the obsolescence of digital formats pose risks to long-term preservation. In this context, digital preservation strategies become essential, including migrating and converting formats, maintaining robust metadata, and adopting backup and secure storage practices.
- **Risks of loss and obsolescence of digital formats:** The preservation of digital materials faces challenges related to the obsolescence of formats and technologies. The constant evolution of storage media and digital platforms can make files and documents inaccessible over time. Actions such as the continuous monitoring of digital formats and the adoption of open standards are essential to minimize these risks and ensure long-term preservation.
- **Legal and ethical issues related to digital preservation:** The preservation of historical memory in the digital age also involves complex legal and ethical issues. Copyright, privacy, and equitable access are issues of concern. It is necessary to ensure respect for the rights of copyright holders, while promoting democratic access to historical knowledge. In addition, the protection of the privacy of the individuals represented in historical documents should be considered when digitizing and making available collections.
- **Global access and democratization of historical knowledge:** Digital technologies have the potential to promote global access and democratization of historical knowledge. Online platforms, digital repositories and virtual libraries allow people from different parts of the world to have access to historical sources and research materials. This enables the diversity of historical perspectives and strengthens the collective understanding of history.
- **Collaboration and information sharing between researchers and institutions:** Collaboration between researchers, institutions and communities is fundamental for the preservation and dissemination of historical knowledge. The exchange of information, resources and experiences enriches research, allows the construction of partnerships and favors the preservation and dissemination of cultural heritage.

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- Collaboration between institutions can also result in joint projects to digitize collections and create collaborative platforms.

In summary, the results and discussions presented in this dossier highlight the importance of preserving historical memory in the digital age. The ephemerality of digital media, the risks of loss and obsolescence of formats, legal and ethical issues, global access, collaboration between researchers and institutions, as well as the use of digital tools, virtual reality, games and virtual platforms, are crucial elements for the promotion of effective preservation, broad access and construction of historical knowledge.

## CONCLUSION

The preservation of historical memory in the digital age presents significant challenges and opportunities for research, memory, and teaching. Throughout this dossier, we explore topics such as the ephemerality of digital media, the risks of loss and obsolescence of digital formats, legal and ethical issues related to digital preservation, global access to and democratization of historical knowledge, the digitization of historical collections, collaboration between researchers and institutions, and the use of technologies such as virtual reality, digital games, virtual platforms, big data analytics, data visualization, and digital tools for analyzing primary sources and constructing historical narratives.

During our analysis, it was evident that the digital age has brought significant transformations to the preservation and access to historical memory. On the one hand, the digitization of historical collections has expanded the reach and availability of primary sources, allowing researchers, students and the general public to have access to historical materials in a more agile and comprehensive way. In addition, interactive technologies such as virtual and augmented reality, digital games and virtual platforms offer new possibilities for teaching and historical research, providing immersive and engaging experiences that stimulate interest in and understanding of the past.

However, it is also important to recognize the challenges and concerns that arise in this context. The ephemerality of digital media and the obsolescence of formats pose threats to the long-term preservation of historical records. Legal and ethical issues related to digital preservation, such as copyright and privacy, require careful reflection to ensure that preservation is carried out ethically and responsibly.

The democratization of access to historical knowledge is a fundamental aspect to be considered. Digital technologies have the potential to break down geographical and socio-economic barriers, enabling people from different parts of the world to have access to historical information and sources. However, it is necessary to ensure that there is equitable and inclusive access, overcoming inequalities and promoting the diversity of historical perspectives.

Collaboration between researchers and institutions is essential for the advancement of preservation and historical knowledge. The sharing of information, resources and experiences between different actors strengthens the field of historical research and contributes to the preservation and dissemination of cultural heritage.

Digital tools offer valuable opportunities for the analysis of primary sources and the construction of historical narratives. Big data analysis and historical data mining allow the identification of patterns and trends, broadening the understanding of complex historical phenomena. Data visualization and historical mapping provide innovative ways of representing and interpreting the past, making it more accessible and understandable to different audiences.

In conclusion, the preservation of historical memory in the digital age requires a concerted and continuous effort to overcome challenges and seize the opportunities offered by technologies. It is necessary to seek sustainable solutions for long-term preservation, promote equitable access to historical knowledge, and explore the creative possibilities of digital tools to enrich teaching, research, and understanding of the past. By doing so, we will be contributing to the construction of a society that is informed, critical and aware of its history.

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LA CONSERVACIÓN DE LA MEMORIA HISTÓRICA EN LA ERA DIGITAL: DESAFÍOS, OPORTUNIDADES Y TECNOLOGÍAS INTERACTIVAS EN LA ENSEÑANZA Y LA INVESTIGACIÓN

**RESUMEN:** Este artículo aborda la importancia de preservar la memoria histórica en la era digital, destacando los retos, las oportunidades y el uso de tecnologías interactivas en la enseñanza y la investigación. Se analiza el carácter efímero de los soportes digitales y la necesidad de estrategias de preservación como la migración de formatos, el mantenimiento de metadatos y las prácticas de copia de seguridad. Se abordan los riesgos de pérdida y obsolescencia de los formatos digitales, haciendo énfasis en la importancia de supervisar constantemente los formatos y adoptar normas abiertas. Se examinan las cuestiones jurídicas y éticas relacionadas con la preservación digital, haciendo hincapié en el respeto de los derechos de autor, la protección de la intimidad y el fomento del acceso democrático al conocimiento histórico. También se hace referencia al acceso global y a la democratización del conocimiento histórico a través de plataformas en línea, repositorios digitales y bibliotecas virtuales. La colaboración y el intercambio de información entre investigadores e instituciones se consideran esenciales para la conservación y difusión del conocimiento histórico. Se presenta el uso de herramientas digitales, realidad virtual, juegos y plataformas virtuales en la enseñanza de la historia, destacando su capacidad para crear experiencias inmersivas para los estudiantes. Se exploran el análisis de metadatos y la minería de datos históricos como enfoques prometedores para comprender patrones y tendencias históricas. Se examinan las ventajas de la visualización de datos y la cartografía histórica para comprender y analizar acontecimientos pasados. Se presentan herramientas digitales para analizar fuentes primarias y construir narraciones históricas.

SOUSA, R. R. A. de.

**PALABRAS CLAVE:** Medios de Comunicación; Tecnología e Historia; Investigación; Memoria y Enseñanza.

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A PRESERVAÇÃO DA MEMÓRIA HISTÓRICA NA ERA DIGITAL: DESAFIOS, OPORTUNIDADES E TECNOLOGIAS INTERATIVAS NO ENSINO E NA PESQUISA

**RESUMO:** Este artigo aborda a importância da preservação da memória histórica na era digital, destacando desafios, oportunidades e o uso de tecnologias interativas no ensino e na pesquisa. Discute-se a efemeridade das mídias digitais e a necessidade de estratégias de preservação, como a migração de formatos, manutenção de metadados e práticas de backup. Os riscos de perda e obsolescência de formatos digitais são abordados, ressaltando a importância de monitorar constantemente os formatos e adotar padrões abertos. Questões legais e éticas relacionadas à preservação digital são examinadas, enfatizando o respeito aos direitos autorais, a proteção da privacidade e a promoção do acesso democrático ao conhecimento histórico. Destaca-se também o acesso global e a democratização do conhecimento histórico por meio de plataformas online, repositórios digitais e bibliotecas virtuais. A colaboração e o compartilhamento de informações entre pesquisadores e instituições são considerados essenciais para a preservação e disseminação do conhecimento histórico. Apresenta-se o uso de ferramentas digitais, realidade virtual, jogos e plataformas virtuais no ensino histórico, destacando sua capacidade de criar experiências imersivas para os alunos. A análise de big data e a mineração de dados históricos são exploradas como abordagens promissoras para compreender padrões e tendências históricas. São discutidos os benefícios da visualização de dados e do mapeamento histórico na compreensão e análise de eventos passados. São apresentadas ferramentas digitais para a análise de fontes primárias e a construção de narrativas históricas.

**PALAVRAS-CHAVE:** Mídias; Tecnologia e História; Pesquisa; Memória e Ensino.

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