NARRATE

Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples

Project Information

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The purpose of NARRATE project is to codify the actual recording and documentation needs for the ecclesiastical cultural treasures, through a systematic study of the users' needs.

Consortium partners

NARRATE

Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples

ΙΔΡΥΜΑ ΚΡΑΤΙΚΩΝ ΥΠΟΤΡΟΦΙΩΝ IKY

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Main Authors

Name	Organization
Konstantinos Evangelidis Stella Sylaiou Konstantinos Papatheodorou Uros Todorovic	INTERNATIONAL HELLENIC UNIVERSITY

Contributing Partners

Organization
ARISTOTLE UNIVERSITY OF THESSALONIKI
SOFIA UNIVERSITY ST KLEMENT OHRIDSKI
ASSOCIATION FOR THE PROTECTION OF CULTURAL HERITAGE (KMKD)
COGNITIVE UX

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Abbreviations

CH	Cultural Heritage
3D	Three dimensional
LMS	Learning Management Systems
SME	Subject matter experts
CMS	Content Management Systems
API	Application Programming Interface.
AR	Augmented Reality
VR	Virtual Reality
WYSIWYG	What You See Is What You Get
SCORM	Sharable Content Object Reference Model
DAMS	Digital Asset Management Systems
TMS	The Museum System
3D	Three-dimensional

Executive Summary

The EU Erasmus+ “NARRATE: Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples” (2022-1-EL01-KA220-HED-000089867) aims at identifying and promoting the needs and priorities concerning ecclesiastical Cultural Heritage (CH) documentation.

The current study is being performed to codify the actual recording and documentation needs for the ecclesiastical cultural treasures, through a systematic study of the users’ needs. NARRATE reflects an emphasis on documenting ecclesiastic CH treasures in ways that will enable stakeholders to narrate their intertwined histories, functions, and spiritual importance throughout time.

In this report we made an attempt to identify and analyze the best tools and practices for the development of a training program on the CH domain. We focused on LMS and Collaboration and Communication Tools and we identified the involvement of SMEs and Stakeholders as the best practice for the NARRATE project success.

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1. Introduction

The development of a training program includes the development of the educational content and all the appropriate procedures for the provision of the content to the learners. Concerning the development of a training program in the Cultural Heritage (CH) domain, there are several tools and practices that can be beneficial for all the above mentioned activities. The selection of tools and practices should align with the requirements of NARRATE project, the actual needs, opinions, and expectations of the involved stakeholders and end-users and practically with the exact processes that will be executed.

A major category related to the CH domain processes concerns the documentation of ecclesiastical CH treasures. Although in the framework of NARRATE project there will be no need for demanding capturing processes, 3D modelling, or 3D reconstructions of ecclesiastical objects, in this report, the above-mentioned procedures are included for the purposes of a comprehensive review. Another major category that is included for the same reason is that of the Extended Realities which have been penetrated in the promotion of cultural heritage during the last decade.

The following categories of both tools and practices have been identified and analyzed in Section 2:

- **Content Management Systems (CMS)**: CMS platforms enable the creation, management, and publishing of digital content. They are extremely useful for the organization and presentation of CH-related content, including documents, images, videos, and audio files. Some indicative CMSs globally used on the web are WordPress, Drupal, and Joomla. **Learning Management Systems (LMS)** are CMSs with Cultural Heritage content and provide a digital platform for delivering educational materials and courses focused on cultural heritage topics.
- **Authoring tools:** They can be defined as software platforms that allow users to create multimedia applications for manipulating multimedia objects. They empower content creators to design captivating and educational experiences for users to explore and engage with cultural heritage topics.
- **Collaboration and Communication Tools:** These tools facilitate communication and collaboration in a training program among learners and

trainers. Tools like WebEx, Zoom, Microsoft Teams, or Google Workspace may be employed to provide real-time messaging, video conferencing, document sharing, and collaborative workspaces.

- **Analytics and Reporting**: Analytics tools help track learner progress, monitor engagement, and gather insights about training effectiveness. Learning analytics can be integrated into LMS platforms or implemented separately using tools like Google Analytics, Learning Locker, or x API-enabled systems.
- **Augmented and Virtual Reality:** Augmented Reality (AR) and Virtual Reality (VR) technologies have significant applications in the Cultural Heritage domain, offering immersive and interactive experiences that bring historical sites, artifacts, and cultural content to life.
- **Subject matter experts (SMEs) and Stakeholders:** A good practice during the training program development is to involve subject matter experts (SMEs) and stakeholders from the CH domain, since they can provide valuable insights, review the content for accuracy, and ensure that the training program meets the specific needs and requirements of the CH domain.
- **Gamification:** Gamification techniques can make training programs more engaging and motivating. Adding game elements, such as points, badges, leaderboards, and challenges, can increase learner participation and knowledge retention. Tools like Kahoot, Quizizz, and Classcraft can be used to incorporate gamification into training programs.

In Section 3 we focused on LMS and Collaboration and Communication Tools. These along with the involvement of SMEs and Stakeholders constitute the best tools and practices identified in the present report for the NARRATE project success.

2. Identification and Analysis of best Tools & Practices

2.1 Authoring tools

In order to create and develop content related to cultural heritage topics, there are plenty of authoring tools offering features and functionalities for the design, structure, and publishing of interactive content. These authoring tools provide a range of options for creating and presenting cultural heritage content in diverse formats, including text, images, videos, interactive elements, and immersive experiences. They empower content creators to design captivating and educational experiences for users to explore and engage with cultural heritage topics.

Some indicative popular authoring tools applicable in the cultural heritage domain are:

- **Adobe Creative Suite**[1] for designing visually appealing presentations, brochures, and digital materials related to cultural heritage.
- **Unity3D**[2] for creating immersive and interactive experiences for cultural heritage. It enables the creation of 3D virtual environments, interactive simulations, and augmented reality (AR) or virtual reality (VR) applications that allow users to explore and interact with cultural heritage sites or artifacts.
- **Omeka**[3]**,** a content management system specifically designed for cultural heritage institutions, museums, and libraries. It provides a user-friendly interface for creating and managing digital collections, exhibits, and storytelling experiences related to cultural heritage.
- **Articulate Storyline**[4]**,** an e-learning authoring tool that allows the creation of interactive and multimedia-rich courses and presentations. It provides a wide range of templates, animations, and interactive elements to engage learners and deliver cultural heritage content in an engaging and educational manner.
- **Scalar**[5]**,** a web-based authoring and publishing platform that focuses on creating digital scholarly projects, including those related to cultural heritage. It enables the creation of multimedia-rich content, such as text, images, videos,

[1] https://www.adobe.com
[2] https://unity.com/
[3] https://omeka.org/
[4] https://articulate.com/360/storyline
[5] https://scalar.me/anvc/scalar/features/

and maps, with the ability to annotate and connect different elements to create a cohesive narrative or exploration of cultural heritage topics.

- **H5P[6],** an open-source authoring tool that enables the creation of interactive content for e-learning. It offers a wide range of content types, including quizzes, presentations, timelines, and interactive videos, which can be used to deliver engaging cultural heritage content and assessments.

Some of the key features commonly found in authoring tools regardless of their purpose and target audience are as follows [1], [2], [3]:

Content Creation and Editing: Authoring tools provide a user-friendly interface for creating and editing content. Users can create text-based content, import multimedia elements like images, videos, and audio, and arrange them in a visually appealing manner. These tools often include WYSIWYG (What You See Is What You Get) editors, drag-and-drop functionality, and formatting options to customize the appearance of the content.

Interactivity and Multimedia Integration: Authoring tools enable the inclusion of interactive elements to enhance learner engagement. These elements can include quizzes, assessments, simulations, drag-and-drop activities, branching scenarios, and clickable hotspots. Additionally, authoring tools allow the integration of multimedia elements, such as videos, audio files, images, and animations, to create dynamic and engaging content.

Templates and Themes: Authoring tools often provide a range of pre-designed templates and themes to streamline content creation. These templates offer a consistent design and layout, allowing users to focus on the content itself rather than the visual aspects. Themes provide a selection of color schemes, fonts, and styles that can be easily applied to maintain a cohesive look and feel throughout the content.

Responsive Design and Device Compatibility: With the increasing prevalence of mobile devices, authoring tools incorporate responsive design capabilities. This ensures that the content created can adapt and display properly on different screen sizes and devices, including desktops, laptops, tablets, and smartphones. Responsive design features allow for a seamless learning experience across various devices.

[6] https://h5p.org/

Assessment and Tracking: Authoring tools often include features for creating assessments and tracking learner progress. These tools enable the creation of quizzes, surveys, and assessments with various question types, such as multiple choice, fill in the blanks, and matching. Additionally, authoring tools may provide tracking and reporting capabilities to monitor learner performance, completion rates, and assessment results.

Collaboration and Review: Authoring tools may offer collaboration features that enable multiple authors or subject matter experts to work together on content creation. These features can include version control, commenting, and content review workflows. Collaboration features streamline the review process and allow stakeholders to provide feedback, suggest changes, and ensure content accuracy and quality.

Publishing and Delivery Options: Authoring tools provide options for publishing and delivering the created content to learners. These options can include generating SCORM (Sharable Content Object Reference Model) packages for Learning Management Systems (LMS), exporting to web formats, creating standalone executable files, or publishing to specific platforms. Authoring tools ensure compatibility and accessibility of the content for learners.

Integration with Learning Management Systems (LMS): Many authoring tools offer integration with LMS platforms, allowing seamless transfer and management of the created content. Integration features may include exporting content packages in compatible formats, synchronization of learner progress and assessment data, and the ability to launch content directly from the LMS.

2.2 Virtual Reality (VR) and Augmented Reality (AR)

VR and AR technologies can enhance training experiences by providing immersive and interactive simulations. They can be particularly useful in the CH domain for recreating historical settings, archaeological sites, or museum exhibits [4], [5], [6]. Tools like Unity3D, Unreal Engine, and A-Frame can be used for developing VR and AR applications.

Here's how AR and VR can be utilized:

- **Virtual Tours:** VR enables users to experience virtual tours of cultural heritage sites and museums from anywhere in the world. Users can explore 3D reconstructions of historical locations, navigate through virtual environments, and interact with virtual objects. This provides an opportunity to visit inaccessible or distant sites and engage with cultural heritage in a highly immersive manner.
- **Artifact Visualization:** AR and VR can be used to visualize and interact with digital representations of artifacts. By using AR-enabled devices like smartphones or tablets, users can overlay virtual models of artifacts onto the real world, allowing them to examine details, rotate objects, and access additional information. This enhances the understanding and appreciation of cultural artifacts.
- **Historical Reconstructions:** AR and VR technologies enable the creation of immersive historical reconstructions. By combining historical data, architectural plans, and artistic interpretations, virtual environments can be developed to showcase how cultural heritage sites appeared in different time periods. Users can explore these reconstructions and witness the historical context firsthand.
- **Interactive Exhibitions:** AR and VR can enhance traditional museum exhibitions by incorporating interactive elements. AR markers or QR codes can trigger virtual overlays, multimedia content, or animated guides when scanned by visitors' devices. This enriches the visitor experience, providing additional information, stories, or interactive activities related to the exhibits.
- **Educational Tools:** AR and VR applications in education facilitate immersive learning experiences. Students can explore virtual environments, interact with historical figures, and engage in interactive learning activities related to cultural heritage. This technology offers a more engaging and memorable way to learn about history, art, and cultural significance.
- **Digital Storytelling:** AR and VR can be utilized to create immersive narratives and storytelling experiences related to cultural heritage. Users can participate in interactive narratives that unfold in virtual environments, bringing historical events and stories to life. This allows for a more engaging and personalized storytelling experience.
- **Preservation and Restoration:** AR and VR technologies can aid in the preservation and restoration of cultural heritage. 3D scanning and modeling techniques can create digital replicas of artifacts or sites before they deteriorate or are lost. These digital representations can be used for research, documentation,

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and virtual restoration projects, ensuring the long-term preservation of cultural heritage.

AR and VR technologies provide new avenues for experiencing, preserving, and sharing cultural heritage. By offering immersive and interactive experiences, they engage a wider audience, promote understanding, and contribute to the preservation and appreciation of our diverse cultural heritage.

2.3 Gamification

Gamification in the Cultural Heritage domain refers to the use of game elements and mechanics to engage visitors, promote learning, and enhance the overall experience in cultural heritage sites, museums, exhibitions, or virtual platforms. It leverages the principles of game design to make cultural heritage more interactive, immersive, and enjoyable for individuals of all ages [7], [8], [9].

Here are some examples of how gamification can be applied in the Cultural Heritage domain:

- **Scavenger Hunts:** Gamified scavenger hunts can be designed where visitors are provided with clues or tasks to complete within a cultural heritage site. By searching for specific objects, following a trail, or solving puzzles, visitors can actively explore the site while learning about its history, artifacts, or cultural significance. Rewards or points can be offered for successful completion, encouraging further engagement.
- **Interactive Exhibits:** Gamification can be incorporated into interactive exhibits by adding game elements such as touchscreens, motion sensors, or augmented reality (AR) to create immersive experiences. Visitors can interact with virtual artifacts, solve puzzles, or participate in simulations, allowing them to actively engage with the cultural heritage content.
- **Leaderboards and Challenges:** Cultural heritage sites or virtual platforms can introduce leaderboards or challenges to encourage friendly competition among visitors. For example, visitors can compete for the highest score based on their knowledge of historical facts, solving riddles, or completing certain tasks. This fosters engagement, motivation, and a desire to explore more.

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- **Augmented Reality (AR) and Virtual Reality (VR):** AR and VR technologies can be utilized to gamify the Cultural Heritage domain by creating virtual experiences that transport visitors to historical eras or recreate significant events. Users can engage with 3D models, explore virtual environments, and interact with virtual characters, enhancing their understanding and emotional connection to the cultural heritage.
- **Gamified Learning Apps:** Mobile applications can be developed to gamify cultural heritage learning. These apps can include quizzes, trivia games, or storytelling elements to educate users about historical events, cultural traditions, or famous personalities. Points, levels, or achievements can be integrated to incentivize continuous learning and exploration.
- **Social Engagement:** Gamification can promote social interaction and engagement among visitors by incorporating multiplayer games or interactive group activities. Visitors can collaborate to solve challenges, work together to unlock new content, or engage in cooperative gameplay, fostering a sense of community and shared experience.

By incorporating gamification techniques, the Cultural Heritage domain can attract a wider audience, particularly younger generations, and create more interactive and memorable experiences. It encourages active participation, knowledge acquisition, and emotional connections, making cultural heritage sites and artifacts more accessible, engaging, and relevant in the digital age.

2.4 Learning Management Systems (LMS)

Learning Management Systems (LMS) with Cultural Heritage content provide a digital platform for delivering educational materials and courses focused on cultural heritage topics [10], [11], [12]. These systems combine the functionalities of a traditional LMS with curated content and resources related to cultural heritage. Here are some key features and benefits of LMSs with Cultural Heritage content:

- **Course Management:** LMSs allow instructors to create and manage courses centered on cultural heritage. They can develop multimedia-rich modules, organize learning materials, create assessments, and track learners' progress.

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LMSs provide a structured and centralized platform for delivering cultural heritage content to students.

- **Curated Content:** LMSs with Cultural Heritage content often include a repository of curated resources such as articles, videos, images, interactive maps, and virtual tours related to cultural heritage sites, artifacts, history, and traditions. These resources offer students a comprehensive and diverse range of materials to enhance their understanding of cultural heritage topics.
- **Multimedia Integration:** LMSs facilitate the integration of multimedia elements within course content. Instructors can embed videos, audio recordings, images, and interactive media to engage learners and create immersive learning experiences. This enables students to explore cultural heritage content through various formats, enhancing their comprehension and interest.
- **Collaboration and Discussion:** LMSs support collaborative learning by providing discussion forums, chat features, and group activities. Learners can engage in discussions, share insights, ask questions, and collaborate on projects related to cultural heritage. This promotes peer learning, critical thinking, and a deeper understanding of the subject matter.
- **Assessments and Feedback:** LMSs offer assessment tools to evaluate learners' knowledge and progress. Instructors can create quizzes, assignments, and assessments specific to cultural heritage topics. They can provide timely feedback to students, track their performance, and adapt teaching strategies accordingly.
- **Gamification and Interactive Elements:** Some LMSs incorporate gamification elements and interactive features to enhance learner engagement. Gamified quizzes, badges, leaderboards, and progress tracking can motivate students to actively participate in cultural heritage learning. Interactive elements like virtual tours, 360-degree images, and interactive timelines provide hands-on exploration and immersive experiences.
- **Progress Tracking and Reporting:** LMSs provide administrators and instructors with comprehensive reports on learners' progress, completion rates, and assessment results. This data allows educators to monitor student performance, identify areas that require additional support, and make data-driven decisions to optimize the learning experience.

- **Accessibility and Flexibility:** LMSs enable learners to access cultural heritage content anytime, anywhere, and on various devices. They support mobile learning, allowing students to engage with course materials and activities on their smartphones or tablets. This flexibility enhances accessibility and accommodates diverse learning preferences.

LMSs with Cultural Heritage content play a crucial role in delivering engaging and effective educational experiences focused on cultural heritage. They provide a platform for learners to explore, understand, and appreciate the rich heritage of different cultures, fostering a sense of cultural awareness and preservation.

2.5 Collaboration and Communication Tools

Collaboration and communication tools are software applications and platforms that facilitate teamwork, information sharing, and communication among individuals and groups. These tools are designed to enhance productivity, streamline workflows, and enable effective collaboration, especially in remote or distributed work environments. Some commonly used collaboration and communication tools are:

- **Project Management Tools:** Project management tools like Trello, Asana, and Jira help teams organize and track tasks, set deadlines, assign responsibilities, and monitor project progress.
- **Communication and Messaging Tools:** Communication tools such as Slack, Microsoft Teams, and Google Meet enable real-time messaging, video conferencing, and file sharing. These tools help teams stay connected, hold meetings, and collaborate regardless of their physical location.
- **File Sharing and Document Collaboration Tools:** Tools like Google Drive, Dropbox, and Microsoft OneDrive allow teams to store, share, and collaborate on files and documents in a centralized and accessible manner. Multiple users can work on the same document simultaneously, making it easy to collaborate in real time.
- **Virtual Whiteboarding Tools:** Virtual whiteboarding tools like Miro and Mural provide a digital space for teams to brainstorm ideas, create mind maps, and collaborate visually. These tools simulate the experience of a physical whiteboard, enabling remote collaboration and ideation.

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- **Video Conferencing Tools:** Video conferencing platforms such as Zoom, Microsoft Teams, and Google Meet allow teams to hold virtual meetings, presentations, and discussions. They often include features like screen sharing, recording, and breakout rooms to facilitate effective collaboration.
- **Task Management and Productivity Tools:** Tools like Todoist, Evernote, and Microsoft Planner help individuals and teams manage tasks, set priorities, and stay organized. They often provide features such as reminders, due dates, and integrations with other collaboration tools.
- **Knowledge Sharing and Documentation Tools:** Knowledge sharing platforms such as Confluence, Notion, and SharePoint enable teams to create and maintain a centralized knowledge base. These tools facilitate documentation, information sharing, and collaboration on project-related materials, processes, and best practices.
- **Version Control and Collaboration for Developers:** Tools like GitHub and GitLab provide version control and collaboration features for software development teams. They allow multiple developers to work on the same codebase, track changes, and merge their contributions seamlessly.
- **Social Intranet Platforms:** Intranet platforms such as Microsoft SharePoint, Jive, and Yammer serve as internal communication hubs for organizations. They provide features like news feeds, forums, document repositories, and employee directories to foster collaboration and communication within the company.
- **Task Automation Tools:** Task automation tools like Zapier, IFTTT, and Microsoft Power Automate help automate repetitive tasks and integrate different applications. They allow teams to create workflows and trigger actions based on specific events, improving productivity and reducing manual effort.

These are just a few examples of the wide range of collaboration and communication tools available today. The choice of tools depends on the specific needs of your team or organization, as well as your preferred workflows and integration requirements.

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3. Tools & Practices for the development of a training program in the CH domain

In this section we focus on selected tools and practices required for the development of a training program and we provide specific examples on how these are utilized in the CH domain.

3.1 Learning Management Systems (LMS)

Learning Management Systems (LMS) are widely used in various domains, including the Cultural Heritage (CH) sector, to deliver online courses, training programs, and educational content. Below we provide some examples of how LMS platforms are utilized in the CH domain.

3.1.1 Museum Education Programs

Museums often employ LMS platforms to offer online educational programs and courses for learners of all ages. These programs can cover a range of topics, such as art history, archaeology, conservation techniques, or specific exhibitions. LMS platforms enable museums to deliver multimedia content, assessments, discussion forums, and progress tracking to enhance the learning experience.

Museums can create and deliver online courses and workshops through LMS platforms. These courses can cover various topics, such as art history, cultural heritage, scientific discoveries, or specific exhibitions. LMS platforms allow museums to structure the course content, provide multimedia resources (videos, images, audio), offer quizzes or assignments for assessment, and facilitate discussion forums for participants to interact and share insights [13]-[14].

LMS platforms enable museums to offer self-paced learning modules or courses [15]. Participants can access the learning materials at their convenience, progress through the content at their own pace, and complete assessments or quizzes to assess their understanding. LMS platforms track individual progress, providing learners with a personalized and flexible learning experience.

LMS platforms can host virtual exhibitions and collections, allowing participants to explore museum exhibits remotely. Museums can provide detailed descriptions, images, videos, and interactive features within the LMS platform, enabling participants

to virtually navigate through the exhibition space, view artifacts, and learn about their historical and cultural significance [16], [17].

LMS platforms are valuable for implementing distance learning programs, particularly for schools or individuals who cannot physically visit the museum [18]. Museums can develop curriculum-aligned educational modules, interactive activities, and assessments within the LMS platform. This enables students and teachers to access resources, engage in learning materials, and participate in educational experiences tailored to specific age groups or curriculum requirements.

LMS platforms can serve as repositories for educator resources and professional development materials [19]. Museums can create modules or courses for educators, providing them with access to teaching guides, lesson plans, activity ideas, and training materials. LMS platforms facilitate the sharing of resources, collaborative discussions among educators, and professional development opportunities.

LMS platforms can support virtual field trips, allowing students or visitors to virtually explore the museum and its exhibits [20]. Museums can create interactive experiences within the LMS platform, providing guided tours, multimedia content, and interactive elements to engage participants. LMS platforms also enable educators to facilitate discussions and assessments related to the virtual field trip.

By utilizing LMS platforms in museum education programs, museums can extend their reach, offer engaging and accessible educational experiences, facilitate collaboration and discussion among participants, and provide valuable resources for educators. These platforms enhance the accessibility and flexibility of museum education, enabling learners to engage with cultural heritage materials in a dynamic and interactive manner.

3.1.2 Cultural Heritage Preservation and Conservation Training

LMS platforms are utilized by organizations involved in the preservation and conservation of cultural heritage. They offer courses on various preservation techniques, artifact handling, digitization methods, and ethical considerations. LMS platforms allow learners to access course materials, engage in interactive activities, and receive certifications upon completion.

Below we provide some examples of how Learning Management Systems (LMS) platforms are utilized in cultural heritage preservation and conservation training.

LMS platforms are used to offer online courses on various preservation techniques, such as preventive conservation, object handling, environmental monitoring, and cleaning methods [21]. These courses can include instructional videos, interactive modules, quizzes, and assignments. LMS platforms enable learners to access course materials, interact with instructors, and track their progress throughout the training.

LMS platforms can be utilized to deliver training programs on digitization and documentation methods for cultural heritage materials [22]. These courses cover topics like digitization best practices, metadata standards, imaging techniques, and cataloging procedures. LMS platforms allow learners to access multimedia resources, participate in practical exercises, and receive feedback on their work.

LMS platforms are used to provide training on risk assessment and emergency response in cultural heritage contexts [23]. These courses cover topics such as disaster preparedness, emergency planning, salvage techniques, and recovery strategies. LMS platforms enable learners to access instructional materials, interactive scenarios, and assessments related to handling emergencies in cultural heritage settings.

LMS platforms can be employed to deliver courses on conservation ethics, theories, and principles [24]. These courses delve into topics such as the ethics of restoration, decision-making in conservation, and the history of conservation practices. LMS platforms enable learners to engage with readings, participate in discussions, and submit reflective assignments to explore these topics in depth.

LMS platforms are utilized to offer continuing professional development programs for conservation professionals [25]. These programs cover emerging techniques, advancements in materials science, or changes in conservation practices. LMS platforms enable professionals to access resources, attend webinars or lectures, and complete assessments to earn CPD credits.

Virtual Labs and Simulations may also be hosted by LMS platforms for hands-on training in cultural heritage preservation and conservation [26]. These virtual environments allow learners to practice conservation techniques, simulate real-life scenarios, and apply their knowledge in a controlled setting. LMS platforms facilitate

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interactive learning experiences with multimedia resources, step-by-step instructions, and feedback mechanisms.

3.1.3 Cultural Heritage Management and Tourism

Cultural Heritage Management and Tourism utilize LMS platforms for the provision of training programs. The involved courses may cover topics such as heritage site management, interpretation strategies, community engagement, and sustainable tourism. LMS platforms enable learners to access course modules, engage in discussions, and complete assessments remotely.

LMS platforms can be used to deliver online courses on heritage site management [27]. These courses cover topics such as heritage conservation, site interpretation, visitor management, and sustainable tourism practices. LMS platforms provide learners with access to course materials, interactive modules, quizzes, and assessments to enhance their understanding of cultural heritage management in the tourism context.

LMS platforms are utilized to offer training programs on interpretation techniques and visitor engagement strategies [28]. These programs can include modules on storytelling, exhibit design, guided tours, and interactive experiences. They can also host courses on cultural tourism [29] marketing and promotion [30]. These courses cover topics such as destination branding, digital marketing strategies, social media management, and tourism product development. LMS platforms are utilized to deliver training programs on sustainable tourism practices in cultural heritage contexts [31]. These programs cover topics such as community engagement, environmental sustainability, cultural sensitivity, and responsible tourism. They can also be used to offer online training programs for tour guides in cultural heritage tourism [32]. These programs provide modules on communication skills, historical and cultural knowledge, guiding techniques, and customer service. LMS platforms allow aspiring tour guides to access learning materials, participate in interactive exercises, and complete assessments to develop their skills and knowledge.

LMS platforms are utilized to deliver certification programs in cultural heritage interpretation [33]. These programs cover topics such as interpretive planning, storytelling techniques, audience engagement, and evaluation methods. LMS platforms provide learners with access to course materials, discussion forums, and assessments, leading to a certification upon successful completion.

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By utilizing LMS platforms in cultural heritage management and tourism, organizations can offer flexible and accessible training programs to individuals interested in the field. These platforms provide learners with interactive content, assessments, and opportunities for collaboration and discussion. LMS platforms enhance the knowledge and skills of professionals and enthusiasts in cultural heritage management and tourism, ensuring the sustainable and responsible promotion of cultural heritage assets.

3.1.4 Archaeological Field Schools and Training

LMS platforms are utilized in archaeological field schools and training programs to deliver theoretical and practical content [34]. These platforms facilitate the sharing of course materials, resources, and assessments. They can also support remote collaboration among students, instructors, and field supervisors during excavations or research projects.

LMS platforms are used to provide pre-fieldwork preparation for participants in archaeological field schools [35]. These platforms allow organizers to share essential resources, readings, and introductory materials to familiarize participants with the fieldwork objectives, methodologies, and safety protocols. LMS platforms also facilitate pre-fieldwork assessments or quizzes to gauge participants' understanding before they arrive on-site. LMS platforms can also host online lectures and modules that cover foundational knowledge and theoretical concepts in archaeology. These modules may include topics such as archaeological methods, excavation techniques, artifact analysis, and site interpretation [36].

LMS platforms are utilized to manage fieldwork documentation and reporting processes. Participants can use the platform to submit daily or weekly reports, upload photographs, or record field notes. They can also facilitate remote collaboration and communication among participants, instructors, and supervisors during fieldwork. Discussion forums, messaging features, or video conferencing tools within the LMS platform enable participants to ask questions, seek guidance, and engage in discussions with their peers and instructors, even when they are not physically present at the excavation site [37].

LMS platforms can host virtual fieldwork simulations that allow participants to practice archaeological techniques and decision-making in a controlled environment. These

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simulations provide participants with virtual excavation scenarios, where they can apply their knowledge, make informed decisions, and engage in critical thinking exercises. LMS platforms facilitate interactive learning experiences, assessments, and feedback on participants' performance [38].

By utilizing LMS platforms in archaeological field schools and training, organizers can enhance the learning experience, foster collaboration among participants, and streamline documentation and reporting processes. These platforms provide a centralized hub for resources, communication, and assessments, enabling participants to engage with the field of archaeology in both practical and theoretical contexts.

3.1.5 Digital Humanities and Cultural Studies

LMS platforms are employed in the digital humanities and cultural studies fields to offer courses on topics like digital archives, data visualization, text analysis, or digital storytelling. These platforms enable learners to access digital resources, collaborate on projects, and engage in discussions related to cultural heritage and digital scholarship and provide assessments to enhance their understanding of digital tools and methodologies in the field [39].

LMS platforms facilitate collaborative research projects in Digital Humanities and Cultural Studies. Participants can form research groups, share resources, collaborate on data analysis, and contribute to project development within the LMS platform. Features like discussion forums, shared document repositories, and task management tools enable effective collaboration and coordination among researchers [40]. They are also utilized to manage digital archives in the field of Cultural Studies. These platforms enable the organization, preservation, and accessibility of digital collections, such as images, texts, audio recordings, or videos. LMS platforms allow researchers to upload, annotate, and catalog items in the archive, ensuring efficient management and retrieval of cultural materials. [41]. LMS platforms can host online workshops and webinars on specific topics in Digital Humanities and Cultural Studies. These interactive sessions may involve presentations by experts, demonstrations of digital tools, hands-on exercises, or discussions. LMS platforms facilitate participant registration, content delivery, and engagement through features like live chat, video conferencing, and resource sharing. LMS platforms can support the development and delivery of courses on Digital Humanities pedagogy. These courses focus on teaching strategies, curriculum development, and best practices for integrating digital tools and methods

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into cultural studies education. LMS platforms provide instructional resources, case studies, and discussion forums to facilitate knowledge sharing and collaboration among educators [42]. Finally, LMS platforms are utilized for digital publishing and exhibition of research projects, scholarly articles, or curated digital exhibitions in Cultural Studies.

3.1.6 Professional Development and Continuing Education

LMS platforms are utilized in the CH domain for professional development and continuing education programs [43]. These programs cater to professionals working in museums, archives, libraries, or heritage organizations, offering courses on topics such as museum administration, archival management, collection care, or exhibition design. LMS platforms facilitate self-paced learning, assessment, and certification. LMS platforms facilitate the delivery of webinars and virtual conferences in the CH domain. These online events bring together experts, practitioners, and enthusiasts to share insights, research findings, and best practices. LMS platforms provide features for live video streaming, interactive Q&A sessions, and networking opportunities among participants. Recorded sessions can be archived within the platform for on-demand access by learners [44]. LMS platforms are utilized to facilitate mentorship and coaching programs in the CH domain. These programs pair experienced professionals with individuals seeking guidance and career development in cultural heritage. LMS platforms provide a platform for mentors and mentees to communicate, share resources, set goals, and track progress. Discussion forums and messaging features enable ongoing support and knowledge exchange [45]. By utilizing LMS platforms in professional development and continuing education in the CH domain, organizations can offer accessible and relevant learning opportunities for professionals. These platforms provide a centralized hub for resources, interactive learning modules, collaboration, and networking. LMS platforms enhance the professional growth and knowledge exchange among practitioners in the CH field.

3.2 Collaboration and Communication Tools in CH domain

In the cultural heritage domain, collaboration and communication tools play a crucial role in facilitating the preservation, research, and sharing of cultural artifacts and

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knowledge. Here are some collaboration and communication tools commonly used in the cultural heritage sector:

3.2.1 Digital Asset Management Systems (DAMS)

Digital Asset Management Systems (DAMS) like TMS (The Museum System), Axiell DAMS[7], and CollectiveAccess[8] help cultural heritage institutions manage and organize their digital collections. These tools allow users to store, search, and retrieve digital assets such as images, videos, documents, and audio recordings. The following cultural heritage projects have employed DAMS for managing and preserving their digital collections. These examples illustrate how cultural heritage institutions leverage DAMS to digitize, organize, and preserve their diverse collections, allowing for wider access, research, and engagement with cultural heritage materials:

- **Europeana**[9]: Europeana is a digital platform that provides access to millions of cultural heritage objects from European institutions. It employs a DAMS to manage and organize a vast collection of images, videos, documents, and other digital assets contributed by museums, libraries, archives, and galleries across Europe.
- **Smithsonian Institution**[10]: The Smithsonian Institution, the world's largest museum and research complex, utilizes a DAMS called CollectionSpace[11]. It allows the institution to manage and preserve digital assets related to its diverse collections, including art, history, science, and cultural artifacts.
- **Getty Research Institute's Open Content Program**[12]: The Getty Research Institute has implemented a DAMS to support its Open Content Program. The DAMS facilitates the digitization, management, and dissemination of high-resolution images of artworks from the Getty's collection, making them freely available for scholarly and public use.
- **National Library of Australia**[13]: The National Library of Australia uses a DAMS called DigiTool to manage its digital collections, including photographs, maps,

[7] https://www.axiell.com/solutions/product/digital-asset-managent/
[8] https://www.collectiveaccess.org/
[9] https://www.europeana.eu/en
[10] https://www.si.edu/
[11] https://collectionspace.org/
[12] https://getty.libguides.com/openaccess/getty
[13] https://www.nla.gov.au/

manuscripts, and newspapers. DigiTool[14] enables the library to organize, preserve, and provide access to its extensive collection of digitized materials.

- **British Library's Digital Collections**[15]: The British Library employs a DAMS to manage its vast digital collections, including digitized manuscripts, books, newspapers, sound recordings, and images. The DAMS enables efficient storage, retrieval, and preservation of these valuable cultural artifacts.
- **Museum of New Zealand Te Papa Tongarewa**[16]: Te Papa Tongarewa, the national museum of New Zealand, utilizes a DAMS to manage its digital assets. It supports the preservation and accessibility of a wide range of cultural and natural heritage collections, including artworks, photographs, historical documents, and multimedia resources.

3.2.2 Virtual Exhibitions and Galleries

Virtual Exhibitions and Galleries are assisted by specialized tools like Omeka[17], Artsteps[18], and Sketchfab[19] that enable the creation of virtual exhibitions and galleries. They provide a digital space where cultural heritage organizations can showcase their collections and engage with visitors through immersive experiences.

Below we provide a few examples of cultural heritage-related projects that have employed Virtual Exhibitions and Galleries tools to create immersive and engaging online experiences. These examples demonstrate how cultural heritage organizations have embraced Virtual Exhibitions and Galleries tools to offer immersive and accessible experiences to audiences worldwide. These online platforms allow users to virtually explore museum spaces, view artworks and artifacts, and engage with rich multimedia content, thereby extending the reach and impact of cultural heritage collections:

- **Google Arts & Culture**[20]**:** Google Arts & Culture is a platform that partners with cultural institutions around the world to create virtual exhibitions and galleries. It offers high-resolution images, 360-degree virtual tours, and interactive

[14] https://godigitool.com/
[15] https://www.bl.uk/catalogues-and-collections/digital-collections
[16] https://www.tepapa.govt.nz/
[17] https://omeka.org/
[18] https://www.artsteps.com/
[19] https://sketchfab.com/
[20] https://artsandculture.google.com/

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experiences that allow users to explore artworks, historical artifacts, and cultural sites from various museums and heritage organizations.

- **British Museum's Virtual Museum[21]:** The British Museum has created a virtual museum using Sketchfab tool. It allows visitors to virtually explore the museum's galleries and view 3D models of artifacts from its collection. Users can navigate through different rooms, zoom in on objects, and access information about each artifact.
- **The Louvre Museum's Online Exhibitions[22]:** The Louvre Museum in Paris has developed online exhibitions using the Artsteps virtual exhibition tool. These virtual exhibitions provide curated collections of artworks, accompanied by descriptions and contextual information. Users can navigate through the virtual space, view artworks, and engage with multimedia content.
- **Smithsonian National Museum of Natural History's Virtual Exhibits[23]:** The Smithsonian National Museum of Natural History offers virtual exhibits using a platform called Open Exhibits[24]. These virtual exhibits allow visitors to explore various topics related to natural history, including fossils, ecosystems, and biodiversity. Users can access interactive content, images, videos, and educational resources.
- **Vatican Museums' Virtual Tours[25]:** The Vatican Museums offer virtual tours using a platform called Vatican Patrons. Visitors can explore the museums' galleries, including the Sistine Chapel and Raphael's Rooms, through high-resolution images and interactive features. The virtual tour provides a detailed view of the artworks and historical spaces.
- **National Museum of African American History and Culture's Online Exhibitions[26]:** The National Museum of African American History and Culture (NMAAHC) in the United States provides online exhibitions using the Omeka platform. These exhibitions focus on various aspects of African American

[21] https://www.britishmuseum.org/blog/how-explore-british-museum-home
[22] https://www.louvre.fr/en/online-tours
[23] https://naturalhistory.si.edu/visit/virtual-tour
[24] https://openexhibits.org/
[25] https://m.museivaticani.va/content/museivaticani-mobile/en/collezioni/musei/tour-virtuali-elenco.html
[26] https://nmaahc.si.edu/explore/exhibitions

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history, culture, and achievements. Users can explore curated collections, multimedia content, and educational resources.

3.2.3 Collaborative Research Platforms

Research platforms such as Academia.edu[27], ResearchGate[28], and Zenodo[29] promote collaboration and knowledge sharing among researchers in the cultural heritage field. These platforms allow researchers to upload, share, and discover scholarly articles, reports, and other research outputs. Some examples of collaborative research platforms in the cultural heritage (CH) domain that facilitate collaboration and knowledge sharing among researchers, scholars, and cultural heritage professionals are presented below. These examples highlight the diverse range of collaborative research platforms in the cultural heritage domain. These platforms aim to facilitate interdisciplinary collaboration, knowledge sharing, and the development of new research methodologies, ultimately advancing our understanding and appreciation of cultural heritage:

- **Europeana Research**[30]: Europeana Research is a platform that provides access to millions of digitized cultural heritage objects from European institutions. It offers tools and services specifically designed to support research activities, including an API for accessing metadata and content, a task-focused workspace for researchers, and access to data sets for research purposes.
- **European Research Infrastructure for Heritage Science**[31]: E-RIHS is the European Research Infrastructure for Heritage Science that supports research on heritage interpretation, preservation, documentation and management. The mission of E-RIHS is to deliver integrated access to expertise, data and technologies through a standardized approach, and to integrate world-leading European facilities into an organization with a clear identity and a strong cohesive role within the global heritage science community.

[27] https://www.academia.edu/
[28] https://www.researchgate.net/
[29] https://zenodo.org/
[30] https://pro.europeana.eu/page/research
[31] https://www.e-rihs.eu/

- **ResearchSpace**[32]: ResearchSpace is a collaborative research platform developed by the British Museum in partnership with the University of Reading. It provides a digital workspace where researchers can explore, annotate, and link diverse CH data, including texts, images, and 3D models. The platform encourages collaboration and facilitates the development of new research methodologies and interpretations.
- **Cultural Heritage Experiences through Socio-personal Interactions and Storytelling (CHESS)**[33]: CHESS is a collaborative research project that focuses on enhancing visitor experiences in cultural heritage sites. It brings together researchers, technologists, and cultural heritage practitioners to explore innovative technologies and design interactive storytelling experiences that engage visitors and facilitate knowledge exchange.

3.2.4 Digital Preservation Tools

Digital preservation tools like **Archivematica**[34], **Preservica**[35], and **Rosetta**[36] help cultural heritage institutions ensure the long-term preservation and access to digital materials. These tools assist in the management of digital preservation workflows, including ingest, metadata extraction, file format validation, and storage. Examples of cultural heritage-related projects that have employed digital preservation tools to ensure the long-term preservation and access of digital assets are presented below:

- The British Library has implemented various digital preservation tools and systems to safeguard its digital collections. They utilize the Archivematica digital preservation system that automates processes such as file format migration, quality assurance, and metadata extraction, ensuring the long-term preservation of digital materials.
- The **Library of Congress**[37] in the United States has a robust digital preservation program in place. They employ tools like **LOCKSS**[38] (Lots of

[32] https://researchspace.org/
[33] https://cordis.europa.eu/project/id/270198
[34] https://www.archivematica.org/en/
[35] https://preservica.com/
[36] https://natlib.govt.nz/collections/digital-preservation/ndha-tools-and-resources/rosetta
[37] https://www.loc.gov/
[38] https://www.lockss.org/

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Copies Keep Stuff Safe) and **BagIt**[39] to create redundant copies of digital content, perform integrity checks, and ensure the authenticity and accessibility of their digital collections.

- Preservica is a digital preservation platform used by various institutions, including the National Archives in the UK[40]. It enables the National Archives to ingest, manage, and preserve digital records, ensuring their long-term accessibility and integrity. Preservica supports formats such as PDF/A, TIFF, and XML, and provides tools for migration, metadata management, and preservation planning.
- The National Library of Australia[41] employs the Digital Preservation Software Platform (DPSP) to manage and preserve its digital collections.

3.2.5 Crowdsourcing Platforms

Crowdsourcing platforms such as **Zooniverse**[42], **Smithsonian Transcription Center**[43], and **Europeana Crowdsource**[44] allow the public to actively contribute to cultural heritage projects. These platforms engage volunteers in tasks such as transcribing, tagging, and enriching digitized collections, thereby increasing accessibility and knowledge about cultural artifacts. Examples of cultural heritage-related projects that have employed crowdsourcing platforms to engage the public and harness their collective knowledge and skills are presented below:

- **Art Detective**[45], led by the Public Catalogue Foundation, engages the public in researching and identifying artworks from UK collections. Participants contribute their knowledge and expertise to help catalog and provide information about lesser-known artworks, thereby expanding the understanding and accessibility of the UK's art collection.
- **Citizen Archivist**[46] Projects at the National Archives (US) hosts several crowdsourcing projects on their Citizen Archivist platform. These projects invite volunteers to transcribe documents, tag and describe photographs, and

[39] https://www.digitalpreservation.gov/multimedia/videos/bagit0609.html
[40] https://www.nationalarchives.gov.uk/
[41] https://www.nla.gov.au/
[42] https://www.zooniverse.org/
[43] https://transcription.si.edu/
[44] https://pro.europeana.eu/event/planning-crowdsourcing-projects-in-cultural-heritage
[45] https://www.artuk.org/artdetective/
[46] https://www.archives.gov/citizen-archivist

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contribute to the transcription and indexing of historical records, enhancing public access to the National Archives' collections.

- **HeritageCrowd**[47] is a platform that enables cultural heritage organizations to launch crowdsourcing projects. It allows institutions to engage the public in tasks such as transcribing documents, identifying photographs, and enriching metadata. HeritageCrowd provides a user-friendly interface for participants to contribute their knowledge and expertise to cultural heritage projects.

3.2.6 Collaborative Annotation Tools

Annotation tools like hypothes.is, **eMargin**[48], and **Recogito**[49] facilitate collaborative analysis and annotation of cultural texts and documents. These tools enable scholars, researchers, and the public to collectively annotate and interpret historical documents, manuscripts, and other textual resources. Below are a few examples of CH (Cultural Heritage) related projects that employ Collaborative Annotation Tools. These projects demonstrate how collaborative annotation tools can be utilized to engage volunteers, scholars, and researchers in the process of transcribing, annotating, and analyzing cultural heritage materials, thereby enriching our understanding of the past:

- **Transcribe Bentham**[50]: Transcribe Bentham is a project that aims to transcribe the works of philosopher Jeremy Bentham using crowdsourcing. It allows volunteers to collaboratively transcribe Bentham's manuscripts using an online collaborative annotation tool. The project makes use of the crowdsourced transcriptions to create a digital archive of Bentham's works.
- The **Shelley-Godwin Archive**[51]: The Shelley-Godwin Archive is a collaborative project that brings together the manuscripts of Percy Bysshe Shelley, Mary Shelley, William Godwin, and Mary Wollstonecraft. The project allows scholars and volunteers to annotate and transcribe these manuscripts using collaborative annotation tools. The annotations and transcriptions are then made available online, facilitating research and analysis of these important literary works.

[47] https://crowdheritage.eu/en
[48] https://emargin.bcu.ac.uk/
[49] https://recogito.pelagios.org/
[50] https://www.ucl.ac.uk/bentham-project/transcribe-bentham
[51] http://shelleygodwinarchive.org/

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- **Mapping the Republic of Letters**[52]: Mapping the Republic of Letters is a digital humanities project that explores the correspondence network of early modern intellectuals. The project uses collaborative annotation tools to annotate and transcribe letters exchanged between scholars, writers, and thinkers of the time. The annotated letters are then visualized on a map, allowing researchers to study the flow of ideas and connections between individuals.
- **What's the Score at the Bodleian?**[53]: This project by the Bodleian Libraries at the University of Oxford invites volunteers to help transcribe and annotate digitized musical scores from their collections. The collaborative annotation tools enable volunteers to contribute to the transcription process, enhancing access to and understanding of the scores.
- **The Civil War Washington**[54]: The Civil War Washington project focuses on the Civil War era in Washington, D.C. It uses collaborative annotation tools to allow volunteers to transcribe and annotate primary sources such as letters, diaries, and newspapers from that period. This collaborative effort helps make historical documents more accessible and enables researchers to study various aspects of the Civil War era in the nation's capital.

3.2.7 Online Forums and Communities

Online forums and communities, such as H-Net and the Digital Preservation Network (DPN) community, provide spaces for cultural heritage professionals to discuss challenges, share best practices, and collaborate on projects. These platforms foster networking, knowledge exchange, and community building within the cultural heritage sector. Some examples of Cultural Heritage (CH) related projects that make use of online forums and communities are presented below. These examples demonstrate how online forums and communities provide spaces for people to connect, collaborate, and engage in discussions related to cultural heritage. They facilitate knowledge sharing, networking, and the exchange of ideas, promoting a sense of community among individuals passionate about CH and related fields.

[52] http://republicofletters.stanford.edu/
[53] https://digital.bodleian.ox.ac.uk/collections/whats-the-score/
[54] https://civilwardc.org/

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- **Reddit's /r/AskHistorians**[55]: /r/AskHistorians is a popular subreddit on Reddit where people can ask questions about history and receive answers from knowledgeable historians. This online community serves as a platform for engaging discussions and sharing historical knowledge. It provides a space for the public to interact with experts, fostering a sense of community and promoting the dissemination of historical information.
- **British Library's Online Community**: The British Library hosts an online community platform where users can discuss various topics related to cultural heritage, including manuscripts, rare books, and historical artifacts. The platform allows users to connect with each other, share insights, and engage in conversations about the library's collections and other CH-related topics.
- **Europeana Community**[56]: Europeana is a digital platform that provides access to millions of cultural heritage items from European libraries, museums, archives, and galleries. The Europeana Community section of their website features an online forum where users can participate in discussions, share their experiences, ask questions, and collaborate on CH-related projects. The community fosters dialogue and collaboration among professionals, researchers, educators, and enthusiasts interested in European cultural heritage.
- **Digital Humanities Slack Channels**[57]: Slack is a popular messaging and collaboration platform used by various communities, including those in the Digital Humanities field. Many CH-related projects and organizations have their own Slack channels or participate in relevant channels, creating spaces for professionals and enthusiasts to connect, share resources, and discuss topics related to cultural heritage, digital humanities, and related disciplines.
- **The Digital Classicist List**[58]: The Digital Classicist List is an online community and mailing list that brings together scholars, researchers, and practitioners interested in the application of digital methods to the study of the ancient world. It serves as a platform for sharing announcements, resources, and discussing

[55] https://www.reddit.com/r/AskHistorians/
[56] https://pro.europeana.eu/europeana-network-association/communities
[57] https://dhcenter-unil-epfl.ch/en/
[58] https://www.digitalclassicist.org/

topics related to digital classics and the use of technology in studying ancient cultures.

3.2.8 Social Media and Blogging Platforms

Social media platforms like Twitter, Instagram, and Facebook, as well as blogging platforms like WordPress and Medium, are commonly used by cultural heritage organizations to communicate and engage with the public. These platforms allow institutions to share updates, behind-the-scenes insights, and stories related to their collections and activities. Examples of Cultural Heritage (CH) related projects that make use of social media and blogging platforms are:

- the Smithsonian Institution's Instagram[59]
- the British Museum's Blog,[60]
- the Getty Museum's Twitter,[61]
- Archaeology Magazine's Facebook Page[62] and
- the National Archives' YouTube Channel[63]

These examples illustrate how social media and blogging platforms are utilized by CH-related projects to reach wider audiences, share engaging content, encourage dialogue, and facilitate the exploration and appreciation of cultural heritage in a dynamic and interactive manner.

3.2.9 Digital Collaboration and Project Management Tools

Digital collaboration and project management tools, such as **Basecamp**[64], **Trello**[65], and **Microsoft Planner**[66], are used in the cultural heritage domain to coordinate and manage collaborative projects. These tools facilitate task management, scheduling, and communication among team members working on digitization, preservation, or research initiatives.

[59] https://www.instagram.com/smithsonian/?hl=en
[60] https://www.britishmuseum.org/blog
[61] https://twitter.com/GettyMuseum
[62] https://www.facebook.com/archaeologymag/
[63] https://www.youtube.com/usnationalarchives
[64] https://basecamp.com/
[65] https://trello.com/
[66] https://tasks.office.com/

3.2.10 *Video Conferencing and Webinar Tools*

Video conferencing tools like Zoom, Microsoft Teams, and Google Meet, as well as webinar platforms like GoToWebinar and Webex, are used for virtual meetings, conferences, and educational webinars in the cultural heritage field. These tools enable remote collaboration, knowledge sharing, and interactive discussions among professionals and audiences.

Here are some examples of Cultural Heritage (CH) related projects that make use of video conferencing and webinar tools:

- Virtual Conferences and Symposiums: Many CH organizations and academic institutions have adapted to virtual formats for conferences and symposiums due to the COVID-19 pandemic or to facilitate wider participation. Platforms like Zoom, Microsoft Teams, or Webex are commonly used to host online sessions, allowing presenters to share their research, engage in discussions, and interact with participants from different locations.
- Webinar Series: CH projects often organize webinar series to educate and engage audiences on various topics related to cultural heritage. Platforms like GoToWebinar, Zoom Webinars, or Adobe Connect enable project organizers to deliver presentations, conduct panel discussions, and facilitate Q&A sessions with participants.
- Virtual Workshops and Training Sessions: CH projects frequently organize virtual workshops and training sessions to impart knowledge and skills related to cultural heritage preservation, conservation, or research methods. Video conferencing tools such as Zoom or Microsoft Teams enable trainers and participants to interact, demonstrate techniques, and provide hands-on guidance remotely.
- Virtual Tours and Exhibitions: Cultural institutions, museums, and heritage sites have embraced video conferencing tools to offer virtual tours and exhibitions. They use platforms like Zoom, Google Meet, or Microsoft Teams to conduct live guided tours where visitors can explore the collections, artifacts, or sites virtually while interacting with tour guides or curators.
- Remote Collaboration and Consultations: CH projects often require collaboration among teams or consultation with external experts who may be located in different geographic locations. Video conferencing tools facilitate

remote collaboration, allowing team members to hold virtual meetings, share screens, and discuss project progress, challenges, and strategies.

- Online Lectures and Talks: CH projects and institutions organize online lectures and talks to disseminate knowledge and engage with a wider audience. Platforms like Zoom, YouTube Live, or Facebook Live are commonly used to stream presentations by experts, scholars, or researchers, followed by interactive Q&A sessions with the audience.

These examples highlight how video conferencing and webinar tools have become essential in the CH domain, enabling virtual engagement, knowledge sharing, and collaboration, even when physical gatherings are not possible or feasible. These tools provide opportunities to connect with diverse audiences, foster discussion, and facilitate remote access to cultural heritage resources and expertise.

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