







GUIA PARA APRENDER E PARTICIPAR EM MUSEUS DIGITAIS

Title: Guia para aprender e participar em museus digitais.

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MUSEUS

Educação Artística

Herança

Tecnologia





ER, Anima Lab project, photography by Manu Suarez.

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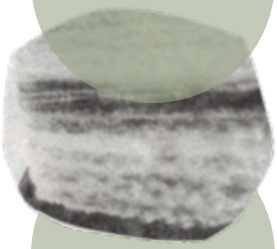
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INTRODUÇÃO



Este Guia foi concebido para alargar o acesso a recursos educativos inovadores a educadores de toda a Europa, tendo em conta estratégias, ferramentas, boas práticas e estudos de caso no âmbito da educação digital em museus. Este guia abrangente apoia os educadores no enriquecimento dos seus currículos com conteúdos museológicos e serve como uma ferramenta contínua de desenvolvimento profissional. Professores e educadores podem beneficiar deste guia para integrar recursos digitais de museus no seu ensino e serem incentivados a explorar novas formas de envolver os alunos com o património histórico e cultural.

As estatísticas da UE indicam uma crescente desigualdade digital nos contextos educativos, sendo que o Plano de Ação para a Educação Digital de 2020 destaca que apenas 38% dos alunos na União Europeia são ensinados por professores digitalmente confiantes e com apoio nesse domínio. A falta de desenvolvimento profissional na utilização de ferramentas digitais dificulta a adoção de novas práticas pedagógicas.

O projeto *Museums Uniting Students and Educators in Digital and Historical Exploration* (MUSED) pretende colmatar esta lacuna, fornecendo aos educadores o conhecimento e as ferramentas necessárias para integrar conteúdos digitais no ensino através da aprendizagem baseada em museus.

Além disso, apesar da rica herança cultural da Europa, observa-se um declínio notório no envolvimento das gerações mais jovens com as suas raízes culturais, em parte devido às distrações da era digital. O Eurobarómetro sobre os Valores Culturais Europeus (2017) revelou que uma parte significativa dos cidadãos da UE considera que o património cultural não está suficientemente integrado nas políticas educativas e culturais. O desafio reside em ligar a geração nativa digital ao seu passado de forma a que este dialogue com o seu presente e futuro. Assim, o MUSED procura contrariar esta tendência, utilizando plataformas digitais para tornar a educação patrimonial mais acessível, inclusiva e apelativa para os jovens aprendentes. Esta abordagem está alinhada com o enfoque da UE na preservação cultural e na educação como base essencial para a manutenção da diversidade cultural e da consciência histórica da União Europeia.

Este documento oferece uma visão estruturada das principais abordagens, ferramentas e metodologias relacionadas com a educação digital em contextos museológicos e escolares. Ao longo dos capítulos, são explorados os fundamentos teóricos da educação em museus, bem como a aplicação prática de ferramentas digitais para o desenho de atividades, avaliação das aprendizagens e desenvolvimento de iniciativas acessíveis e inclusivas. A transformação digital é apresentada como uma oportunidade para reformular os processos educativos e culturais, com enfoque nos contextos de ensino formal e não formal. Exemplos práticos e estudos de caso ilustram como museus e escolas podem colaborar para promover experiências de aprendizagem significativas.

1. Educador é um termo muito amplo. Refere-se não apenas a professores, mas também inclui aqueles que facilitam a aprendizagem em contextos informais e formais, como museus, livrarias, organizações culturais, centros culturais e até ambientes digitais. "Professores" refere-se especificamente a alguém que ensina num ambiente formal, como uma escola. A sua função está vinculada a um plano de estudos, a matérias específicas e a um quadro institucional definido. Um professor está normalmente associado ao sistema educativo formal.
2. OECD (2019), TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners, TALIS, OECD Publishing, Paris, https://doi.org/10.1787/1d0bc92a-en.
3. 80% dos cidadãos da UE consideram o património cultural importante para si próprios e para as suas comunidades, revela o novo Eurobarómetro, segundo a NEMO - Rede de Organizações de Museus Europeus

Descrição do projeto Erasmus e dos parceiros

MUSED é um projeto KA220 SCH Erasmus+ (Asociaciação de Cooperação em matéria de Educação Escolar) 2024-2026 cujo coordenator é o Liceo Carlo Troya em Ándria (Italia). Os seus parceiros são: Insieme per Camminare em Rossano Calabro (Italia), Abdulkerim Bengi Anadolu Lisesi em Tarsus (Turquia), Espacio Rojo em Madrid (Espanha), Escola Básica 2,3 Ciclos Dr. Horácio Bento de Gouveia no Funchal (Portugal), Model Vocational High School de Epanomi (Grécia), Collegium Balticum-Akademia Nauk Stosowanych z siedzibą w Szczecinie em Szczecin (Polónia) and Magyar Nemzeti Muzeum em Budapest (Hungria).

A colaboração formou-se com a intenção estratégica de reunir uma combinação de organizações que coletivamente puderan abarcar um largo espetro de conhecimentos e capacidades necessárias para a execução satisfatória do projeto.

Esta combinação inclui instituições educativas, organizações culturais e especialistas em tecnologia, cada um dos quais contribui com competências únicas para os projetos e os seus principais objetivos. De facto, as instituições de Itália, Turquia, Grécia, Portugal e Polónia trazem experiência direta no ensino secundário, compreendendo as necessidades, os desafios e as oportunidades de integrar métodos de ensino inovadores nos programas curriculares. Por outro lado, os especialistas em museus, arte e educação digital de Itália, Espanha e Hungria oferecem a sua experiência em pedagogia digital, metodologias de educação museológica e desenvolvimento de ferramentas e recursos digitais. Além disso, a organização Insieme per Camminare, ao gerir um museu com património classificado pela UNESCO, é especializada no desenvolvimento de ferramentas e plataformas digitais para instituições culturais.

O consórcio MUSED pretende inovar a aprendizagem digital nos museus e melhorar a educação sobre o património cultural, promovendo a literacia digital entre educadores e alunos. Através da integração de ferramentas digitais com recursos museológicos, procura tornar o património cultural mais acessível e atrativo, incentivando uma compreensão e apreciação mais profundas em toda a Europa. O objetivo é reforçar as práticas educativas, fomentar o intercâmbio intercultural e apoiar o desenvolvimento da criatividade nos alunos, assegurando um impacto duradouro na educação.

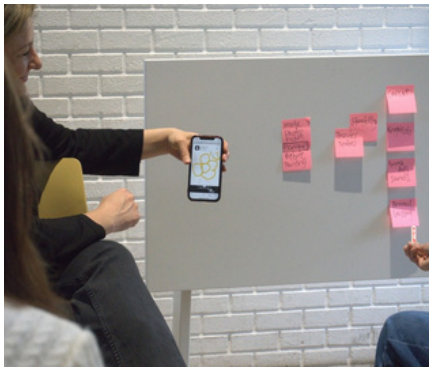
A cooperação institucional será responsável pela criação de um guia para a aprendizagem e participação em museus digitais e por um conjunto de ferramentas para a criação de museus ou exposições virtuais, duas atividades de aprendizagem sobre museologia digital e criação de museus virtuais, um museu virtual dos patrimónios europeus e, por fim, um projeto eTwinning para promover a colaboração intercultural.











LTT Madrid 2025, fotografias de Alison Valenzuela



Fotografia do Museu Nacional da Hungria

A importâcia das ferramentas digitais para museus e escolas

A integração de ferramentas digitais em museus e escolas revoluciona a educação ao melhorar a acessibilidade, o envolvimento e a aprendizagem interdisciplinar. As coleções digitalizadas eliminam barreiras físicas, permitindo que estudantes de todo o mundo explorem o património cultural através de imagens de alta resolução, modelos 3D e visitas virtuais. Estas plataformas oferecem um acesso inclusivo para alunos que enfrentam desafios económicos ou logísticos.

Para além da acessibilidade, as ferramentas digitais promovem a consciência global ao expor os estudantes a diversos recursos culturais e possibilitar a colaboração além-fronteiras. As tecnologias imersivas aumentam o envolvimento, tornando conceitos abstratos mais tangíveis e memoráveis. Além disso, a digitalização preserva artefactos frágeis e incentiva uma educação sustentável, reduzindo a dependência de materiais físicos e viagens.

Ao adotarem ferramentas digitais, museus e escolas estreitam a relação entre património cultural e educação, promovendo uma apreciação ao longo da vida e experiências de aprendizagem inovadoras.

1. A Realidade Aumentada é uma experiência interativa que combina o mundo real com conteúdo 3D gerado por computador. Este conteúdo pode abranger múltiplas modalidades sensoriais, incluindo visual, auditiva, háptica, somatossensorial e olfativa.
2. A Realidade Virtual é uma experiência simulada que utiliza ecrãs 3D próximos aos olhos e rastreamento de posição para proporcionar ao utilizador uma sensação imersiva num mundo virtual.

Sugestões para a Implementação nas Práticas Educativas

Para maximizar o impacto do guia, recomienda-se abordá-lo tanto como referência quanto como manual prático:

- Secções Relevantes: Comece por rever os capítulos mais alinhados com os seus objetivos educativos ou necessidades institucionais. Por exemplo, educadores que procuram ferramentas para envolver os alunos podem focar-se no Capítulo 2, enquanto aqueles que estão a elaborar planos de aula podem beneficiar do Capítulo 3
- Melhores Práticas: Utilize os estudos de caso do Capítulo 6 como modelos para adaptar e implementar no seu contexto. Esses exemplos oferecem informação sobre como superar desafios e alcançar sucesso em diversos ambientes educativos.
- Adapte ao seu público: Ajuste as estratégias e ferramentas sugeridas no guia às necessidades específicas dos seus alunos ou visitantes. Por exemplo, adapte o conteúdo digital para diferentes faixas etárias, estilos de aprendizagem ou contextos culturais, garantindo inclusão e relevância.
- Promova a colaboração: Trabalhe em conjunto com colegas, educadores de museus e organizações culturais para desenvolver atividades colaborativas e partilhar recursos. Os esforços de colaboração tendem a resultar em experiências educativas mais inovadoras e impactantes.
- Avaliar e evoluir: Avalie periodicamente a eficácia das estratégias aplicadas, utilizando os métodos de avaliação descritos no Capítulo 5. Recolha comentários dos estudantes, educadores e partes interessadas para aperfeiçoar e melhorar as suas práticas.
- Integrar gradualmente: Comece com aplicações em pequena escala das recomendações do guia, como testar uma ferramenta digital numa aula ou atividade. Aos poucos, amplie o uso dos recursos digitais à medida que se familiariza com o seu potencial.

Este guia é simultaneamente um roteiro e uma ferramenta concebida para apoiar a integração das tecnologias digitais na educação de forma significativa e sustentável. Ao aplicar os seus princípios e estratégias, educadores e profissionais de museus podem desbloquear o potencial transformador do património cultural na era digital.



1

EDUCAÇÃO EM MUSEUS

Fundamentos e Abordagens



MUSEUS

Servem como espaços inclusivos onde o conhecimento (integrado em artefactos digitais e mediadores) apoia o desenvolvimento cognitivo, emocional e social, promovendo conexões mais profundas com a cultura e a história.

Em relação a isto, em 2022, o Conselho Internacional de Museus (ICOM) apresentou uma definição mais atualizada do que se entende por museu.

Um museu é uma instituição permanente, sem fins lucrativos, ao serviço da sociedade, que investiga, coleciona, preserva, interpreta e expõe o património tangível e intangível. Abertos ao público, acessíveis e inclusivos, os museus promovem a diversidade e a sustentabilidade. Operam e comunicam de forma ética e profissional, com a participação das comunidades, proporcionando experiências variadas para a educação, o lazer, a reflexão e a partilha de conhecimento.

Neste sentido, com foco na acessibilidade e inclusão, a educação museológica procura envolver os visitantes, melhorar a sua compreensão e fomentar uma apreciação mais profunda do conteúdo cultural, histórico ou científico. O objetivo é promover a cidadania ativa e a aprendizagem ao longo da vida num contexto de educação não formal.

Aborgagens inovadoras da educação museológica

Historicamente, a educação museológica concentrou-se na transmissão de informação através de visitas guiadas e conferências, destacando a competência do curador. Muitas vezes, esse método colocava os visitantes como receptores passivos de conhecimento.

No entanto, académicos como John Dewey reconheceram o potencial educativo dos museus, defendendo a aprendizagem experiencial, que incentiva os visitantes a participarem ativamente nas exposições (Hein, 2004).

Embora os formatos de visitas guiadas e conferências ainda sejam utilizados, as abordagens evoluíram e a diversidade de programas disponíveis para o público aumentou. Os museus passaram dos métodos didáticos para práticas interativas e participativas, influenciadas pelas teorias construtivistas, que veem a aprendizagem como um processo ativo e contextualizado. Assim, continuam a desempenhar um papel crucial na educação, promovendo a aprendizagem ao longo da vida e a valorização cultural.

As abordagens inovadoras incluíem:

- **Programas Diversificados:** Oferecer uma ampla gama de programas, não apenas para atender a todas as faixas etárias, mas também para acomodar diferentes estilos de aprendizagem.

  Alguns exemplos incluem aulas de arteterapia ou workshops de artesanato, que enfatizam a aprendizagem através da criação, ampliando o papel educativo dos museus para além dos resultados tradicionais de aprendizagem (Wei et al., 2023).

  Outro exemplo são os programas de desenvolvimento e orientação de talentos, que oferecem oportunidades de aconselhamento profissional para adolescentes e ensinam futuros visitantes a interagir com materiais culturais.
- **Exposições Interativas:** Conceber exposições que incentivem a participação prática, permitindo que os visitantes explorem e descubram informações de forma autónoma.
- **Aprendizagem Digital:** Integrar tecnologias digitais, como coleções digitais, visitas virtuais, experiências de realidade virtual, aplicações móveis e plataformas de redes sociais, para criar experiências de aprendizagem imersivas.



Fotografia do Museu Nacional da Hungria

Transformação digital na educação museológica

As tecnologias digitais transformaram a educação museológica, mudando a forma como os museus interagem com o público, interpretam coleções e transmitem conteúdos educativos. Ao integrar ferramentas digitais, os museus ampliaram o seu alcance e criaram experiências de aprendizagem dinâmicas, interativas e personalizadas, oferecendo aos visitantes formas imersivas e envolventes de interação com as exposições. Estas ferramentas permitem que os museus proporcionem uma contextualização mais profunda dos objetos, reduzindo a distância entre a exposição estática e a narrativa dinâmica. As tecnologias de aprendizagem digital podem ser divididas em duas grandes categorias: aprendizagem digital presencial e aprendizagem digital à distância.



Fotografia de Dhiemas Afif Febriyan no Unsplash

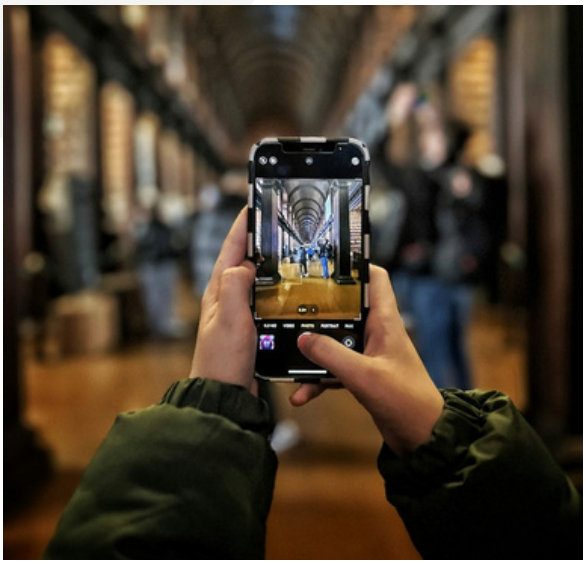
Aprendizagem digital presencial

A aprendizagem digital presencial melhora as experiências nos museus através de tecnologias interativas, como audioguias, guias ligados a códigos QR e questionários online. Auriculares com GPS oferecem informações com base na localização, enquanto a Realidade Aumentada (AR) sobrepõe reconstruções históricas e a Realidade Virtual (VR) imerge os visitantes em diferentes épocas e locais.

A VR tem sido utilizada em projetos transnacionais, como o Programa Transnacional do Danúbio, para apresentar sítios arqueológicos de nove países europeus. As experiências de VR podem ser estruturadas com narração guiada ou de forma livre, permitindo exploração independente, com educadores ao vivo a fornecer insights mais aprofundados.



Fotografia de Kwynett Bragado no Unsplash



Fotografia de Jamie O'Sullivan no Unsplash



Fotografia de Lucrezia Carnelos no Unsplash

Ensino digital à distância

As plataformas digitais permitiram que os museus oferecessem oportunidades de aprendizagem à distância, eliminando a necessidade de presença física dos visitantes. Estes métodos tornaram-se particularmente relevantes durante eventos como a pandemia de COVID-19 e continuam a beneficiar os visitantes atualmente.

Além de casos especiais, a aprendizagem digital à distância pode desempenhar um papel importante na educação remota e servir como um pilar fundamental para o material da diplomacia cultural. Materiais pedagógicos museológicos descarregáveis e tarefas podem fornecer conhecimento prévio aos futuros visitantes, e os educadores podem utilizá-los como ferramenta antes de uma visita a um museu estrangeiro, ou mesmo para fins de comparação.

As ferramentas digitais mais tradicionais incluem as visitas virtuais, seguidas por exposições online que apresentam a realidade do museu num formato visualmente acessível. As tecnologias digitais também possibilitam abordagens interativas, como jogos online, questionários ou webinars interativos concebidos em torno de uma visita virtual ou exposição online.

As tecnologias digitais transformaram a educação museológica ao melhorar a acessibilidade e o envolvimento dos visitantes. Elas permitem a participação remota, eliminando barreiras geográficas e facilitando a inclusão de pessoas com deficiência ou limitações de mobilidade (Tzortzi, 2021; Kelly, 2021). Funcionalidades como leitura de texto em voz alta, legendas e opções multilingues aumentam a acessibilidade, enquanto plataformas com inteligência artificial personalizam experiências de aprendizagem (Drotner et al., 2018).

No entanto, a digitalização também apresenta desafios. A divisão digital limita o acesso para algumas audiências, agravando desigualdades (Walsh-Pister et al., 2020). Os elevados custos de implementação representam um obstáculo, especialmente para museus de menor dimensão (Marty, 2014), e a lacuna de competências digitais entre educadores pode dificultar a sua utilização eficaz.

Além disso, a dependência excessiva de ferramentas digitais pode reduzir o envolvimento com exposições físicas. Uma abordagem equilibrada, que integre experiências digitais e presenciais, garante que a tecnologia complementa, em vez de substituir, a educação museológica tradicional.



Fotografia de Walls.io no Unsplash



2

FERRAMENTAS DIGITAIS:

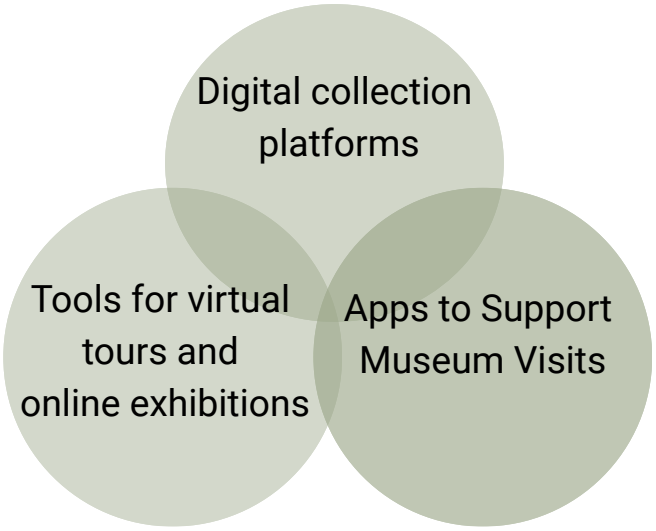
Para o Ensino nas Escolas e nos Museus

TECHNOLOGY

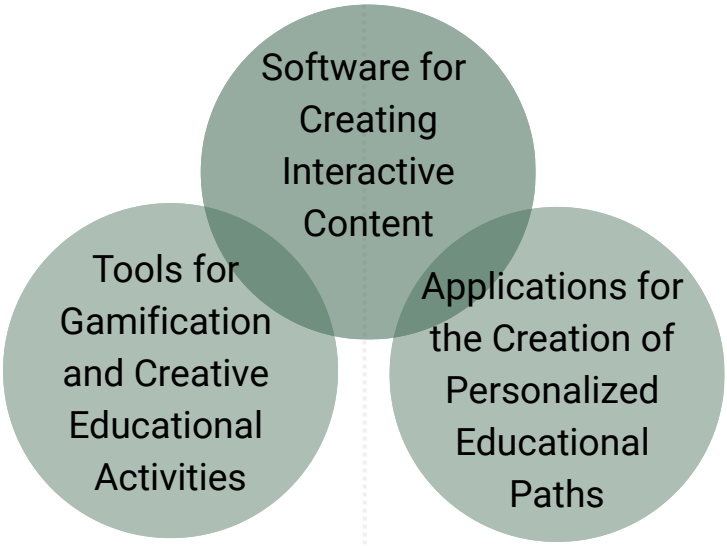
This chapter presents a list of digital tools available to meet the needs of teachers and students, considering their ease of use. The variety of tools analyzed allows them to respond to different educational contexts, both in-person and remote, encouraging active student participation and enhancing cultural heritage through technology.

It is important to consider the changing nature of these tools, as they rapidly evolve in functionality, business models, and availability. Furthermore, many platforms begin as free and later adopt paid models, limiting certain features or requiring subscriptions.

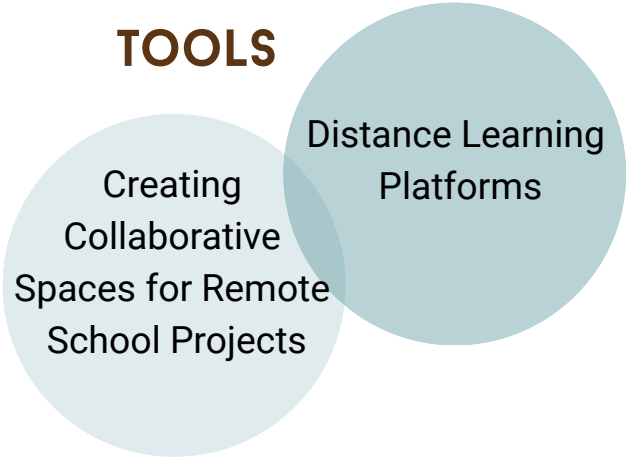
1 MUSEUM TOOLS AND PLATFORMS



2 TEACHING TOOLS FOR INTERACTIVE TEACHING

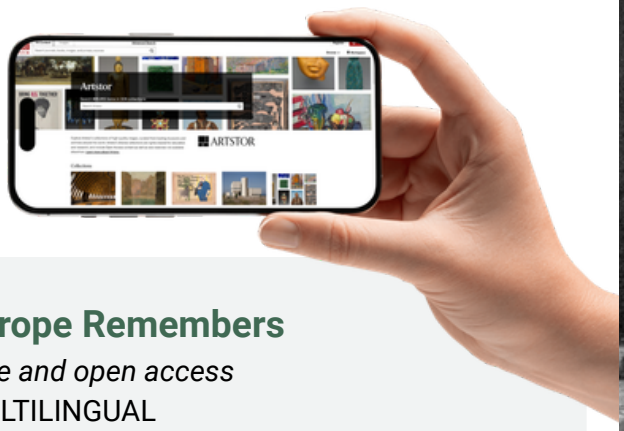


3 ONLINE COLLABORATION AND COMMUNICATION TOOLS



1 MUSEUM TOOLS AND PLATFORMS

These tools allow museums to overcome physical boundaries, making their collections accessible everywhere and allowing educators to integrate immersive experiences into their teaching methods.



Digital collection platforms

Europeana

Free and open access
MULTILINGUAL
www.europeana.eu
Is a platform that brings together and shares Europe's cultural heritage globally. Available in over 30 languages, it offers free access to millions of objects from museums, libraries and archives. Teachers can use the special collections and educational tools to enrich their lessons with high-quality and authentic content.

Google Arts & Culture

Free and open access
MULTILINGUAL
artsandculture.google.com
Allows to explore artwork and historical documents through high-resolution images and virtual tours. Working with museums and galleries around the world, Google Arts & Culture is a great way to integrate technology into your lessons.

Digital Public Library of America

Free and open access
ENGLISH
https://dp.la/
Offers free access to millions of books, images, videos and audio files from cultural institutions across the United States. Educators can use this platform to integrate primary sources into their lessons, making learning more dynamic.

Europe Remembers

Free and open access
MULTILINGUAL
europeremembers.com
Commemorates the events of the Second World War through a database of historical places and documents. It is useful for teaching history in an interactive and in-depth way, thanks to the integration of maps and authentic materials.

The British Museum Collection Online

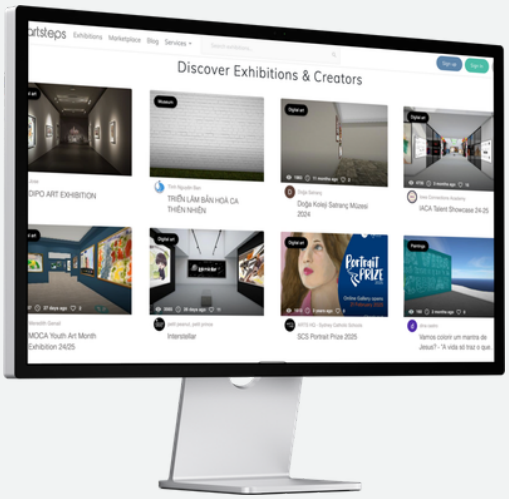
Free and open access
ENGLISH
https://www.britishmuseum.org/
Provides access to millions of objects from the British Museum, covering historical, archaeological and artistic subjects. The platform is an invaluable resource for students and teachers who want to explore cultures and civilisations.

Cenobium

Free and open access
MULTILINGUAL
cenobium.isti.cnr.it
Is a platform dedicated to the digital visualization of medieval cloisters in Europe. Using high-definition 3D models, it allows you to explore the architectural and artistic details of these spaces, making them accessible to students and researchers. It is an excellent tool for lessons in art history or medieval architecture.

USEUM

Free with in-app purchases
ENGLISH
useum.org
Combines contemporary art and cultural heritage, providing a vast catalog of works from museums and independent artists, ideal for art classes or to stimulate creativity.



Tools for virtual tours and online exhibitions

Artsteps

Freemium
ENGLISH - FRENCH
www.artsteps.com
Is a free tool for designing personalized virtual exhibitions. Users can upload images, videos, and documents to create immersive galleries. Educators and students can collaborate to create thematic itineraries, exploring cultural topics in innovative ways.

Kuula

Free with in-app purchases
ENGLISH
www.kuula.co
Allows you to create 360° virtual tours, enriched with annotations, links and multimedia content. Teachers can use this platform to offer immersive experiences to students, exploring museums or historical sites with ease.

The Met 360° Project

***F**ree and open access*
ENGLISH
The Met 360° Project | The Metropolitan Museum of Art
Offers immersive virtual tours of the iconic galleries and spaces of the Metropolitan Museum of Art in New York. Students can explore historic and artistic environments in 360° visualization, enriching their learning in an accessible and dynamic way.

Omeka

Software Open Source
ENGLISH
www.omeka.org
Is an open-source platform that allows you to create digital archives and online exhibitions. Ideal for cultural institutions and schools, it allows you to organize and present digital materials with detailed descriptions and historical contexts.

Tinkercad

Freemium
MULTILINGUAL
www.tinkercad.com
While originally designed for learning 3D design, can also be used to create virtual exhibits with custom objects. Teachers can collaborate with students to design 3D models inspired by museum collections and integrate them into online experiences. This interactive approach encourages critical thinking and creativity.

Sketchfab

Freemium
ENGLISH
www.sketchfab.com
Is a platform specialized in visualizing 3D models. Museums can upload digital scans of artifacts and allow students to virtually explore them, observing them from every angle. It is a great tool for studying topics related to archaeology or art.

Apps to Support Museum Visits



Clio

free access with subscription
ENGLISH
theclio.com
Is an app that provides detailed information about nearby museums, monuments, and cultural sites. Perfect for educational field trips, Clio helps teachers and students discover the historical and cultural context of a site in real time.

Artivive

Freemium
ENGLISH
www.artivive.com
Uses augmented reality to deliver interactive content directly onto artworks. Users can point their device at an artwork to unlock videos, animations, and additional explanations. Artivive is an excellent app for educators who want to stimulate students' imaginations and interest.

Smartify

App Freemium
ENGLISH
smartify.org
Turns your smartphone into a personal guide, allowing users to scan artworks for detailed information, trivia, and stories. The app also offers predefined thematic tours, making it perfect for educators who want to enrich students' museum experiences. Smartify is free and available on iOS and Android devices.

Bloomberg Connects

App Free and open access
ENGLISH
bloomberg connects.org
Connects visitors to the world's leading museums and cultural institutions. Through the app, users can access digital guides, audio tours, and exclusive educational materials. The simple, intuitive interface makes Bloomberg Connects ideal for students and teachers who want to delve deeper into specific topics.



2 TEACHING TOOLS FOR INTERACTIVE TEACHING

Interactive teaching is an effective approach to actively engage students in the learning process. Digital tools allow for dynamic and interactive content, encouraging understanding, collaboration, and creativity. Here are some of the best resources available.

Software for Creating Interactive Content

Genially

Freemium
MULTILINGUAL
www.genially.com
Is a versatile platform that allows you to create presentations, infographics, quizzes and interactive content. Perfect for enriching lessons with visual and dynamic elements, Genially is intuitive and has a free version suitable for teachers and students.

Padlet

Freemium
MULTILINGUAL
https://padlet.com
Is a virtual wall where users can post text, images, videos and links.Students can work collaboratively on a common project, paving the way for group collaborative projects. They can share their work via popular social networks, embed it in blogs or turn it into a QR code.

H5P

Software Open Source
ENGLISH
www.h5p.org
Is an open-source tool for creating interactive content, such as quizzes, presentations and timelines. It integrates with learning platforms such as Moodle and WordPress and is completely free.

Book Creator

Freemium
ENGLISH
bookcreator.com
Allows teachers and students to create interactive e-books, integrating text, images, video and audio. Ideal for creative and interdisciplinary projects, the app is available with a free version.

Prezi

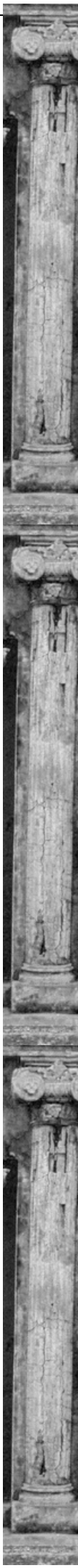
Freemium
MULTILINGUAL
prezi.com
Transforms static presentations into dynamic visual experiences, using a nonlinear format to capture students' attention. The free version offers enough tools for classroom use.

Storyboard That

Freemium
ENGLISH
www.storyboardthat.com
Is another platform for creating visual stories and illustrating complex concepts in a narrative way. Teachers can use it for interdisciplinary projects or to explain scientific and historical processes.

Coggle

Freemium
MULTILINGUAL
www.coggle.it
It is an online tool for creating interactive mind maps. Teachers can use it to organize lessons, plan collaborative projects, or help students visualize complex concepts. The free version supports the creation of simple but effective mind maps.



ThingLink

Freemium
MULTILINGUAL
www.thinglink.com
Lets you turn images and videos into interactive content by adding hotspots that can include text, links, or audio. It's especially useful for explaining complex topics visually.

Tools for Gamification and Creative Educational Activities

Fimo

App Freemium
ENGLISH
FIMO - Analog Camera - App Google Play
It is a free app that allows you to capture retro-style photographs, mimicking the effect of analog cameras.

Chroma Key

App Freemium
MULTILINGUAL
Chroma - App Google Play
It is an application that allows users to record videos and remove the background using a green screen or similar setup.

Podcast Studio

App Freemium
MULTILINGUAL
Podcast - App Google Play
It's an app that allows users to record voices and add special sound effects. It also allows you to easily record, publish, distribute, and analyze your podcast, whenever and wherever you want.



CapCut

free access with subscription
MULTILINGUAL
www.CapCut.com
It is a free video editing app developed by ByteDance, the same company behind TikTok. It's popular for its easy-to-use interface, creative features, and powerful editing tools—making it a go-to choice for both beginners and content creators, especially on social media.

SoundCloud

free access with subscription
MULTILINGUAL
www.SoundCloud.com
It is a platform where audio content, such as music or podcasts, can be uploaded, shared, and distributed.

Kahoot!

Freemium (free basic plan, paid for advanced options)
MULTILINGUAL
www.kahoot.com
Lets you create interactive, competitive quizzes that engage students through play. It's intuitive, free and perfect for testing knowledge in a fun way.

Quizizz

Free and open access with institutional enrollment for Premium Plans
MULTILINGUAL
www.quizizz.com
Combines gamification and personalized quizzes to make lessons interactive and engaging. Students can participate remotely or in person.

Minecraft Education Edition

Free access during the trial period
MULTILINGUAL
education.minecraft.net
Offers science, technology, engineering, and mathematics (STEM) activities, with a playful approach.

Flippity

Free and open access
ENGLISH
www.flippity.net
Uses Google Sheets to create educational games, flashcards and interactive quizzes. It's free and requires minimal technical skills.

Classcraft

Freemium
MULTILINGUAL
https://www.hmhco.com/
Transforms the classroom into a role-playing game where students earn points for positive activities and behaviors. Great for motivating and holding students accountable.

Blooket

Free with in-app purchases
MULTILINGUAL
www.blooket.com
It's a gamification platform that allows to the teachers to create quizzes and turn them into games interactive. The students they can participate individually or in teams , making the activities didactics engaging and competitive. Blooket is free and offers options simple to set up.

Plickers

Free and open access
MULTILINGUAL
www.plickers.com
It's a tool that allows you to use gamification without the need for devices electronics for the students. Teachers distribute QR cards to students who they can answer questions showing the card . The teacher's smartphone or tablet app reads the answers in real time. This The tool is free and ideal for environments with limited access at the technology.

Mentimeter

Free and open access (paid for advanced version)
MULTILINGUAL
https://www.mentimeter.com
Creates questionnaires, polls, charts and quizzes in real time. Mentimeter is a highly flexible tool that encourages active participation, collaboration and reflection in museum education.

Nearpo

Free and open access
MULTILINGUAL
FREE WITH SUBSCRIPTION PLANS
https://nearpod.com
Can be used for the integration of interactive elements such as quizzes, videos, VR tours and multiple-choice questions into presentations. It is an integrated tool that can enhance museum education by offering an experience that combines technology, interaction and multimedia. It offers the possibility of integrating Virtual Reality (VR) tours. Students can tour famous museums, such as the British Museum or the Louvre, and explore the exhibits.

Wordwall

Free and open access
MULTILINGUAL
www.wordwall.net
Allows you to create games educational personalized as crosswords, quizzes, wheels from the luck and many others. The teachers can choose between various models and adapt them to the needs from the lesson. The version free supports a number limited activity , but enough to get started .



Applications for the Creation of Personalized Educational Paths

Edpuzzle

Freemium
MULTILINGUAL
www.edpuzzle.com
Lets you personalize educational videos by adding interactive questions and comments. Perfect for distance learning or to supplement in-person activities.

LearningApps

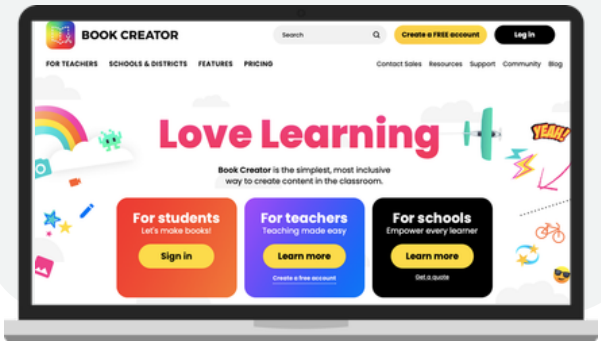
Freemium
MULTILINGUAL
learningapps.org
Is a free platform that lets you create interactive activities like matching, quizzes, and timelines. Teachers can customize the content to meet the needs of their students.

Pear Deck

Freemium
MULTILINGUAL
www.peardeck.com
Integrates interactive questions into presentations, turning lessons into participatory experiences. It is a free tool compatible with Google Slides.

Playposit

Freemium
MULTILINGUAL
https://go.playposit.com
Is a great tool that can be used to create video lessons . It is possible to add tables, images, audio snippets, links and even embed other objects.



ClassDojo

Freemium
MULTILINGUAL
www.ClassDojo.com
It is a digital classroom platform that allows teachers to: Give students real-time feedback on behavior and participation, Share updates, photos, and announcements with families, Build a positive classroom culture

Book Creator

Free and open access
MULTILINGUAL
https://bookcreator.com/
Is an online book and story creation site that allows children to combine text, pictures, video and audio to tell any story their imagination can create.

Classkick

Freemium
MULTILINGUAL
www.classkick.com
Is a platform that allows teachers to assign assignments and track student progress in real time. Students can receive instant feedback and collaborate with classmates. Teachers can tailor assignments to meet the specific needs of each student. The free version includes many useful features to get started. Learn more at.

Canva for education

Free access for educational institutions
MULTILINGUAL
www.canva.com/education
Is a free version designed specifically for teachers and students. it is a powerful tool to support museum education , combining ease of use, flexibility in content creation and collaboration capabilities. The platform supports the addition of multimedia to enhance the learning experience and the integration of third -party applications as Kahoot , Mentimeter or Nearpod.

3 ONLINE COLLABORATION AND COMMUNICATION TOOLS

These tools support both synchronous and asynchronous learning, offering flexibility and customization to meet different educational needs and allowing students to work together, share ideas and manage activities in an organized and productive way, even at a distance.

Distance Learning Platforms

Google Classroom

Free and open access
MULTILINGUAL
classroom.google.com
Is a free platform designed to facilitate the management of online lessons. Teachers can create, assign and evaluate assignments, communicate with students and monitor progress in an intuitive way. Integrated with other Google Workspace tools, such as Docs and Drive, it is particularly suitable for digital classrooms.

Microsoft Education

Free and open access
MULTILINGUAL
www.microsoft.com/education
Combines chat, video conferencing, and collaboration tools into one platform. It lets you create virtual classrooms, share materials, and track student work. The free version offers many useful features for distance learning, making it a popular choice among educators.

Moodle

Free and open access
MULTILINGUAL
moodle.org
Is an open-source platform that offers flexibility and customization for creating online courses. Teachers can upload materials, create quizzes, manage forums, and monitor student activity. Although it requires a more complex initial setup, Moodle is free and well documented, making it ideal for schools and universities.

BigBlueButton

Free and open access
ENGLISH
bigbluebutton.org
Is an open-source platform designed specifically for distance learning. It includes tools for video conferencing, interactive whiteboards, and lecture recording. It integrates with platforms such as Moodle , making it an excellent choice for schools and universities.

Zoom for Education

Freemieum
MULTILINGUAL
zoom.us
Is a popular video conferencing platform that is ideal for remote learning. With features like breakout rooms, screen sharing, and recording, Zoom makes it easy for teachers and students to interact. The free version allows sessions of up to 40 minutes for larger groups.



Creating Collaborative Spaces for Remote School Projects

Miro

Freemium
MULTILINGUAL
miro.com
Is a collaborative digital whiteboard that allows users to create mind maps, diagrams, and visual schedules. Students can add notes, drawings, and images, working together in real time. The free version includes three whiteboards and basic collaboration tools.

Notion

Freemium
MULTILINGUAL
notion.so
Is a multi-purpose platform that combines documents, tables, and boards to create shared workspaces. Students can collaborate on projects, take notes, and organize resources. The free version offers many useful features for schools.

Slack

Free and open access
MULTILINGUAL
slack.com
is a communication platform that allows you to create specific channels for different projects. Students can discuss, share files, and coordinate activities in a structured way.

Wakelet

Freemium
MULTILINGUAL
https://wakelet.com
Is an online content curation and collaboration platform that allows users to save, organize, and share digital resources in an engaging and visually appealing way. It serves as a digital repository where you can gather various types of media, including links, articles, videos, images, and notes, and arrange them into organized collections.

Trello

Freemium
MULTILINGUAL
trello.com
Uses a card system to organize tasks and track project progress. Teachers can create boards to assign tasks, set due dates, and share resources with students. The platform is free and suitable for both short- and long-term collaborative projects.

Stormboard

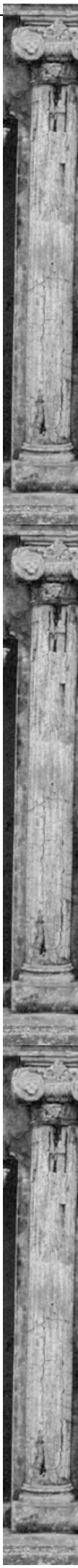
Freemium
MULTILINGUAL
https://stormboard.com/
Is a cloud-based collaboration and brainstorming platform that helps teams generate, organize, prioritize, and execute ideas. It provides a shared virtual workspace where team members can collaborate in real-time or asynchronously.

Pearl Trees

Freemium
MULTILINGUAL
https://www.pearltrees.com
Can be a valuable tool in education for organizing and sharing learning resources, fostering collaboration, and enhancing research. It allows users to collect, organize, and share links, documents, and media in a tree-like structure. This tree-like structure of Pearltrees can help students see connections between concepts or topics, enhancing understanding and promoting visual learning.

Lino

Free and open access
ENGLISH-JAPANESE
https://en.linoit.com/
Is an online, virtual corkboard platform that allows users to create sticky notes and organize them on a digital board. It's designed for collaborative work, where users can add text, images, videos, and links to the notes, making it ideal for brainstorming sessions, project planning, and sharing ideas in real time.



ACTIVITY:

Design of Activities and Application Of Digital Tools

3





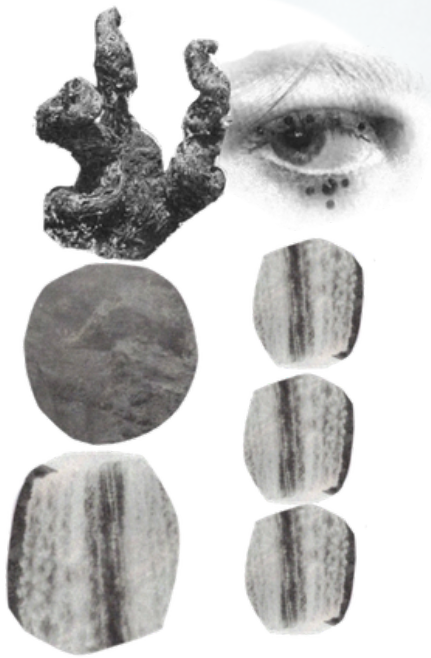
This chapter explores the implementation of educational activities and experiences using digital tools and incorporating topics related to European cultural heritage. It delineates the distinctions between formal and non-formal educational settings, thereby identifying opportunities for educators within both the classroom and the museum context.

Differences Between Designing for Museums and Schools

The integration of digital resources into educational environments has transformed the way knowledge is presented and experienced. However, designing effective digital learning experiences requires a nuanced approach that considers the unique characteristics of different educational contexts. While museums and schools are both essential to cultural and intellectual development, they operate with distinct pedagogical frameworks, audiences, and objectives. The challenge, therefore, is to adapt digital tools to enhance learning in each setting, ensuring that technology not only supports engagement but also aligns with the specific goals of informal and formal education. By understanding these differences, digital education strategies can be adapted to maximize their impact and accessibility, taking into account the following parameters:

Formal Education (School): The education system is highly institutionalized, chronologically graded and hierarchically structured from the early years of primary school to the final years of university.

Non-formal education (Museum): This is a structured and methodical educational programme, delivered outside of the traditional school environment, with the specific aim of delivering targeted learning opportunities to specific subgroups of the population, including both adults and children.



ARTISTIC
EDUCATION
HERITAGE

How to structure a digital lesson in the classroom from formal education

DESIGNING a lesson that effectively combines school and museum digital resources requires careful planning and a clear understanding of both educational objectives and available digital tools. The aim is to create an engaging learning experience where students can better appreciate the cultural heritage thanks to innovative methods.



Before creating a methodology to structure a lesson, it is important to define the objectives of the lesson. These should be specific, measurable and relevant to the curriculum. For example, the lesson could help students better understand the historical context of a work of art, improve their technological competence or strengthen their collaboration skills. When designing a digital activity in the classroom, please consider the following:

(1) Identifying the appropriate digital resources. Tools such as virtual tours, AR and educational apps are excellent choices to bridge the gap between the classroom and cultural institutions. Virtual tours offer students the chance to explore iconic museums and historical sites without leaving the classroom, while apps provide interactive features that can be tailored to different levels of learning.

(2) An engaging introduction is essential to capture students' interest. The main part of the lesson should involve active exploration, such as visiting a virtual museum or analysing digital artefacts. This phase can be followed by a hands-on activity, where students apply their learning by creating contents such as digital posters, infographics, or even planning their own virtual exhibitions.

(3) Concluding the lesson with a positive discussion or an interactive quiz helps consolidate the knowledge gained and allows students to share the information they have just acquired.

(4) Flexibility is essential to deal with the diverse needs of students. Teachers should provide clear instructions on how to use digital tools and offer alternative options for those who may face technological challenges. Adapting activities to suit the class ensures that every student can actively participate in and benefit from the lesson.

Steps to build an interactive lesson using digital technologies

Creating an interactive classroom with digital technologies requires a step-by-step approach that actively involves students. The following steps are:

STEP 1

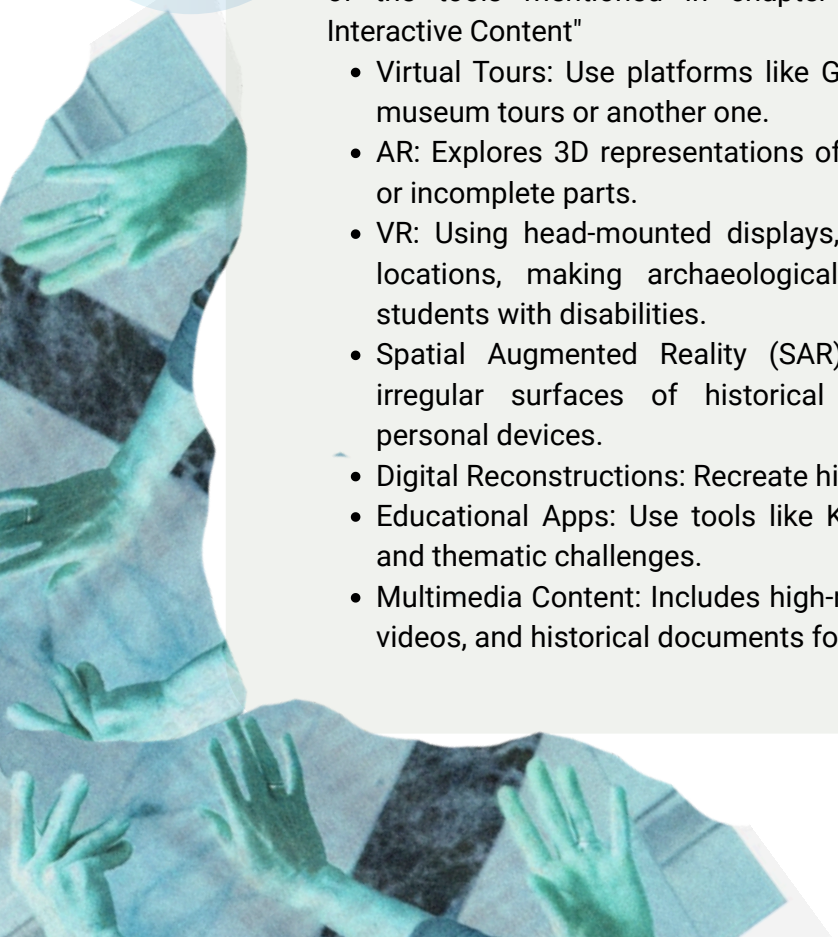
Initial analysis.
Before designing the lesson, analyse:

- Define the objectives of the lesson
- Students' needs, educational level, skills and interests and familiarity with technologies.
- Available resources, such as internet connection, devices, and software.

STEP 2

Selecting digital tools.
Guide students through the interactive learning experience using one of the tools mentioned in chapter 2 - "Software for Creating Interactive Content"

- Virtual Tours: Use platforms like Google Arts & Culture for 360° museum tours or another one.
- AR: Explores 3D representations of artefacts, reconstructing lost or incomplete parts.
- VR: Using head-mounted displays, students can explore digital locations, making archaeological sites accessible even for students with disabilities.
- Spatial Augmented Reality (SAR): Projects 3D images onto irregular surfaces of historical buildings without requiring personal devices.
- Digital Reconstructions: Recreate historically significant sites.
- Educational Apps: Use tools like Kahoot! or Quizizz for quizzes and thematic challenges.
- Multimedia Content: Includes high-resolution images, educational videos, and historical documents for analysis activities.





STEP 3

Designing the lesson phases

- Introduction: Present the objectives and introduce the topic with an engaging activity.
- Exploratory Phase: Guide students through activities using selected resources, such as virtual tours or artwork analysis. Encourage the exploration of local and global heritage with tools like mentioned in chapter 2-"Digital collection platforms".

STEP 4

Application Phase

- Engage students in creating digital content with tools mentioned before Chapter 2 "Software for Creating Interactive Content" to create visual contents (such as posters or presentations, infographics and videos) to summarise their findings. Additionally, planning of virtual exhibitions and creation of virtual exhibitions.
- Gamification: Use quizzes or reflective activities to consolidate learning outcomes. For instance, students can compete in real-time quizzes based on the content they have explored, making the lesson both fun and informative.
- Reflection and Discussion: Fostering a collaborative discussion to consolidate learning. Encouraging students to share insights and their personal opinion from their experience.

STEP 5

Measuring overall learning.

Assessing effectiveness in the use of digital tools and the subject of learning. Use some of the methodologies and tools mentioned in Chapter 4- Measuring Learning Effectiveness with Digital Tools.

From the Classroom to the Museum: Educational Mediation through Digital Tools and Cultural Heritage

The use of technological tools in education is a powerful and effective means to enhance dynamism and interactivity in the teaching process. Students are generally drawn to technological methods, an area they are often familiar with, unlike the content typically encountered in museums, which may be more unfamiliar to them.

Education through interactive technological tools in museums operates in a more complex way than in the classroom, as it involves different resources and settings. In the classroom, teachers usually have direct access to technological tools they can operate themselves; a basic setup with a computer and a projector often suffices. Accessibility is key, both in terms of the teacher's familiarity with the tools and the limited range of technology required.

In contrast, museums present a different environment. Their structure and operation differ from the classroom, and teachers are often unfamiliar with how to navigate or use the available digital resources. Consequently, the technological tools typically used in schools may not be applicable in museum settings.



ER, Anima Lab project, photography by Manu Suarez.



Photography of Hungarian National Museum



Photography of Liceo D'Azeglio in Muse proyect



Photography of Tony cherby on Unsplash



Photographs of Liceo D'Azeglio in Muse proyect

This chapter, therefore, aims to adapt a series of activities using the applications introduced in the previous chapter 2 “Digital Tools For Teaching In Schools And Museums” to develop a structured approach to teaching through cultural and artistic mediation between the classroom and the museum.

The aim is for the teacher, in collaboration with the museum educator, to design an activity that ensures continuity between the classroom and the museum. This collaboration enables a process of cultural and artistic mediation, between both parts, the classroom and the museum.

Collaboration between schools and museums can take various forms. Teachers can incorporate pre-visit activities such as virtual tours, guided discussions, or research projects. Museum visits become more impactful when students engage in interactive tasks, hands-on experiences, or inquiry-based learning. After the visit, students can reinforce their knowledge through reflective activities, creative writing, or digital storytelling projects. Another option is to visit the Museum and then create an activity in Classroom.

The activities proposed in the first section of this chapter “Steps to build an interactive lesson using digital technologies” serve as a framework for the classroom, but what happens when the learning space shifts to the museum?

Museums can educate both indirectly, through their exhibitions, and directly, through organized educational activities. In this context, coordination with the educational institution is essential. Unlike the classroom, the museum offers a more diverse and flexible learning environment, often perceived by students as more stimulating and engaging.

MUSEUMS

To design an engaging and innovative learning experience, it is essential to identify the museums available in your city with interactive technology. These can generally be classified as:

- ARTISTIC
- HISTORICAL
- SCIENTIFIC
- MODERN AND CONTEMPORARY ART
- CLASSICAL ART
- DECORATIVE ARTS
- CRAFTS
- HOUSE MUSEUMS
- ARCHAEOLOGICAL AND ANTIQUITIES
- SITE MUSEUMS
- ANTHROPOLOGICAL
- ETHNOGRAPHIC
- COMMUNICATIONS
- COMMERCE
- AGRICULTURE
- NATURAL SCIENCES AND NATURAL HISTORY
- SCIENCE AND NEW TECHNOLOGIES
- SOCIAL SERVICES
- ARCHITECTURAL MUSEUMS
- MONOGRAPHIC MUSEUMS

Each category offers diverse perspectives and materials that can enrich classroom activities. Museums play different roles in cultural heritage, such as collection, identification, documentation, research, preservation, conservation, exhibition and education.

Most museums provide websites with dedicated educational resources, though the availability and quality of these materials can vary significantly. Therefore, it is essential to explore both renowned institutions and smaller, lesser-known museums, as they often offer distinctive and valuable educational initiatives.

The museum employs a variety of active methodologies, including non-formal evaluation of the students. These include guided visits, guided visits with a subsequent workshop, and visits with a previous one. These visits are designed to encourage critical thinking and engagement with topics of interest, working in heterogeneous groups.

Museum education focuses on experiential learning, in which participants observe, analyze, reflect, and engage in dialogue with objects, spaces, and historical narratives. This approach seeks to make learning participatory, multisensory, and interdisciplinary, allowing individuals to construct their own meaning from the experience.

Interactive strategies and digital tools play an essential role in museum education, as they allow for greater immersion, making each visit unique and meaningful. Traditionally, museums have been the main settings for this educational approach, however, this methodology can also be applied in other heritage spaces, such as historical parks, archaeological sites or urban areas with cultural value. Moreover, this approach can incorporate situated practices that encourage interaction with the environment, taking art outside the museum walls and placing it in neighbourhoods, squares and other public spaces, thus promoting citizen participation. In this context, the local community has the opportunity to explore social, cultural and topical issues, enriching the educational experience and broadening its impact.

Interactive Music

Digital applications: Genially + Groovepad

Creative Activity: Art-Inspired Musical Narrative

Students will select a work of art, such as a painting, sculpture, or architectural structure, and develop a fictional narrative that interprets the events, atmosphere, or emotions they associate with that time, place, or scene.

Building on their narrative, they will compose a musical piece using the Groovepad app, integrating sounds and rhythms that evoke the mood and essence of their story.

Finally, students will use Genially to create an interactive presentation that brings together the selected artwork, their musical composition, and the fictional narrative. The final outcome will be an immersive experience that seamlessly intertwines visual art, music, and storytelling.



ER, Anima Lab project, photography by Manu Suarez.

Innovative Digital Activities in Museums: Bringing Tradition and the Present Together

By implementing museum-based educational strategies, these processes can be reinforced, creating meaningful connections between historical narratives and contemporary issues. The following examples demonstrate how such activities foster a deeper engagement with the past while establishing relevant links to the present.

Photo Report

Digital applications: Fimo

Individual Activity: Documentary Photo Storytelling

In this activity, each student will use the Fimo App to visually document their surroundings employing documentary photo storytelling to explore a selected environment, such as, a museum, art gallery, heritage site, monuments or architectural parks. Through this process they will observe and capture elements from a new perspective. The objective is to encourage critical observation and creative engagement with their environment.

After completing the activity, students will share their results in class. Through a collective discussion, they will determine a central topic for a collaborative photo report that brings the perspectives and findings from all participants.

Stories from My Neighborhood

Digital applications: Padlet
Individual Activity: Territorial Research

In this activity, each student will research a selected open space, such as an architectural park, a monument, or a heritage building. The process will involve investigating the history and significant events associated with the site, identifying key buildings or sites, capturing representative photographs and making audio recordings or video tours. Finally, an interview will be conducted to someone who lives or works in the area.

Once all the information is gathered, students will review and upload their findings to Padlet. Each student will have a dedicated section within the collaborative digital mural, ensuring that all contributions are displayed in an organized and visually engaging manner.

This activity is designed to highlight the significance of both tangible and intangible cultural heritage, fostering a connection between the local environment, whether a neighborhood, town, or city and the museum, using the metaphor of the museum as an integral part of a living community.

Musical Video Clip

Digital applications: Chroma Key + CapCut
Creative Activity: Song About a Historical Event

In this activity, students will collaborate in teams with each group assigned a historical event previously studied at the museum. They will conduct research to gather key information and. based on their findings, they will compose song lyrics that creatively narrate the event.

After writing the lyrics, students will record a video performance on their song using the Chroma Key app utilizing a green screen background which can be made from a green poster board or fabric. Once the video is recorded, they will edit it in CapCut, adding images related to the historical location or event to enhance the visual storytelling.

The final result will be a dynamic video that integrates music, creativity, and historical learning offering an engaging and immersive educational experience.

Mystery Podcast

Digital applications: Podcast Studio + SoundCloud
Group Activity: Creating a Mystery Story

In this activity, students will work in groups to create a fictional mystery story inspired by a historical monument, a work of art, or a popular festival. The story must incorporate real elements such as dates, names, or locations, blending them creatively into the narrative.

Once the story is developed, students will use Podcast Studio to record the narration. They can dramatize the storytelling and add sound effects to enhance the experience. When the project is complete, it will be uploaded to a SoundCloud account created by the teacher, making it accessible for sharing and listening.

From the Classroom to the Museum: Educational Mediation through Digital Tools and Cultural Heritage

Collaboration between school educators and museum educators is key to providing integrated and enriching learning experiences. School teachers contribute pedagogical expertise and a deep understanding of their students' needs, while museum educators bring their specialized knowledge of museum content and resources, along with skills in interpretation. Combining these strengths significantly enhances the educational process.
The first step in this synergy is identifying the learning needs of the student group, which should serve as the starting point for designing activities in the museum. Likewise, the museum educator must have in-depth knowledge of their institution's content and operations to align proposed experiences with the school's pedagogical objectives. This process also fosters mutual learning: while school teachers familiarize themselves with museum resources, museum educators gain a better understanding of school education contexts, leading to a cross-disciplinary exchange of knowledge.

Integrating the methodologies of both educators into a shared approach is a complex challenge, yet one that brings great benefits to students. School teachers, knowing their students well, can facilitate active participation in activities and strengthen the link between classroom content and museum experiences. Meanwhile, museum educators enrich the learning process by offering unique perspectives and approaches based on the cultural and artistic resources they manage.
It is essential that this collaboration be based on a horizontal and reciprocal relationship. Both educators should exchange knowledge, ideas, and values, integrating their expertise with the common goal of maximizing student learning. This collaborative model not only enhances the educational experience but also promotes more inclusive, dynamic, and meaningful teaching.
Finally, it is important to recognize that museums today are increasingly engaging with revisionist approaches to history. This trend seeks to examine past narratives and events from a new perspective, allowing society to expand its historical understanding. By doing so, museums open spaces for voices and narratives that have been historically marginalized, giving rise to perspectives such as decolonial thought, feminism, and social class analysis.





Photographs of Hungarian National Museum

The Role of Teachers and Museum Educators

Teachers play a vital role in helping students connect with museums and heritage spaces, recognizing them as part of their cultural environment. While exhibitions are the most visible aspect, museums also engage in research, archiving, and community-based activities with social and environmental relevance.

By fostering curiosity and linking content to students' interests, teachers enrich learning and encourage deeper engagement. Interactive technologies support the idea of a "situated museum," which brings museum experiences to students, especially those facing social or economic barriers.

Museum educators, in turn, must adapt content for diverse audiences. Young children benefit from play-based, hands-on learning; teenagers from activities that promote critical thinking; and adults from inclusive formats that address accessibility needs, such as guided tours with headphones or enlarged visuals.

Digital tools also promote autonomy, allowing users to explore content remotely. Ideally, these tools should be available in permanent digital labs or public libraries to ensure equal access.

Ultimately, educators must adapt communication to different ages and contexts, fostering personal connections with heritage content and promoting inclusive, meaningful learning experiences.







ER, Anima Lab project, photography by Manu Suarez.

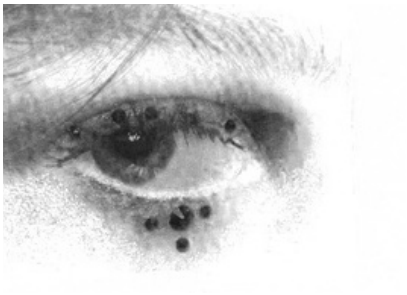
ASSESSMENT:

Learning with digital tools



4

DIGITAL TOOLS



are highly useful and effective for assessing learning outcomes in museums, as they offer various functionalities that enrich the evaluation process. Throughout this section, their main features and advantages will be analyzed. Nowadays, traditional evaluation methods are complemented by interactive technologies, which allow obtaining information in real time and generating knowledge based on data.

Museums can measure learning effectiveness through a variety of digital methods, such as interactive quizzes, visitor behavior tracking, and analysis of augmented and virtual reality experiences. These tools help museums refine their educational programs, tailor content to different audiences, and enhance the visitor experience. By leveraging digital assessments, museums can continuously improve their strategies, ensuring that learning remains engaging, accessible and impactful.

From the Classroom to the Museum: Educational Mediation through Digital Tools and Cultural Heritage

Real-Time Feedback

Digital platforms allow educators and museum staff to gather data in real-time, providing immediate feedback on how learners are progressing. For example, teachers can monitor how long students spend on assignments, how they interact with digital content, and how they respond to quizzes or interactive elements. This is particularly helpful in creating personalized learning pathways, as feedback from these tools can highlight areas where students may need additional help or challenges.

Example: In a high school setting, a teacher may use a tool like Google Classroom or Moodle to assign quizzes and track student responses. If a student is struggling with a particular topic, the teacher can use this data to offer additional resources or one-on-one assistance. Similarly, interactive quizzes provided through platforms like Kahoot! or Quizlet can give teachers instant insight into class comprehension levels, enabling them to adapt the lesson on the spot.

Objective Assessment

Digital assessment tools provide standardized evaluations, reducing biases and inconsistencies that can occur in traditional grading methods. Assessments like essays or short-answer questions often depend on subjective interpretation, which can lead to variations in scoring. In contrast, digital tools, such as automated quizzes and multiple-choice tests, apply uniform criteria, ensuring consistency across all learners.

Example: In a museum setting, digital quizzes following virtual tours or exhibits can help assess whether visitors are engaging with the content. For example, the Smithsonian National Museum of Natural History uses interactive touchscreens that quiz visitors on the information presented in the exhibits. The system records responses, allowing museum staff to analyze the effectiveness of the exhibit in terms of visitor engagement and knowledge retention.

Engagement Measurement

Digital tools offer a more nuanced way of measuring engagement, going beyond simple attendance or participation records. Tools like Padlet, ClassDojo, and Socrative allow teachers to track how often students interact with content, collaborate with peers, and participate in discussions or group activities. These insights are especially useful for identifying disengaged students or groups, allowing educators to intervene early to re-engage them.

Example: For an NGO working with displaced populations, such as Save the Children, digital tools are used to assess both the participation and completion rates of educational modules on literacy or numeracy. Real-time data helps identify when learners may be falling behind or disengaging, so educators can adapt lesson plans or provide additional support through mentorship.

Personalization and Adaptivity

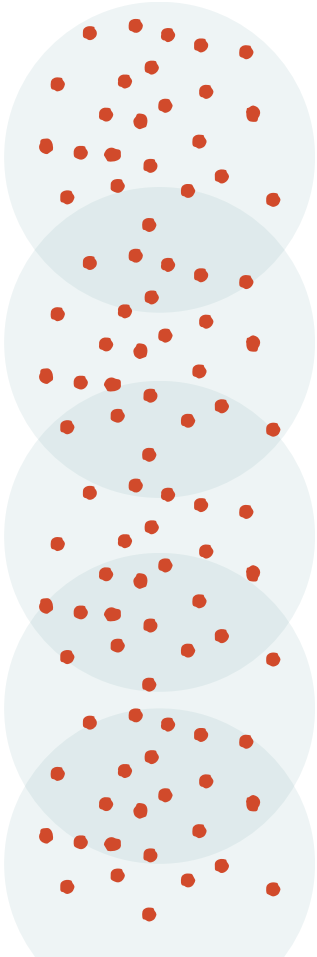
One of the major advantages of digital learning tools is their ability to adapt to the needs of individual learners. These tools can adjust the difficulty of questions or tasks based on the learner's previous answers, providing a personalized learning experience. Personalization can help ensure that each learner progresses at their own pace and receives content tailored to their specific learning needs.

Example: Khan Academy is a prime example of an adaptive learning tool. It monitors students' progress as they work through lessons, adjusting the difficulty of exercises based on how well students perform. If a student answers a question correctly, they are given more challenging content; if they struggle, they receive simpler, explanatory material to help them understand the concept better. This personalized learning experience is invaluable in both classroom and online learning environments, ensuring students are neither bored with content that's too easy nor overwhelmed by content that's too difficult.

Comprehensive Data Collection for Continuous Improvement

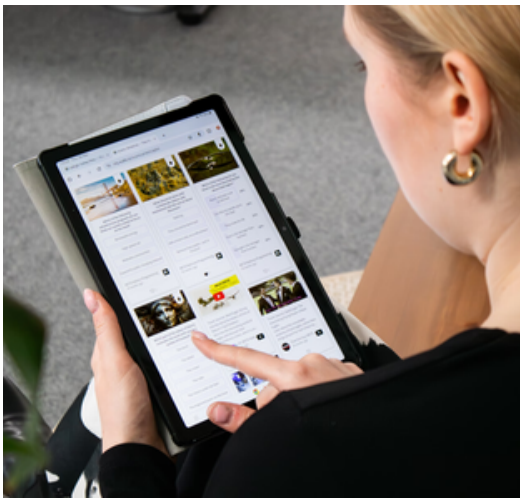
Digital tools offer institutions the ability to collect comprehensive data on a learner's journey, providing valuable insights for future teaching practices. For example, these tools can track how much time a student spends on a particular module, how they interact with different types of content, and what types of assessments they excel at. This data can be used to refine the curriculum and instructional methods, ensuring that future educational experiences are more tailored and effective.

Example: The British Museum uses analytics from its mobile app to gather data on visitor interactions with exhibits. This includes how long visitors spend at each station, which items generate the most questions, and how they respond to quizzes. This data helps museum curators continuously adapt exhibitions to maximize engagement and learning outcomes.



Tools for Measuring Learning Effectiveness

There are a variety of digital tools that are specifically designed to measure and track learning outcomes in both formal educational settings and informal environments like museums and NGOs. Below are some popular tools used to assess learning effectiveness:

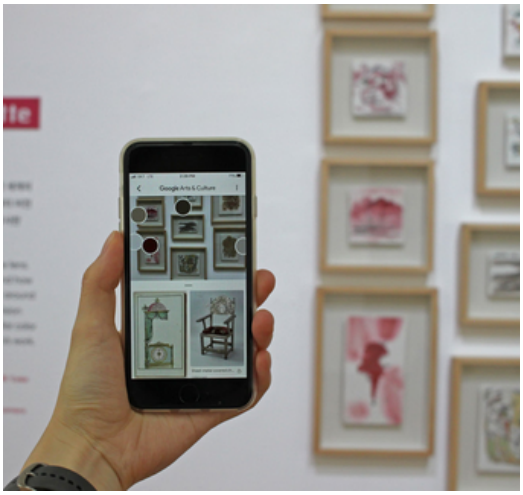


Photography of Walls.io en Unsplash

Learning Management Systems (LMS)

Learning management systems like Moodle or Canvas allow educators to manage courses, assignments, and assessments, while also tracking student progress. These platforms offer integrated analytics tools that help teachers understand how students are performing across a variety of metrics, from assignment completion rates to engagement levels with different course elements.

Example: Canvas allows instructors to create assignments, quizzes, and discussions while tracking student performance across multiple criteria. In addition, it provides data on how often students access materials and whether they complete activities on time.

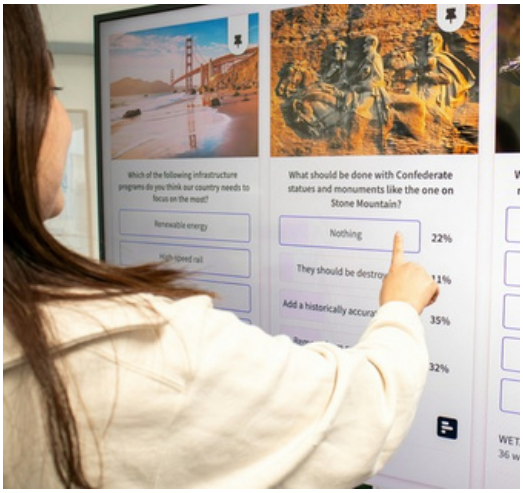


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Interactive Assessment Tools

Tools like Kahoot! or Quizlet provide interactive ways to assess student learning. These tools allow teachers to create engaging quizzes and games that help reinforce learning while simultaneously gathering data on how well students understand the material.

Example: Kahoot! is commonly used in classrooms to assess students' understanding of the material in a fun and engaging way. The platform collects data on how well students answer questions and provides immediate feedback, which can help teachers identify areas that need further attention.



Photography of Walls.io en Unsplash

Behavioral Tracking Tools

Behavioral tracking tools, such as Padlet or ClassDojo allow teachers to monitor student behavior, participation, and engagement during both in-person and virtual lessons. These platforms provide valuable insights into which students are actively participating and which may need additional support.

Example: ClassDojo is used in many classrooms to monitor student behavior and track learning progress. Teachers can assign points for positive behaviors and participation, while parents can track their child's progress through the app. This real-time tracking promotes engagement and accountability.

5



EDUCATION:

Accessible Sustainable, and Inclusive Digital Cultural

SUSTAINABLE

Building Lasting Impact: Sustainability, Accessibility, and Community in Digital Cultural Education

DIGITAL MUSEUM EDUCATION

has profoundly transformed the way cultural heritage is preserved and shared.

Through the integration of technologies, museums have expanded their reach to global audiences, facilitating immersive, interactive and interdisciplinary learning experiences.

In this framework, digitisation contributes directly to the realisation of the right to education and culture, as recognised by the Mondiacult Declaration (2022) and the UNESCO World Conference on Arts and Cultural Education (Abu Dhabi, 2024). By adopting inclusive tools-such as multilingual interfaces, accessibility features for people with disabilities, and platforms adapted to low-speed connections-museums not only democratise access to knowledge, but also promote digital equity and cultural participation.

These initiatives prioritise active and transversal methodologies that articulate different disciplines, fostering creativity, critical thinking and respect for diversity. Through virtual workshops, augmented reality exhibitions and collaborative digital archives, museums enhance meaningful learning and contribute to the formation of a global citizenship committed to cultural diversity.



Sustainability is embedded through ethical practices:

- Environmental: Energy-efficient digital infrastructure.
- Economic: Partnerships with governments and NGOs for funding.
- Social: Co-creation with marginalized communities to ensure relevance and representation.

By addressing longevity through iterative content updates and participatory governance, digital museum education ensures enduring accessibility, aligning with both policies' calls for inclusive, impactful, and future-ready cultural ecosystems. This approach not only safeguards heritage but also redefines cultural rights in the digital age, transforming museums into hubs of global solidarity and innovation.

The Need for Sustainable and Persistence Projects in Digital Museum Education

It is important to emphasise the importance of ensuring the sustainability of digital initiatives in museums in order to address key challenges and maximise their benefits. Preservation of digital content is essential given the rapid pace of technological change, which can render many projects obsolete. Strategies such as regular updates, open sources platforms and secure archiving systems ensure long-term access.

Ongoing funding is another challenge, as many digital programmes rely on temporary grants. Sustainability requires exploring diversified funding sources, including public-private partnerships and memberships, to ensure continuity. Equitable access is also critical, which means designing platforms that are compatible with mobile devices, content that is accessible offline, and multilingual resources for diverse audiences, especially in underserved areas.

The environmental impact of the increasing use of digital technologies also poses challenges, which can be addressed through sustainable practices such as efficient servers, cloud solutions and eco-friendly technologies. Educational integration is crucial, as projects must be aligned with school standards and curricula to maintain their relevance as pedagogical tools, fostering long-lasting partnerships with educational institutions.

In addition, technological adaptability is imperative to incorporate innovations such as augmented reality, virtual reality and artificial intelligence, while remaining committed to their educational mission. Finally, community engagement is vital for sustainability, fostering partnerships with schools, universities and local organisations that strengthen the sense of ownership and support for these projects.



Photography of Foto de Zalfa Imani en Unsplash



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Managing Training and Ensuring Continuous Updating of Digital Skills for Educators

To implement digital tools within classrooms, it is necessary to keep educators' digital skills up to date, both in museums and schools. One of the key actions is to offer regular professional development programmes that train staff in emerging digital tools, such as AR, VR and artificial intelligence (AI). These trainings should provide technical skills in digitisation and pedagogical tools to teachers to integrate them into their educational practice.

The development of online learning platforms is also a good training tool as they offer self-directed courses and certifications in digital literacy and the use of cultural heritage tools, including tutorials on managing digital collections, designing lesson plans and integrating resources into school curricula.

Fostering peer-to-peer learning is another key strategy as communities of educators are created to share best practices, tips and challenges, as well as mentoring programmes linking experienced educators with those less familiar with digital tools.

Ensuring Accessibility and Inclusiveness of Digital Education Projects

To ensure accessibility and inclusion in digital education projects, it is essential to design resources that follow the Web Content Accessibility Guidelines (WCAG), allowing usability for people with disabilities through tools such as screen readers, video captions, and keyboard navigation. Furthermore, integrating multilingual options helps reach diverse language communities. Equally important is the use of lightweight, mobile-friendly platforms, facilitating access in areas with limited connectivity or low-end equipment. Offering downloadable resources, such as lesson plans or offline virtual tours, is also key for schools with limited access to technology.

Furthermore, it is essential to incorporate diverse cultural and historical perspectives into the content, promoting the representation of marginalized or underrepresented groups. Collaborating with local communities and cultural organizations ensures that the material reflects their real experiences. To maximize impact, it is vital to train educators through free or subsidized programs that provide them with skills to use tools inclusively, along with strategies for teaching in diverse digital classrooms. Finally, partnering with disadvantaged schools and community centers, as well as developing specific programs for Indigenous communities, rural areas, or minority groups, fosters more equitable and accessible education for all.



Photography Kenny Eliason / Unsplash



Photography of Gmina Głogów Małopolski – Government Program for Schools Digitalisation

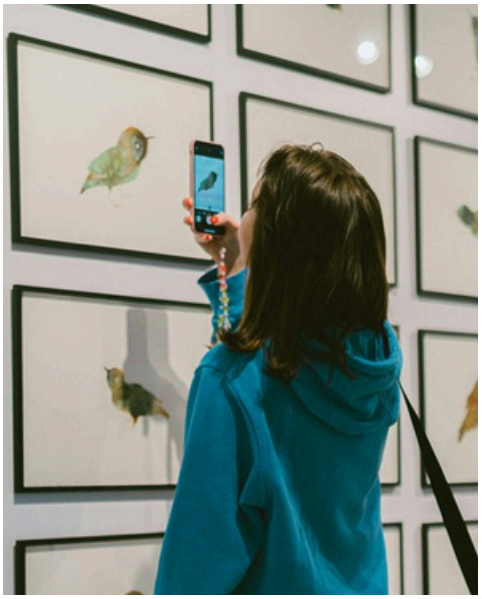


Foto de Oleg Ivanov en Unsplash



Photography of Urząd Miasta Bieruń



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Digital Cultural Preservation: A Bridge to Inclusion and Community Participation

The digitization of cultural heritage has the potential to break down geographical and physical barriers, making virtual museums and 3D replicas of artifacts accessible to those unable to visit physical spaces due to geographical, economic, or physical limitations. Furthermore, this technology provides marginalized communities with the opportunity to preserve and share their own cultural heritage globally, fostering identity and recognition. Digital storytelling platforms allow these groups to tell their stories and traditions in their own voices, challenging dominant narratives. Digitization also promotes intergenerational learning, connecting young and old: younger people can teach older people how to use digital platforms while learning about their shared cultural roots, creating a bridge between generation

Furthermore, community participation is essential in digitization projects. Through strategies such as crowdsourcing, communities can contribute by scanning personal objects, sharing oral histories, or tagging images in digital archives. Community workshops and events can foster collaboration by collecting stories, photos, and local knowledge to enrich digital archives. Furthermore, these projects can promote intercultural understanding, showcasing the connection between global cultures and fostering empathy and respect for cultural diversity. Interactive programs, such as virtual cultural exchanges or joint activities between classrooms from different countries, strengthen dialogue between communities. Finally, digitalization can help recover and celebrate shared cultural heritage, especially for diaspora communities seeking to reconnect with their roots. Virtual festivals, exhibitions, and events can bring communities together to celebrate their cultural identity, reaching a global audience and promoting equity and sustainability in cultural preservation.

[Case Studies]

6



This section presents a collection of case studies and practical examples of Digital Museum education implemented by institutions from partner countries.

Virtual Reality - Hungarian National Museum, Hungary

Link

The Hungarian National Museum participated in the "Danube's Archaeological eLandscapes" project within the Interreg Danube Transnational Programme, creating a series of virtual reality exhibitions entitled Stories of the Past – Virtual Journey into Lost Landscapes. This initiative allowed users to explore historical landscapes in the Danube region, such as prehistoric caves, Iron Age settlements, Roman villas, and medieval fortresses. The virtual content was integrated into the museum's VR stations and pedagogical sessions, offering an interactive and visual experience for students and visitors.

Virtual tour - Acropolis Museum in Athens, Greece

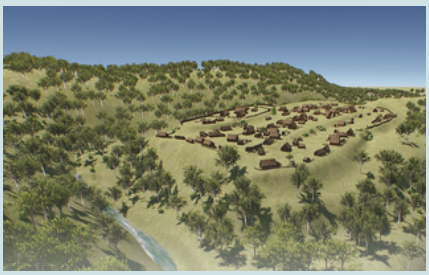
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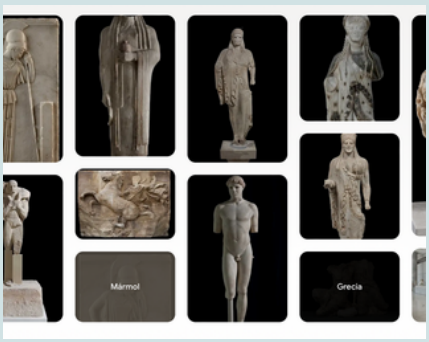
The Acropolis Museum in Athens, Greece, implemented a digital tour to enhance student engagement with Greek cultural heritage, utilizing technologies such as Augmented Reality (AR) and Virtual Reality (VR) to recreate sculptures and offer immersive visits. This project, aligned with the Greek educational curriculum, seeks to make ancient history accessible to students from diverse locations, including remote areas, and to foster interactive and remote learning. The results include increased accessibility, enriched educational experiences, and the development of students' technical and collaborative skills, as well as valuable resources for teachers. Furthermore, the digital tour attracted more than 1.2 million virtual visitors in its first year, with a 95% satisfaction rate, establishing itself as a benchmark in the integration of technology and cultural preservation.

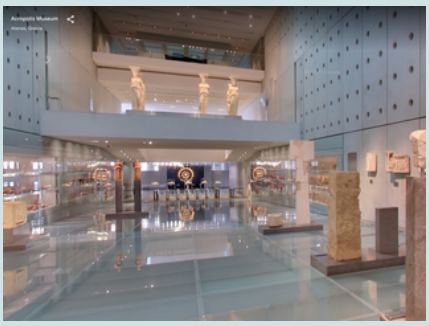
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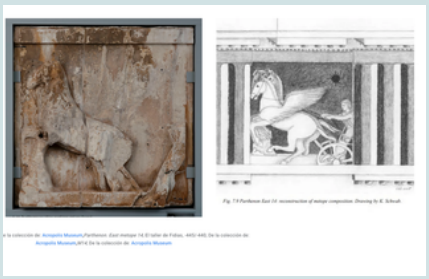


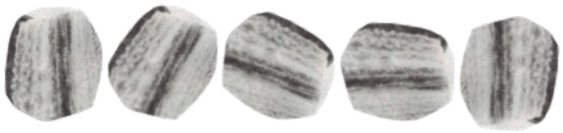












Interactive platform - Museo Nacional del Prado, Spain

Link

In January 2025, the Museo Nacional del Prado, in collaboration with Samsung, launched the "Baroque Spaces" project, a digital educational initiative aimed at students and teachers in the final years of primary and secondary education. This project, presented as an interactive webdoc, combines audiovisual capsules, interactive resources, and transmedia narrative to explore the museum's Baroque collection, connecting 17th-century art with contemporary themes. The project seeks to foster dialogue between art and today's society, enrich the educational experience, promote the use of digital technologies, and develop critical and creative skills in students. Furthermore, "Baroque Spaces" offers flexibility for use in classrooms, homes, or the museum, facilitating equitable access to art and enhancing understanding of the historical and cultural context of the Baroque.

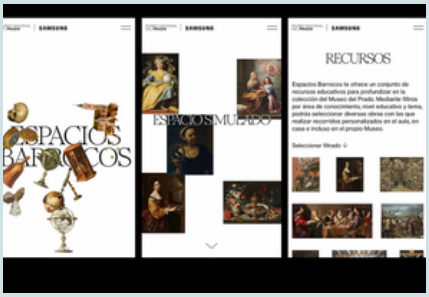
Video game - Warsaw Uprising Museum, Poland

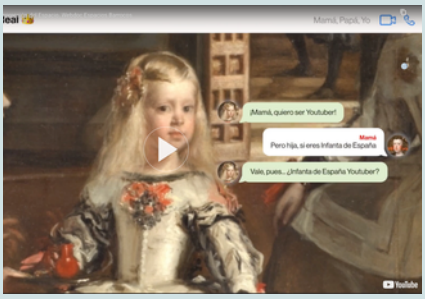
Link 1 *Link 2*

The Warsaw Uprising Museum in Poland has developed digital educational resources, drawing on the aesthetics and narrative of video games. These include virtual tours, interactive timelines, webinars, and Augmented Reality (AR) applications, to teach high school students about the 1944 Warsaw Uprising. These tools, which include gamification and 3D reconstructions, seek to make historical education more interactive and accessible. The results include increased student engagement, greater accessibility for those in rural areas, and recognition of the museum as a model for other institutions.

The images in this guide were taken from the internet. Links to each image can be found using the Link button on this page.



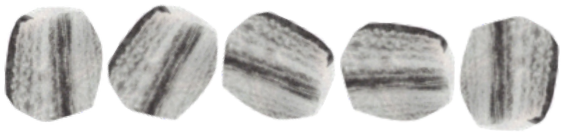












The Museum intervenes in the school “Le Muse”, Italy

Link

The “Le Muse” project, promoted by the Liceo Classico Massimo D’Azeglio in Turin, is an educational initiative that integrates cultural heritage into the school curriculum through a multidisciplinary approach combining humanities, history, and digital technologies. Through workshops, projects, and tools such as 3D printing and the metaverse, students interact with historical content and reinterpret cultural narratives for contemporary audiences. The results include increased interest in history, the development of research skills, and the successful integration of cultural heritage into the curriculum.

The School intervenes in the museum "Art, Cultural Heritage, and Ocean Sustainability: The Whale as an Educational Symbol”, Portugal

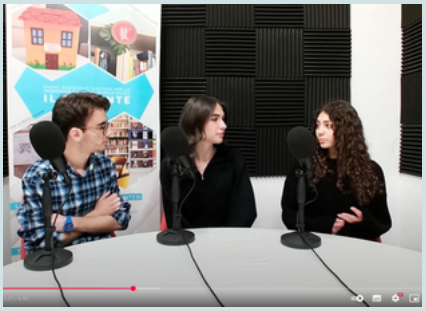
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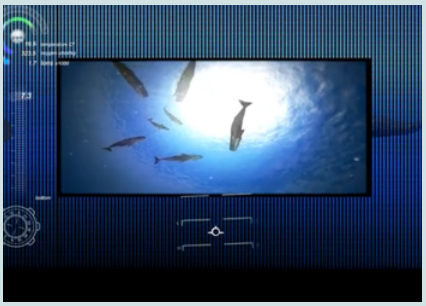
The "Art, Cultural Heritage, and Ocean Sustainability: The Whale as an Educational Symbol" project, developed by the Dr. Horácio Bento de Gouveia School in collaboration with the Madeira Whale Museum (MBM) since 2014, seeks to promote environmental education and learning through art and technology. Aimed at high school students, the project integrates digital tools such as Canva and Tinkercad to create artistic works that reflect the conservation of the oceans and whales, emblematic species of the region. Activities, which include contests and exhibitions, foster skills such as creativity, critical thinking, and active citizenship, aligning with UN Sustainable Development Goal 14.

The images in this guide were taken from the internet. Links to each image can be found using the Link button on this page.













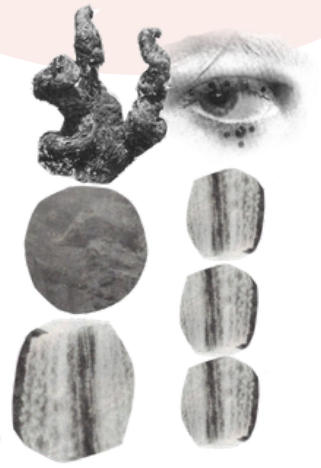
Conclusions and Future Prospects

Digitization offers a transformative way to rethink the links between museums, schools and students, consolidating itself as a tool with great potential to enrich educational experiences and foster new forms of cultural access and participation. This guide addresses the fundamental principles of museum education in dialogue with digital technologies, proposing strategies and practical examples that contribute to the design of inclusive, interactive and sustainable pedagogical proposals.

However, the incorporation of digital tools in educational contexts also poses significant challenges. Inequalities in access to technology and connectivity persist, limiting the full participation of certain groups. Similarly, the costs associated with implementing advanced digital resources can be a barrier for many institutions, especially those with small budgets. Added to this is the need for ongoing training for teaching and museum staff, who must be prepared to use these technologies in a critical, creative and pedagogically relevant way.

In this context, the active participation of users in digital environments represents a turning point for the museum field. The possibility for visitors to contribute to the creation of content and to get involved in online communities changes their behaviour both in the physical space and in the digital environment of the museum. This change of role, where users move from being receivers to active agents, raises new questions about the capacity of museums to develop tools based on personalisation and on the link with local communities. The way in which cultural institutions incorporate this participatory dimension will be decisive for their long-term sustainability.

Looking to the future, the challenge is not only to adopt new technologies, but to do so in a thoughtful and responsible way. It is about building inclusive, resilient and open to innovation cultural ecosystems, where access to knowledge and culture is a guaranteed right for all people. In this process, museums can consolidate themselves as key agents in the redefinition of cultural rights in the digital era and in the construction of communities that are more supportive, informed and committed to their environment.



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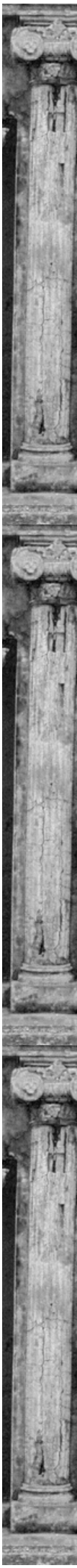
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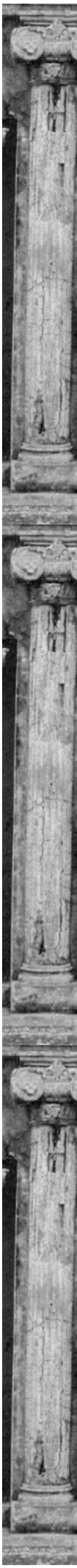
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