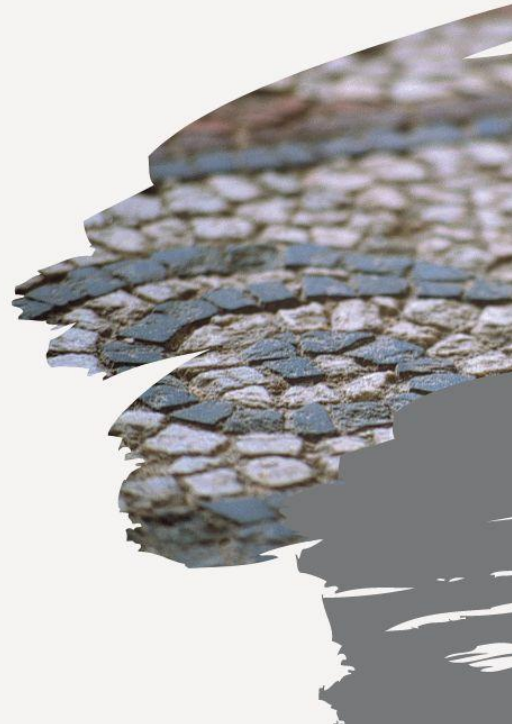# The shared concept for cross-generational presentation of archaeological values

Interreg VI-A Austria-Hungary Programme
ArcheoROUTE (ATHU-0100026)

As part of the project titled "The novel cultural tourism presentation of the archaeological values of the border region Austria-Hungary in cooperation with museum and tourism partners"

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1. Foundational principles and main objectives of the current concept

In recent years, methods of presenting archaeological offerings through digital technologies have become increasingly accessible at a faster pace. These methods include online virtual exhibitions and guided tours, AR/VR and CGI content, as well as exhibition room solutions equipped with 3D technology. This rapid development gained new momentum during the COVID-19 pandemic, which significantly altered cultural consumption habits. In many cases, analogue and digitised offerings diverged. VR and CGI technologies have enabled "travelling" through time and space without requiring visitors to physically visit the respective cultural or archaeological sites. However, the most advanced VR and CGI technologies may be less appealing to older generations, who are often hesitant toward these solutions. In contrast, younger generations may find traditional, analogue exhibition spaces and archaeological artefacts "old-fashioned" and generally expect the presence of digital content. For a more sustainable cultural tourism future of archaeological values, solutions are needed that jointly address the differing needs stemming from generational differences. However, a common methodology, which would consider both scientific and service development perspectives, is missing in the cultural and tourism sector for cross-generational content display.

Based on the above, the primary aim of the current concept is to define a methodology for the processes involved in the mixed presentation of archaeological offerings/values, which can be applied horizontally during the digitization process of an analogue archaeological value, and which establishes the framework conditions for cross-generational display through specific steps.

The concept considers as fundamental and follows in its structural layout the methodological guide developed within the ArcheON project, implemented in the INTERREG V-A Austria-Hungary Programme, which integrates the unique and diverse knowledge/insight of numerous scientific and tourism partners engaged in historical/archaeological work and its scientific processing[1].

2. Tourism innovations, innovative tourism

Europe has a leading role in the post-COVID revival of tourism, with 33% of destinations in the region reportedly introducing some tourism-saving measures. Trends in destination and attraction development have been significantly amplified by the COVID-19 pandemic. The key to the recovery of tourism is continuous innovation, which necessitates mapping consumer trends and best business practices. As a result of the pandemic, the digitization of services has gained even greater emphasis, and this trend is expected to continue to play a prominent role in tourism.

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[1] https://www.interreg-athu.eu/hu/archeon/projekteredmenyek/modszertani-kezikoenyv/

A long-term goal is to balance the competitive development of destinations with the interests of local communities and environmental protection. Sustainability considerations must be integrated into destination-level product development. In terms of accessible tourism, the primary goal is the physical accessibility and barrier-free design of tourist attractions, accommodations, and hospitality venues. The goal of intelligible tourism is rapid and efficient communication, where "noise-free" information and multilingualism play a key role.

The approach is now widely accepted that the consumer should be actively involved in the experience. Therefore, the provider side must offer opportunities for consumers of all ages to explore, learn, be entertained, and to expand their knowledge when visiting historical buildings, archaeological display sites, or cultural and heritage attractions, thus enriching their experiences with memorable encounters.[2]

The innovative element of the current concept is the establishment of conditions necessary for a new approach to the mixed (i.e., simultaneous, analogue and digital) presentation of archaeological treasures. The innovative attraction developments implemented within the framework of this project may serve as a best-practice example for cross-generational presentation.

3. Conceptual explanations

- The term **heritage** has been defined by many in various ways, particularly concerning the use of "heritage tourism" and its synonyms in tourism. According to Nuryanti (1996), heritage is part of a society's cultural traditions that contribute to a community's identity. It is a value from the past that is deemed worthy of preservation and passed down from one generation to the next (Hall and McArthur, 1998). Thurnbridge and Ashworth (1996) suggest that in its broader interpretation, heritage can be divided into five key aspects: any physical remnants of the past, individual and collective memories, non-physical elements of the past, cultural and artistic creations, the natural environment, and a significant economic sector known as the "heritage industry".[3]

- **Cultural heritage tourism** is one of the fastest-growing sectors of tourism, which is increasingly moving towards specialisation. This is a tourism product in which the tourists representing demand are motivated by discovering new cultures, participating in cultural events, and visiting cultural attractions. The unique and distinctive culture of the visited destination provides the core element of the attraction, which is central to the service side. Heritage tourists are not merely seeking adventure but are also interested in culture, history, archaeology, and it is important for them to establish connections with local residents. Heritage tourism can contribute to preserving the unique character of local communities and foster harmony and understanding among

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[2] https://mersz.hu/dokumentum/m963vakt__312/
[3] https://t-modell.uni-miskolc.hu/files/8582/Nagy_2012a.pdf

people.[4]

- The **Tourism product** is a central element within the tourism system. From the tourist's perspective, the product is always a complex package of services designed to fully satisfy the guest's requirements and needs.[5] The tourism product must be characterised by complexity. Its main components include: the attraction, physical accessibility, infrastructure, accommodation, dining options, other services, safety, hospitality, tourism organisations, pricing, and information[6] (Lengyel, 2004).

- A **museum** is a community-centred, non-profit institution that collects, preserves, analyses, and displays tangible and intangible heritage. These institutions are open to all, welcoming, and strongly support cultural diversity and sustainability. Their operation is based on ethical and professional foundations, involving local communities in the processes to offer diverse experiences for their visitors—whether for educational purposes, entertainment, reflective thinking, or knowledge-sharing.[7]

- An **archaeological site** is a man-made creation that is now underground, along with the surrounding environment preserved in its original state.

- **Archaeological park**: An archaeological park is currently defined by the following characteristics:
  - It is located on an archaeological site that holds outstanding significance in some regard.
  - The foundational elements of the location are the visible remnants of the archaeological site.
  - The archaeological area is made a park and may also undergo landscape reconstruction.
  - Interpretive elements (e.g., protective roofing, exhibitions, reconstructions) are present at the site.
  - A museum institution fulfils the professional supervision of the archaeological park.
  - Offers various recreational facilities, such as a resting park, playground, or wellness services, etc.[8]

- Good practices in the **Archeodanube** programme: Gorsium, Pompeii, Vindolanda, Carnuntum, Xanten, Aguntum, Bibracte and Cherven (http://www.archeodanube.eu/good-practices?category=3)

- **Values of museum mediation**: openness, multifacetedness, sustainability, variety,

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[4] https://nmi.hu/wp-content/uploads/2019/02/Tud%C3%A1st%C3%A1r-XII.-Kultur%C3%A1lis-turizmus.pdf
[5] https://t-modell.uni-miskolc.hu/files/8582/Nagy_2012a.pdf
[6] https://www.researchgate.net/publication/342515580_A_tematikus_utak_elmeleti_turisztikai_termekmodellje_Theoretical_model_for_thematic_routes_as_tourism_products
[7] https://icomhungary.hu/hu/node/85
[8] https://muzeumcafe.hu/hu/regeszeti-lelohely-es-muzeum/

reflective thinking, inclusiveness, equal access, community participation, preservation of intellectual heritage, and knowledge sharing.

4. Heritage protection

On November 16, 1972, UNESCO adopted the Convention concerning "the Protection of World Cultural and Natural Heritage"[9], a foundational document establishing shared responsibility and cooperation for significant values that may be endangered.
Archaeology, as a discipline of history and social history, plays a crucial role in preserving cultural heritage and strengthening national identity. Its primary objective is to promote the discovery, processing, and social utilisation of archaeological heritage. To this end, it is essential to ensure adequate material conditions and human resources for archaeological research. Protecting and preserving all aspects of archaeological heritage is important so that future generations can access and study these values.[10]

5. Digital innovations in excavation

The possibilities offered by digital tools facilitate the non-invasive exploration of sites. A paradox arises from the situation that, while excavation allows for the discovery of artefacts, it also disrupts their context, the interconnected systems that, when missing, render the activity more akin to treasure hunting than scientific research. Advances in digital technology enable precise and rapid data collection, making it possible to conduct fully non-invasive research/excavation (e.g., LiDAR [Light Detection and Ranging] or geophysical methods).[11] A best-practice example of this is the digitization methods applied during excavations in the DAeI project under the Interreg DTP framework (such as photogrammetry and 3D modelling with drones).[12][13]
Artificial Intelligence provides new, innovative possibilities for identifying, evaluating, digitally reconstructing, and presenting archaeological artefacts and historical monuments. The exploitation of the opportunities offered by AI is still in its early stages in 2024, but it opens unprecedented horizons in the digitization of archaeological assets, with an impact that may not yet be fully perceptible to us.

6. Best practices in the digital presentation of archaeological assets

Virtual Reality (VR) is a revolutionary information technology that has a significant impact on cultural tourism. It is particularly beneficial for presenting heritage sites that are physically

[9] https://whc.unesco.org/en/conventiontext/
[10] https://real.mtak.hu/144840/1/%5B00038032%20-%20Archaeologiai%20%C3%89rtes%C3%ADt%C5%91%5D%20K%C3%B6z%C3%A9pt%C3%A1v%C3%BA%20r%C3%A9g%C3%A9szeti%20strat%C3%A9gia%E2%80%A2.pdf
[11] https://mnm.hu/hu/cikk/regeszet-21-szazadban-digitalis-regesz-szuletese
[12] https://dtp.interreg-danube.eu/approved-projects/danube-s-archaeological-elandscapes
[13] https://www.archaeo-perspectives.at/leistungen/arch%C3%A4ologie/

vulnerable. Moreover, VR serves as an effective marketing tool by allowing visitors to familiarise themselves with the particular site before their actual visit.

A digital exhibition guide can be an attractive presentation method for young people. An example is **ArcheoTales**, an online application that gamifies the transfer of knowledge related to archaeological and cultural heritage. The aim of this interactive hunt is to discover archaeological remains. Through ArcheoTales, operators of historical and cultural sites, cities, or even tourism agencies can organise discovery tours for visitors, allowing them to explore local history and culture in an entertaining and innovative way. Thus, users transform from passive consumers into active participants.

Upon entering the ArcheoTales mobile application, after selecting an exhibition location, users can follow interactive instructions that appear in a chat-like format. This dialog-based approach facilitates mutual learning between users and cultural sites. The application allows users to explore heritage at their own pace, enabling a personalised learning experience.

Another important feature of the ArcheoTales application is that the user experience differs from the traditional exhibition format. While guiding visitors through the classic exhibition narrative, ArcheoTales also provides opportunities to combine these experiences with outdoor locations, making them publicly accessible. With ArcheoTales, the users' smartphones effectively become an omnipresent guide to archaeological and heritage sites, drawing visitors into the exploration of heritage through gamification.

Augmented Reality (AR), QR codes, and smartphone applications have opened new dimensions for the tourist experience at archaeological sites, historical cities, museums, and national parks. Augmented Reality enriches the real, physical environment with computer-generated virtual and 3D elements, bringing heritage sites to life and making them more fun to engage with. Amidst today's information overload, it is essential for heritage sites to offer sensory experiences that sustain and heighten visitor interest. Commonly used tools include cost-effective, multilingual audio or e-guides and touchscreen monitors that interact with visitors, particularly children and young people, by presenting high-quality photo and video content.[14][15]

Another best practice could be the use of a **3D HOLO PYRAMID** with special effects (e.g., for displaying archaeological finds, artifacts).[16][17]

Last but not least, there is the "simple" digital artefact reconstruction method employed within the ArcheON project.[18]

[14] https://archeotales.com/
[15] https://dtp.interreg-danube.eu/approved-projects/archeodanube
[16] https://ieeexplore.ieee.org/document/7907500
[17] https://science.apa.at/power-search/15690936329949415647
[18] https://www.interreg-athu.eu/hu/archeon/regeszeti-leletek-3d-rekonstrukcioja/

7. Specific examples of cross-generational analogue and digital presentation methods for exhibitions

- original objects, weapons in display cases, with touchable replicas alongside, e.g., clothing reconstructions that can be tried on, and/or 3D animations, holograms,
- interactive applications, e.g., an interactive wall placed on empty (hallway) wall surfaces, excavation footage running on screens, games, and 3D images related to artefacts on multi-touch screens,
- augmented reality experiences bring exhibits to life, sharing information in surprising, playful ways,
- VR headset tours for immersive Roman-era city walks,
- audiovisual space: an audio-visual experience complemented by tactile objects, accessible to the visually and hearing impaired,
- family discovery backpacks: tailored for families with young children, categorised by age, allowing independent exploration of the exhibition (see: MNM Csaladi felfedezo hatizsak),
- writing Latin inscriptions on wax tablets with a stylus and translating them using a mobile app,
- roman show kitchen display set up with original objects, with Apicius' recipes on slips of paper on the wall, allowing children to select the appropriate ingredients for a Roman dish in an online game,
- planning for small groups: exhibitions should encourage visitors to explore collaboratively, engaging in discussion, cooperation, and joint control of interactive elements. Social learning enhances the experience,
- providing contextual information simultaneously for all age groups: using text, timelines, video, audio, and interactive timelines,
- the exhibition evokes daily life and the visual culture of the era through images projected on walls, particularly with visual games and optical tricks,
  virtually placed models for visitors (e.g., https://innoteq.hu/sumeg-digitalis-terepasztal/).

8. Authenticity

In scientific processing, the most important criteria are originality, credibility, and authenticity. Although much depends on the preferences of the audience (target group), the historical credibility of an archaeological artefact or artwork must remain uncompromised. For archaeological artefacts and artworks, it is not their originality that is primary, but their credibility! This is because originality (authenticity, genuineness) always pertains to the origin of the artefacts or objects, ensuring only their provenance. An artefact or object can only credibly (with warranty, certification) validate a given process if it is directly connected to that process.

Any exhibition design or strategy has the fundamental goal of communicating with the target audience rather than merely directing visitor impressions. Studies have shown that personal encounters with objects, interactivity, and learning based on new experiences can achieve greater effectiveness for future generations than traditional learning methods that require less student engagement.[19] Digitalization, with its "spectacularly modern" presentation opportunities, only strengthens this.
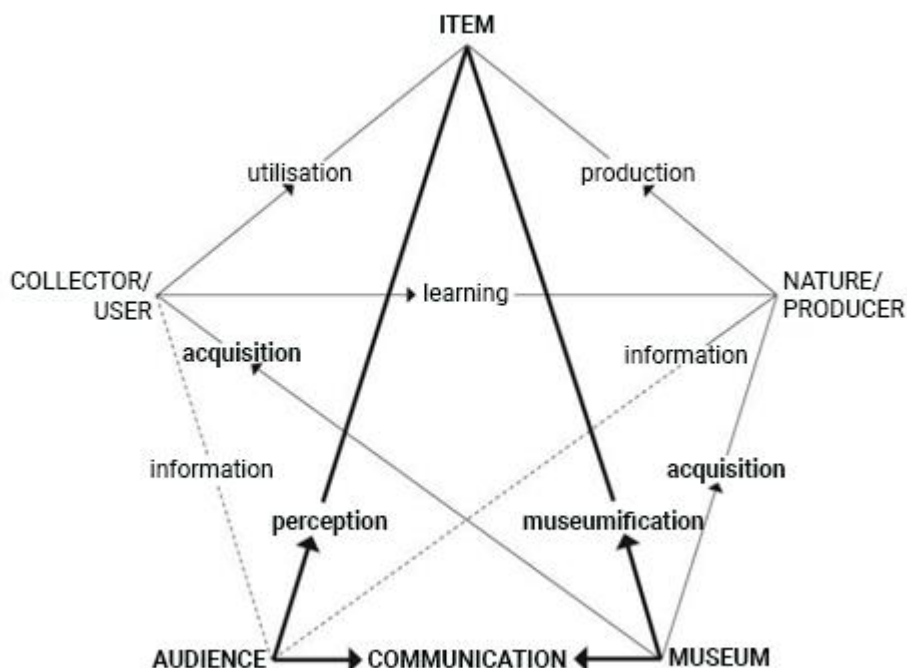
9. Mediation versus Preservation

Museologists constantly balance between two fundamentally opposing demands. On the one hand, their role is to manage objects in such a way that they ideally preserve their original state indefinitely. On the other hand, they must also mediate these objects to society through presentation and interpretation. A typical conflict exists between these demands: on one side, the use and display of objects, which can lead to wear, damage, or even destruction; on the other side, the need to preserve objects as an authentic testimony for future generations, which often means excluding any use. Museologists must live with this tension.

The preservation of museum objects is especially challenging due to the extreme diversity of materials from which they are made. Often, these are items with a limited lifespan, and

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[19] https://arthist.elte.hu/TAMOP_412/2_1_waidacher.pdf

artefacts are frequently made of multiple materials, the optimal preservation conditions of which may conflict with one another.

10. Value Transfer for Different Generations

In the 21st century, the role of cultural value transfer is to support lifelong learning, beginning in childhood, so that individuals can acquire expanding knowledge about the world, others, and themselves. EU member states see this as a condition for citizens to adapt to the rapidly changing world and to respond to environmental and social challenges. While young people's experience is mainly external, based on things that happen to them, the personal experiences of adults and the elderly are defined by their individual identities.

Value transfer based on the preferences of the younger generation
For younger generations, digital presentations of archaeological values are becoming increasingly appealing compared to traditional forms. The main reason is that digital technology offers interactive and experiential opportunities that capture young people's attention. Digital tools such as virtual reality (VR), augmented reality (AR), and interactive applications allow visitors to actively engage in the discovery process. In contrast, traditional exhibits often provide passive experiences, where visitors simply observe and read information about the displayed objects.

Digital presentations also allow archaeological values to be contextualised, for example, through stories and simulations. This helps young people connect more easily with the past, as digital formats make the complexity of history more experiential and understandable. Elements of entertainment, like gamification, also boost interest; visitors can learn in a playful way while enjoying themselves.

With the rise of social media and online platforms, younger generations now seek experiences not only in museums and exhibitions but also in digital spaces. Online content like videos, interactive maps, and blogs enable young people to explore archaeological values from home, further enhancing the appeal of digital presentations due to their accessibility and multifacetedness.

Moreover, the sustainability of digital technologies and environmental awareness are becoming increasingly important to younger generations. Digital presentations do not require the transport and display of physical objects, which can reduce the environmental footprint.

All things considered, the combination of traditional and digital presentations could create an equilibrium in which both a more personal experience (the understanding of historical

significance) and "experience retention" (captivating presentations with modern tools) can be effectively realised.[20]

Értékközvetítés a felnőtt korosztály preferenciái szerint
Among adults, traditional forms of presentation, such as museum exhibits and galleries, are often more appealing as they offer personal experiences and opportunities for direct interaction. Physical objects, historical context, and explanations by experts provide a deeper understanding and allow visitors to have authentic experiences. Traditional forms also give visitors the chance to connect with objects and their histories directly, deepening their knowledge and attachment to culture. It is also important to mention the aspects of lifelong learning.

At the same time, interest in digital presentations is also growing. Technological advancements and openness to digital experiences enable adults to explore new perspectives. Interactive elements such as virtual reality (VR) or augmented reality (AR) applications enrich cultural experiences, allowing visitors to delve into history without being physically present on-site.

This blend of traditional and digital forms creates new opportunities for adults, allowing them to enjoy classic exhibits while exploring interactive experiences provided by modern technology. Digital presentations can complement traditional forms, enabling adults to explore archaeological values at their own pace and style, thereby enriching their cultural experiences.

Value transfer based on the preferences of the older generation
Experiential learning and knowledge acquisition play a crucial role in maintaining the mental and physical activity of older generations. However, in modern societies, numerous factors make life more challenging for older people, leading many to feel alienated from technology and increasingly excluded from the digital world. Despite this, the older generation with more free time are among museums' regular visitors, as the variety of programmes offers both entertainment and therapeutic experiences.
The mixed presentation of archaeological values could provide new opportunities for them to experience modern tools as a challenge. This creates an opportunity for them to learn about the world of technology either independently or with the help of family members, such as their grandchildren or adult children. This shared learning process can not only improve their digital skills but also strengthen family bonds while enriching their cultural experiences.

A horizontális szempontok érvényesítése az értékközvetítés során
In terms of museum programming, several social groups are often excluded, thus missing out on cultural experiences. Such groups include, among others, individuals with

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[20] https://www.nhm-wien.ac.at/forschung/praehistorie/forschungen/digitale_archaeologie

comprehension difficulties, the hearing impaired, and the blind and visually impaired. Special attention must be paid to reaching these groups by utilising the possibilities offered by digitization, thereby enhancing social integration and fostering community cohesion.

11. Framework conditions for cross-generational presentation

In light of the above and considering the numerous fundamental elements of sustainable tourism, ArcheoROUTE's scientific and tourism partners have defined the framework conditions for cross-generational presentation in the following 10 points. In defining each criterion, ArcheoROUTE's partnership prioritised the broadest possible, general applicability for the list of criteria. In certain special cases, the criteria may be supplemented with additional steps relevant to the cross-generational presentation of specific archaeological value(s). The following steps, both in content and order, serve as a "list of criteria" for the mixed (simultaneous analogue and digital) presentation of archaeological values:

1. **preservation, condition, and artefact conservation / site preservation / monument protection**: the particular archaeological value or object must not be damaged in any way during the digitization process. The digitization method must adhere to the strictest preservation, condition, and artefact conservation / site preservation / monument protection standards. The original analogue archaeological object involved in the digitization process remains intact.

2. **accessibility and capacity**: the location of the presentation (whether a museum environment, heritage site, or other site) has been assessed for its "carrying capacity", meaning that the estimated increase in visitor numbers drawn by the attraction/exhibit/presentation will NOT damage the location.

3. **consideration of horizontal principles (social inclusion):** when circumstances permit, the cross-generational presentation will partially or fully include a digitization process that makes the archaeological value accessible/enjoyable for people with disabilities (e.g., special 3D replicas, audio guide supplements)

4. **financial scope**: when planning the digitization process, rational consideration is given to funding options. If the planned digitization process/method proves to be very cost-intensive, it is advisable to use alternative methods that allow for the digitization of additional archaeological objects/values as part of the particular attraction/exhibit/presentation.

5. **prioritisation**: establishing a ranking of importance for the archaeological values or objects planned for digitization during the particular attraction/exhibit/presentation, creating an objective priority order based on funding possibilities.

6. **selecting the proper digital method**: Ensuring that audiences of different ages are provided with suitable analogue and digital information and experiences so that the comprehensibility of digitised archaeological values or objects is not compromised (e.g., equipping 3D field models/objects with explanatory supplements).

7. **authenticity**: the planned digitization process/method preserves/ensures the credibility of the archaeological value or object from a scientific processing standpoint, thus maintaining its authenticity.

8. **quality**: the digitised archaeological value or object is presented in the best possible quality, regardless of the method used—be it VR/AR, CGI, or other projection/visualisation methods (which is essential, as poor execution or accuracy may reduce the experience and distort understanding. Inadequate digitization quality can lead to disappointment for visitors and create negative feedback).

9. **coolification** "tuning": the digitised process considers the latest trends in presentation/display. From the perspective of younger generations, the digitised process makes learning as enjoyable and entertaining as possible, which can have a multiplier effect.

10. **training**: at the location of the particular attraction/exhibit/presentation, the staff receiving visitors is prepared to present the digital content professionally and can interpret it with additional interesting information.

List of Criteria

For the cross-generational (combined analogue and digital) presentation of archaeological value(s)

	Criterion name	Fulfilled		
		Yes	**No or Partially**	**Note / explanation** (if answer is "No" or "Partially")
1	**Preservation, condition, and artefact conservation / site preservation / monument protection**			
2	**Accessibility and capacity**			
3	**Consideration of horizontal principles (social inclusion)**			
4	**Financial scope**			
5	**Prioritisation**			
6	**Selecting the proper digital method**			
7	**Authenticity**			
8	**Quality**			
9	**Coolification "tuning"**			
10	**Training**			

Event/Exhibit/Appearance for which this list of criteria was used:

Title: ....

Date (year, month):..