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Reviewed Article:

RETOLD: On the Way for a Digital Future of Documentation in Open-air Museums – User Requirements for Data Entry and a Management Product for the RETOLD-Project

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As part of the RETOLD project, which runs from 2020 until 2024 and is funded by the Creative Europe Programme, Nüwa Digital Media Production Studios (Ireland) in collaboration with the

Archaeological-Ecological Centre Albersdorf (AÖZA, Germany) have carried out a year-long user research project for a future digital tool, that will enable open air museums to collect and manage data, which are relevant to their practice.

> “In designing our solution, we want to ensure that museums are supported in the use of digital tools, as this was mentioned repeatedly in the interview. At the same time, we want to design a tool that is effective, both usable and functionally appropriate to open-air museums, and facilitates a high standard of data management.

Since January 2021, we have spoken to partner museums, conducted structured interviews, carried out surveys and product analyses to learn more about the state of digitalisation in European open-air museums, and what these very specific museum organisations are missing in current digital data collection and management solutions.

The purpose of this report is to give an overview of our findings to date, and to lay out a product philosophy and requirements for the next stage of the project: Creating and testing a prototype data collection and management tool co-designed by and for open-air museum researchers, professionals and volunteers.

Open-air museums are vast repositories of cultural heritage data, most of which are currently located in physical archival records, photos, video, and – not least - in the minds of museum staff and volunteers. With high staff turnover, retirements and unforeseen obstacles such as not being able to attend a physical workplace, there is a real risk that without a robust process for capturing and storing this data, it will be lost forever.

For this reason, the RETOLD project aims to design and develop a digital tool that helps open-air museums to continue telling important cultural heritage stories to a diverse public in a rapidly changing social and cultural environment. We want to help museums carry out better quality research through more comparable data, and smoother collaboration between museums.

For this purpose, we need to design a standardised workflow to collect, digitise and share data on buildings, crafts, and traditions. As an outcome of the RETOLD project, we envisage an archiving tool that is specifically tailored to the needs of open-air museums. We believe that it will alleviate current challenges in the preservation of tacit cultural heritage knowledge, and create opportunities for more engaging and impactful storytelling to the public.

Open-air museums are process and action-oriented, rather than artefact oriented. Typically, open-air museums are not centred around a single excavation site or built to house a collection of artefacts. Reconstructions of buildings are of interest because of the physical result that can be presented to visitors, but also because of learnings that can be acquired

during the building process, or even later, as the building decays. Exhibitions in these museums consist not only of objects, but of live demonstrations, workshops, and events. Consequently, documentation in open-air museums means dealing with information that is ephemeral, it necessitates use of diverse media and can be highly interdisciplinary (https://exarc.net/issue-2020-1/aoam/use-and-relevance-aoams). Therefore, a solution based on the CIDOC Conceptual Reference Model, that "aims to facilitate the integration, mediation and interchange of heterogeneous cultural heritage information" will form the basis for our documentation workflows. The standardised workflows created by this project will be shared in an open access form on multiple platforms, and open-air museums will be actively encouraged to adopt them. The RETOLD project will thus create easy-to-learn, open access knowledge transfer infrastructure for a new generation of museum professionals, researchers and the public. This represents an important opportunity for open-air museums to fully leverage the new possibilities of digital technologies, social media, and online communities in widely disseminating cultural heritage data.

The desired outcome will be enhanced cooperation between ethnographic and archaeological open-air museums and other cultural heritage specialists, a strengthening of the research and interpretation framework of open-air museums, and ultimately the long-term sustainability of open-air museums as guardians of cultural heritage.

Project Methodology

The RETOLD project is a cross-European interdisciplinary collaboration comprising EXARC, the umbrella organisation for experimental archaeology in Europe, three open-air museums (Museumsdorf Düppel from Stadtmuseum Berlin / Germany, Complexul National Muzeal ASTRA in Sibiu / Romania, and Archaeological-Ecological Centre Albersdorf AÖZA / Germany) and Nuwa, a digital media design and production studio in Dublin, Ireland. This collaboration means that, as a group, we have access to a network of infrastructure and database service providers, interview and research participants, potential end users of the product, and ways of disseminating our findings and prototypes to the beneficiaries, open-air museums and their staff.

As the projected outcome of this collaboration is a digital product co-designed by the partners, we are using the Design Thinking framework to structure our explorations and experiments.

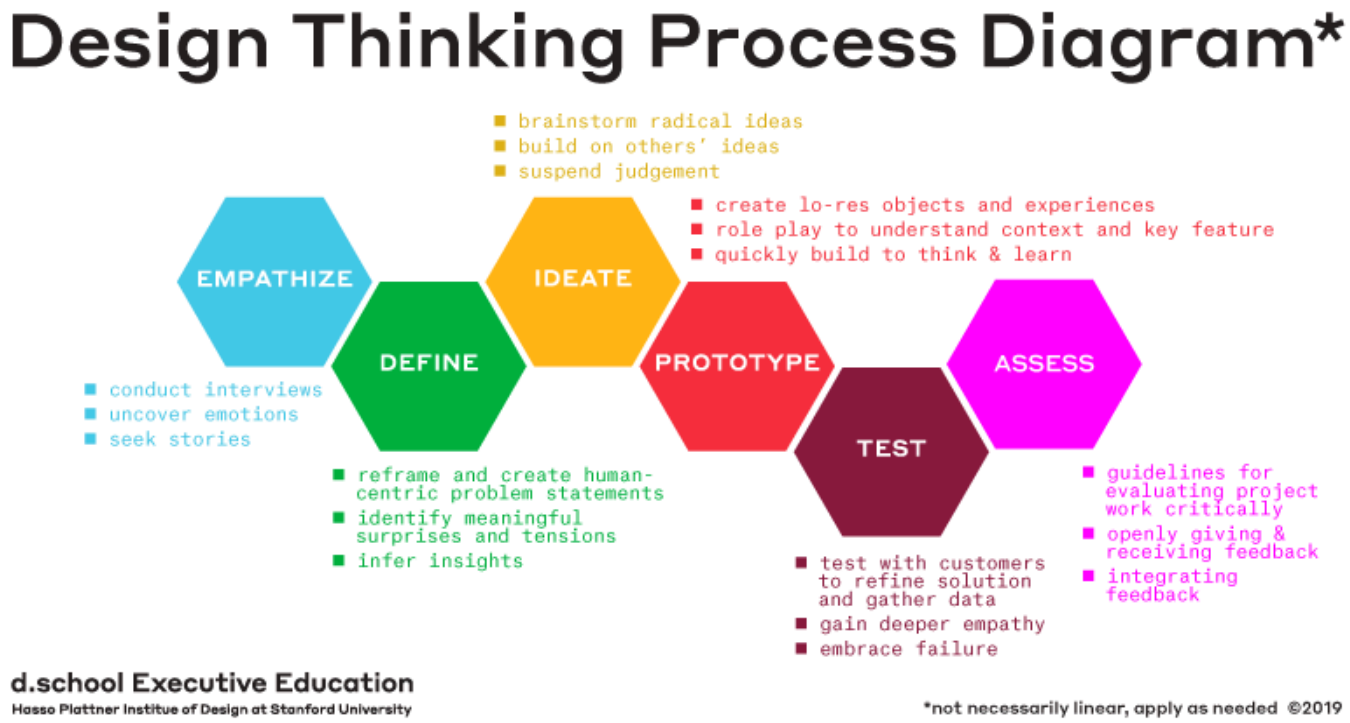

FIG 1. THE STRUCTURE OF THE DESIGN THINKING PROCESS. SOURCE: INSTITUTE OF DESIGN AT STANFORD UNIVERSITY, 2019.

Throughout 2021, we worked through the "Empathise" and "Define" phases of the process. We conducted surveys with self-selected participants from the EXARC network to gain an overview of current approaches to documentation and digitalisation in open air museums, and an insight into potential obstacles to digital tool adoption. In parallel, we analysed data entry and archiving systems currently in use by cultural organisations and museums in Europe and identified friction points in their use and adoption. Structured interviews with museums who have an experimental archaeology approach in their organisation and of using a digital archiving system helped us understand their challenges with data collection and management.

From this data, we created user personas and primary product objectives, allowing us to progress into the "Ideate" and "Prototype" phases of the process in early 2022.

In parallel, our partners at the Museumsdorf Düppel also conducted conversations with colleagues from other open-air museums to identify common data capture needs for experimental work and reconstructions. A prototype for a documentation form was created, which is used to verify the data fields needed specifically by open-air museums, compared to the ones used in more general cultural archiving systems.

In consultation with EXARC and the project partners, we identified the overall scope of the product. The proposed digital solution comprises:

- A user-friendly data entry method for open-air museum staff and volunteers, and

- A database and storage architecture to be facilitated by EXARC for open-air museum members.

It is intended that a high level of usability will help with adoption of digital documentation and further the process of digitalisation within open-air museums in Europe. Interoperability with database systems currently used by museums and cultural organisations is also desirable, as it facilitates further dissemination and preservation of museums' data and knowledge.

To begin the process of narrowing down the scope of the product and the focus for the design process, we articulated a problem statement using a standard user experience (UX) formula. The problem statement summarises which one the product will serve, what the primary need is and what will be achieved by fulfilling this need. The statement also includes a metric, how we will determine if the design challenge was solved sufficiently. In our success metric, we have summarised some of the findings from initial exploratory interviews, which revealed that a lot of open-air museums generally lag behind the digital state of the art, and experience more specific difficulties with current digital archiving solutions. Here is the text of the problem statement:

"Open-air Museums in Europe need an easy and accessible way of capturing, storing, and accessing their documentation, so that they can preserve their specific knowledge and share it with other cultural organisations for more active collaboration. We will know this to be true when open-air museums that have previously resisted digitalisation start using digital solutions and regularly add and access data in digital archiving systems."

One of our hypotheses expressed in the problem statement refers to the possibility that a lot of open-air museums are experiencing organisational resistance to digitalisation, and that a reason for this might be a lack of digital archiving solutions suited to our potential users. In validating this hypothesis, we needed to explore:

- Whether there are current solutions in the market that might suit the needs of open-air museums.
- Obstacles to the adoption of such solutions.

We then needed to decide:

- Whether to adapt or adopt current solutions, or
- Whether to create a custom product specifically for open-air museums.

To help with these decisions, we conducted a survey and analysis of current data management products aimed at the archaeological, cultural heritage and museums sector. Through a collaborative analysis of various publicly funded and commercial solutions with the RETOLD museum partners, we were able to identify some of the strengths and weaknesses of existing products from the point of view of our users, as well as opportunities for

improvement. Our criteria were ease of first-time installation, maintenance and access to trial versions, ease of use for experts and non-experts, and appropriateness of data categories to the open-air museum context.

Following discussion with museum partners and the project lead, we concluded that rather than adopting existing solutions that are too complex, maintenance-heavy and designed for excavation- and collection-based organisations, we should design a custom solution specifically for open-air museums in Europe and further afield.

User Research

In parallel to the market and competitor analysis, we carried out user research in three phases: Exploratory interviews, a survey, and structured user interviews.

This phased approach to engaging with potential users helped us iterate on the problem statement, ensuring that we were asking relevant questions and understanding the users' needs, rather taking a solutions-driven design path.

To start the user research phase of this project, Nuwa and AÖZA conducted an informal but structured interview, to identify areas for further enquiry. AÖZA and Nuwa then conducted a survey based on findings from the initial interview, with participants who worked in open-air museums in Europe. The survey was administered through the EXARC network. Its main purpose was to capture a first impression of the digital landscape in open-air museum organisations:

- How digital technology was used in an organisational context,
- What museums expected from it and
- Where they saw obstacles in using it.

A secondary goal was to identify potential interview participants.

Based on the survey results, we conducted more in-depth user interviews with voluntary participants to learn more about their goals and needs with regard to digital technology solutions, specifically for documentation and digitisation.

During the first research phase, a structured interview with AÖZA helped us describe a typical context for smaller open-air museums who focus on visitors' outdoor experience of reconstructed buildings, the landscape, workshops and craft demonstrations. The museums day-to-day use of digital technology encompasses:

- Digital archives
- Digitisation of hard-copy documentation
- Storing digital files on a local hard drive

- Social media
- A web presence

Since the pandemic in 2020 the organisation has also relied more on video meetings and email, although some volunteers and staff have not adapted well to the remote work setting.

Some of the obstacles to digitalisation mentioned by AÖZA as a relatively small open-air museum were:

- Time and resources needed to set up a good digital infrastructure for documentation;
- A perceived lack of expertise;
- Resistance to adoption of digital solutions;
- Reliance on volunteers and short-term staff to maintain physical and digital infrastructures.

We then designed an online survey to examine whether the concerns raised during this initial interview were generally present in open-air museums in the EXARC network or if additional user needs and frustrations were yet to be identified.

Using *Google Forms*, we created an online survey for dissemination through EXARC's newsletter. The survey was developed first as a draft and then underwent two rounds of feedback from project collaborators. Responses were collected between mid-February and 31st April 2021.

The goal of the survey was to gain an overview of the state-of-the art of digital technology and tools in the context of European open-air museums so that we could identify the type of organisation and museum worker who might benefit most from the output of the RETOLD project. We specifically wanted to know how open-air museums in Europe currently use digital media and tools, and what their needs and expectations are with regard to digitisation.

The results of the survey can be grouped into three sections:

- State of the art,
- Needs and motivations, and
- Frustrations and obstacles.

These categories usually form part of a design persona and will help us make informed and user-centred design decisions later in the process. For now, they will help form an overview of the situation regarding documentation and digitisation in the participating open-air museums.

We got the following results from the survey:

1. Out of the 25 respondents, 65-75% have a documentation strategy. This overlaps significantly with the museums who also have a communication strategy.
2. We also asked about the composition and expertise of staff groups and who was responsible for digital tool selection and infrastructure maintenance. While it was expected that senior staff would be some of the main decision makers, it is also senior staff who mainly use the infrastructure and plan for its development.
3. Most museums that digitise their documentation are working through an archival backlog of existing hard copies and historical documentation. However, as open-air museums, they are active in documenting experiments, reconstructions and work processes.

As mentioned already in the exploratory interview, the documentation needs of open-air museums are not always accommodated well by existing archiving solutions, leading to highly localised approaches.

To understand how museums were thinking about their current practices in digitisation and documentation, we asked both about their perceived strengths, areas of improvement and actual use of digital tools in the organisation:

1. Interestingly, there was a mismatch between how museums were using digital tools for documentation, how they felt they were doing and what they wanted to improve:
2. Despite most museums using physical documentation and archiving methods, most also felt that their use of digital documentation was satisfactory or good. Where areas of improvement were mentioned, they were typically external to the museums, such as a better system or more resource allocation.
3. Where museums stated that they wanted to improve their use of digital tools, this was in the area of audience liaison, such as better dissemination or use of visual material.

To explain this somewhat complex set of attitudes, we needed to consider the frustrations and obstacles that museums identified in the survey:

1. The reasons quoted most often for lack of progress in digital documentation were lack of time and money, with not enough expertise the third category. Staff reported missing know-how, not knowing about the possibilities.
2. An equally important category was organisational culture - participants mentioned that their organisations had certain “manual” traditions due to their affiliation with municipal bureaucracy.
3. Only two participants stated educational and philosophical reasons - the fear of losing physical contact to the guests and wanting guests to engage with the sensory environment of the museum. One participant noted the absence of high-speed internet connections in their location as an obstacle.

4. Paired with a lack of experience of development tools such as Drupal and WordPress, which only three respondents had used, the barriers for open air museums for using digital archives are relatively high. To implement complex software systems, museums would have to rely on IT specialists.

As few of the survey respondents had experience of digital archiving and documentation, we contacted two senior staff persons in established museums for more extensive structured interviews. We wanted to explore in more detail the motivations, needs and frustrations museum staff encounter when dealing with digital documentation tools, allowing us to start ideating potential solutions. Our aims were:

- To understand the organisational context and habits for using digital technology for documentation and dissemination,
- To understand users' motivations for engaging with digital technology in Open-air museums, and
- To identify concrete pain points that our project might address and solve for.

Both participants' museums are based at former excavation sites, comprising collection-based exhibitions, building reconstructions and some practical demonstrations. Both museums were using digital archiving systems, the smaller museum having entered approximately 32,000 items or 7% of their excavated material, and the larger museum 1.9 million entries, some of which were historical archives dating back to the 14th century.

Summarised, the main friction points inherent in the solutions currently in use at the museums, which were mentioned in the interviews were:

1. Data entry is a slow process: The data needs to be in a "clean" format for import from Excel. Even if manual entry is not needed, preparing the entries can be time consuming.
2. Museum data management platforms suffer from overly complex or obscure user interfaces, creating a learnability barrier.
3. Conversion from hard copy records and drawings to a digital format is time consuming and tedious.

The interviews allowed us an insight into issues arising with regular use of relatively well-established digital solutions - in a well-supported environment, with staff who are motivated to adopt digital archiving tools. From the informational interview at the start of the process, as well as the surveys, we see that many open-air museums are not yet at a stage where they are familiar enough with such tools to give detailed feedback on their usability. From the surveys and interviews we have heard that support for digitisation is often not strong enough to help museums build a sustainable digital infrastructure. Instead, funding is often allocated on a per-project basis.

During the surveys and interviews we found that often one person in the organisation becomes responsible for use of digital methods due to familiarity with computer use, or that multiple staff “do a bit of documenting” when they have time.

As part of the early ideation phase, we will articulate our findings into user stories, so that we can project possible interactions and success paths through the digital product.

Design Requirements

Following the first analysis of potential user requirements, we created three design personas - personified summaries of the user requirements identified in interviews:

a) “Sonia”: The main day-to-day user of our proposed solution: a museum curator,

b) “Sebastian”: A less tech-savvy co-worker with deep practical knowledge who needs training in digital technology, and

c) “Sam”: The main decision maker in the museum.

After consultation with museum partners, we extracted one more persona from the interview data:

d) “Sarah”: The student volunteer, who needs efficient ways of sharing her research.

Throughout the design process, we will refer back to these personas, to help us make user-centred design decisions.

User stories are a design tool to ensure that we articulate …

- What users want to achieve,
- Why users want to achieve this, and
- A corresponding success metric.

Within the RETOLD project, articulating the user requirements must take into account the differences in experience levels within museums and among museums: Some user stories will refer to the digital solution itself, and some to the context in which the tool is to be used.

In designing our solution, we want to ensure that museums are supported in the use of digital tools, as this was mentioned repeatedly in the interview. At the same time, we want to design a tool that is effective, both usable and functionally appropriate to open-air museums, and facilitates a high standard of data management.

This are our results so far:

User Stories: Structural support

1. Museums need appropriate training for existing staff.
2. Museums need to be able to build staff expertise in the area of digitisation.
3. Museums need support, so that progress is maintained long-term.

User Stories: Digital product

1. Museums need a digital archiving and documentation tool that is easy to learn, so that it can be used by novices.
2. Museums need to be able to test and evaluate the tool, so that they can advocate for its use.
3. Museums need a tool that educates users about correct data entry, so that entries are quick and accurate.
4. Museums need a tool that is easy to maintain, so that they do not have to rely on IT specialists.
5. Museums need a tool that integrates with existing databases, so that previous work is not lost, and so that data can be shared with other organisations.
6. Museums need a tool that can accommodate visual media, so that documentation becomes easy and engaging.

Another step for our project was when RETOLD partners Julia Heeb from Stadtmuseum Berlin and George Tomegea from ASTRA collaborated on defining the data sets used for documentation specifically by researchers and other staff in the context of open-air Museums. Open-air museums can be categorized as:

a) Ethnographic museums: Preserve and curate translocated original buildings.

b) Archaeological open-air museums: Reconstruct buildings based on archaeological evidence.

To start formulating standardised documentation strategies and workflows, other open-air museums were asked to share their existing documentation forms and workflows, if they existed.

We learned from this evaluation that most open-air museums did not have existing workflows, confirming the need for this project in the first place - out of 21 museums contacted, only 7 had documentation procedures and were actively sharing them with the researchers. Overall, ethnographic open-air museums appear to have a more coordinated approach to documentation, as they are dealing with “originals”. As with any other museum object, great care is taken to record as much detail as possible: Original position of translocated houses, history of translocated houses, transport of translocated houses to the

museum site, and state of repair and deterioration. There may be value for archaeological open-air museums to adopt some of the documentation approaches from ethnographic museums.

As a result of this exploration of existing documentation strategies, draft documentation forms were created and tested with museums from the EXARC network. For the digital product we are designing, we will use these forms as a basis for data entry and management features, so that the product serves the specific documentation needs of open-air museums.

Next Steps: Prototyping

Having researched and defined the primary needs of our users, we are now ready to expand, then refine the user stories and begin ideating the product itself. Rapid prototyping is the approach of mapping out user flows, the overall journey of users through and with the product, potential features and the structure of the product.

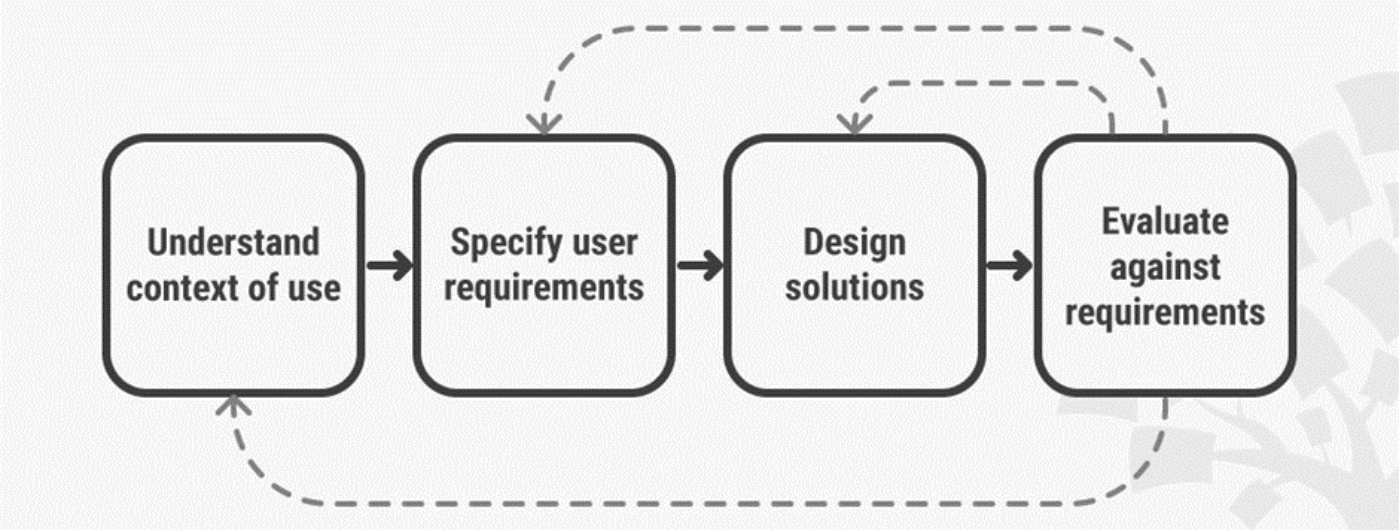

FIG 2. THE RAPID PROTOTYPING PROCESS. SOURCE: INTERACTION DESIGN FOUNDATION, HTTPS://WWW.INTERACTION-DESIGN.ORG/LITERATURE/TOPICS/USER-CENTERED-DESI...

Regular review and testing are integral to this process, so that changes can be made early. This prevents hasty investment in a flawed design and allows us to adopt our design idea to provide maximum value to the user. In early ideation sessions with the project lead and museum partners, it became clear that the RETOLD project follows a well-defined set of values that should be reflected in the digital solution we are designing. Our Core Values are here: Connectivity, Community, Openness, and Collaboration. We believe that translating these values into the functionality of the product will serve our users' need for support in their journey toward digitalisation, and their goals to connect with fellow museums, and to engage audiences sustainably.

Committed to the RETOLD core values, we want to develop a standardised workflow to collect, digitise and share data on buildings, crafts, and traditions, store this data in an open access format on multiple platforms so that museum professionals, researchers and the

public can access and use them freely and fully leverage the new possibilities of digital technologies, social media and online communities in widely disseminating cultural heritage data.

Our motivations are better quality research through more comparable data and standardised data collection, open access knowledge transfer to a new generation of museum professionals, researchers and the public, preservation of tacit cultural heritage knowledge, and opportunities for more engaging and impactful storytelling about cultural heritage to the general public.

The desired project outcomes are enhanced cooperation between historical and archaeological open-air museums and other cultural heritage specialists, strengthening of the research and interpretation framework of open-air museums, and long-term sustainability of open-air museums as guardians of cultural heritage.

The RETOLD project will keep you informed about the next steps in the development of our product and about our work progress. The results will be published and spread to all EXARC members and partners.

Please supply us with information from your different and various institutions if necessary; we will take directly contact with you or give an information via the EXARC newsletter.

Keywords documentation
digitalisation

Bibliography

Hansen, C. and Kelm, R., 2021. Report: RETOLD – Initial Survey of Capture Current State of Digital Tech in Open-Air Museums. *EXARC Journal* 2021 Digest, p. 89.

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