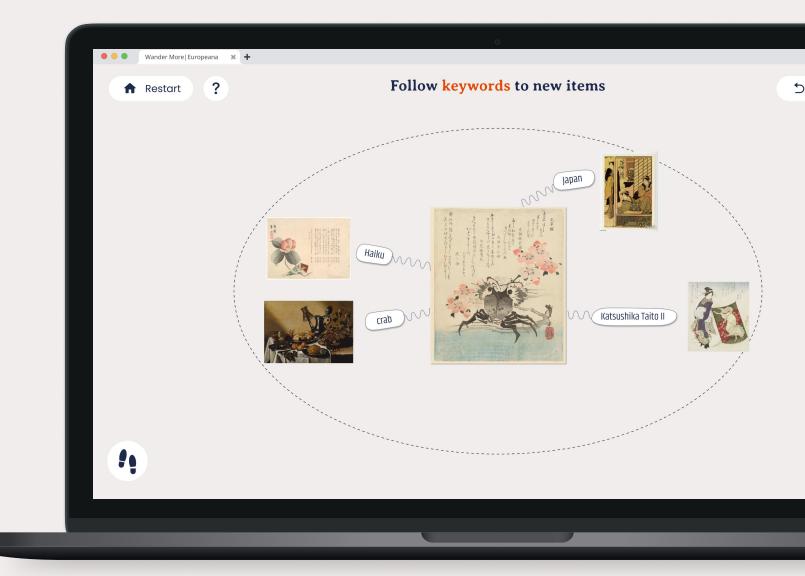
Supporting Casual Users to Explore Digital Collections

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Master thesis



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Master Thesis September 2024



Preface

First and foremost, my deepest thanks go to my two supervisors, Jeff and Peter. Thank you, Jeff, for inspiring me with your professional knowledge in the cultural field, guiding me to navigate the project in the right direction, and helping me communicate the research and design more clearly. Thank you, Peter, for challenging me with your critical insights and supporting me with your expertise in the design field. Your insightful and creative opinions consistently sparked my creativity and shaped my thinking.

I also want to express my sincere gratitude to everyone who participated in the user research, brainstorming sessions, iteration testings, and the final evaluation of this project. Your generous sharing of ideas, feedback, and experiences has been truly invaluable. I deeply appreciate your time and insights, which significantly contributed to the development and refinement of this project. It has been a pleasure meeting each of you, and I look forward to staying in touch in the future.

A special thank you goes to my friend Jingyi. I deeply appreciate your patience and willingness to listen to my thoughts throughout the project. Your insightful opinions have been incredibly valuable to me. Additionally, your encouragement played a crucial role in keeping me motivated and inspired. Thank you for being such a supportive and thoughtful friend.

Last but not least, I extend my heartfelt gratitude to my parents. Your unwavering support, encouragement, patience, and love have been a constant source of strength throughout this journey. Thank you for being there for me every step of the way.

This project has been a collective effort made possible by the support and contributions of these individuals, and I am deeply grateful for your involvement. I hope our paths cross again in the future.

Executive Summary

Today, an increasing number of art, history, and culture-related items are being digitally reproduced and displayed by cultural heritage institutions on websites. As the digitisation of cultural collections progresses, digital collection websites are reaching a broader and more diverse audience, including a growing segment known as casual users. This user group is becoming more prevalent in the context of digital collections. However, despite their increasing presence, the current interfaces of most digital collection websites do not adequately support the casual user experience. Casual users typically visit these sites without a specific informational goal, preferring exploratory browsing. In contrast, many existing interfaces are designed for users with clear motivations, focusing on targeted searches. Tools like search bars and catalogues may limit exploration for casual users, who may feel less encouraged to explore freely. This raises a critical question: how can we an innovative exploration experience that invites casual users to explore and supports their divergent exploration?

Through a literature review of psychological theories on exploratory behaviour, design principles for supporting casual users, theories on facilitating serendipity, and user research with six casual users, a deeper understanding of the context was gained, leading to the definition of the design goal. Four interaction qualities—exploratory, serendipitous, supportive, and playful—were then established as guiding principles for the project.

Based on the research findings, four initial concepts were developed and tested with nine participants. Insights from the first round of testing were used to formulate an integrated concept. An interactive prototype was then created to conduct a second round of testing with five participants.

The final concept, Wander More, is an innovative online tool for exploring digital collections. It is designed to invite casual users to wander through diverse cultural items using connected keywords in a simple, playful, and surprising way. The key features of the final concept are as follows:

- 1. Wandering through various items via keyword connections in a simple and endless way.
- 2. Playfully dragging keywords to generate a diverse range of surprising items.
- 3. Viewing exploration journey summary
- 4. Also supporting deep and specific exploration

In the final evaluation, the design was assessed to determine how well it achieved the design goal. Five participants found it to be a simple and enjoyable experience that allowed them to explore diverse items in a playful and surprising manner.

Table of content

1	Introduction	07
	1.1 Project background	09
	1.2 Casual user	11
	1.3 Digital collections website & Europeana	12
	1.4 Design challenges	14
	1.5 Innovative experiments using new technology	15
	1.6 Design approach	19
2	Literature review	21
	2.1 Psychological Theories Underpinning Exploratory Behaviour	23
	2.2 Design Principles, frameworks, and recommendations on how	27
	to support causal users' exploration on digital collections site	
	2.3 Theories & framework on how to facilitate serendipity	31
	2.4 Conclusion	35
3	User research ·····	37
	3.1 Research goal	39
	3.2 Participants	39
	3.3 Procedure	40
	3.4 Approach	44
	3.5 Results	45
	3.6 Conclusion	59
	3.7 Research sysnthesis	63
4	Design brief	65
	4.1 Design goal	67
	4.2 Interaction qualities	67
5	Design cycle 1: divergence	69
	5.1 Brainstorming session	71
	5.2 Rapid mockups testing	78
	5.3 Initial concepts	79
	5.4 Concept evaluation	89
	5.5 Conclusion	105

6	Design cycle 2: convergence	107
	6.1 Concept development	109
	6.2 Integrated concept	113
	6.3 User testing	129
	6.4 Results	133
	6.5 Conclusions	139
7	Final concept	141
	7.1 Highlights of Wander More	143
	7.2 Final user journey	165
	7.3 Working prototype	169
8	Final evaluation	173
	8.1 Test setup	175
	8.2 Results	179
	8.3 Conclusions	186
9	Limitations & recommendations	187
	9.1 Limitation	189
	9.2 Recommendation	191
10	Personal reflection	193
	10.1 Personal reflection	195

Chapter overview

- 1.1 Project background
- 1.2 Casual user
- 1.3 Digital collections website & Europeana
- 1.4 Design challenges
- 1.5 Innovative experiments using new technology
- 1.6 Design approach

Chapter 1

Introduction

This chapter provides a general overview of the project, covering the background, target users, context, design challenges, several innovative experiments with digital collections, and the project approach. A literature review was conducted to investigate casual users and the context of digital collection websites.

1.1 Project background

Today, more and more art, history and culture-related items provided by the cultural heritage institutions are being digitally reproduced and displayed on the web. According to the ENUMERATE survey (2020), there has been significant growth in the accessibility of digital objects from cultural heritage institutions across Europe through their websites over years. By 2017, over 50% of these objects had been digitised and made accessible online. Many prominent museums, such as SFMOMA, Musei Vaticani, and RijksMuseum, published their digital collections on their websites to ensure widespread public access. At the same time, several digital platforms have emerged that gather data from smaller institutions and present them as large, unified collections. Examples of these platforms include Europeana, Google Arts & Culture, and Wikiart.

Digital collections offer a wide range of benefits. The most significant advantage of digital collections is their high accessibility. Hemminger et al (2005) pointed out that digital collections allow convenient viewing by anyone, anytime, anywhere. It also offers an experience that closely replicates the original works, without risking damage to the physical artefacts. What's more, the digital environment allows for a variety of interfaces and interactions with artworks, which can be customised to meet different users' needs.

As the digitisation of cultural collections has flourished, platforms hosting these digital items have begun to attract a broader and more diverse audience, extending beyond just scholars and researchers (Johnson, 2016). At the same time, digital collections websites and online museums have also opened their doors, focusing on accommodating diverse user groups and expanding their reach. Many cultural heritage professionals have raised concerns about whether the current systems and interfaces could effectively engage a range of users, from experts to the general public (Agosti et al., 2018). Under these circumstances, a type of user group known as casual users has also been included. This group refers individuals who interact with the cultural collection casually, out of intrinsic curiosity rather than professional duty.

Many studies have found that the casual user segment is becoming more and more prevalent on online digital collection websites. A 2014 Europeana user survey found that over 30% of their visitors browse the website to explore topics freely, while only 16% visit with the intention of searching for specific items. This trend is further supported by Walsh et al. (2018), whose research indicated that most visitors to the National Museum Liverpool website are general public users looking to pass time and engage in casual browsing. Additionally, a research and development project by Tyne & Wear Archives & Museums (TWAM) revealed that almost twice as many visitors to the collections search pages on TWAM's websites identify as users who do not have a specific search in mind (Coburn, 2016).

However, despite the increasing presence of casual users, most existing digital collection websites do not adequately support their user experience. One reason is that these platforms were originally often created for internal museum use, without considering the needs of casual users (Mayr et al., 2016). According to Coburn (2016), digital collections interfaces have traditionally been designed for users with a specific interest and motivation to search for particular objects. Consequently, there are still relatively few user-centric interfaces for those who just look around casually without a need for searching.

Therefore, it is essential to rethink how casual users could interact with digital collections and how to support their exploration on the digital collections website, in order to create a more inclusive and engaging cultural exploration environment.

9 - 1

1.2 Casual user

In 2019, Villaespesa found that the users of digital collections can be categorised into six segments: professional researcher, student researcher, personal interest information-seeker, inspiration-seeker, casual browser and planner. His study also shows that researchers and information seekers are primarily motivated by intellectual pursuits, while inspiration-seekers and casual browsers are driven by inspiration and aesthetics. Planners, on the other hand, typically use the website to plan their visits to offline museums.

Among the six user segments of digital collections, casual users were selected as the target group for my project. To better define and understand this group, desk research was conducted to explore their definition and characteristics, which will be outlined below.

Definition

Explained by Marengo et al. (2017), casual users are those who casually interact with the cultural collection in their free time. Also, described by Walsh and Hall (2015), casual users are someone "who has just stumbled across the digital collection in the same way that they would wander into the cultural heritage institution's physical space".

Characteristics

Based on the literature study, there are four main characteristics of casual users, which are summarised below:

1) Lack of clear information goal

When casual users visit the digital collections, they often don't have a clear goal in mind (Villa et al., 2013). They have no obvious task, information need or specific knowledge gap to bridge.

2) Motivated by intrinsic factors

They are often driven by intrinsic motivations, such as the desire to learn something new, find interesting or challenging content, gain knowledge, be entertained, change their mood or physical state, pass time, or interact socially (Elsweiler et al, 2011). They are driven by the pleasure of discovering information itself, rather than by explicit informational needs. (Villa et al., 2013)

3) Low levels of technical/domain expertise

Casual users generally lack expert knowledge about the collection and how to navigate or search within it (Mayr et al., 2016).

4) Always engage in exploratory behaviour

Casual visitors mostly interact with digital collections through exploratory behaviour (Villa et al., 2013). During the exploration, they don't analyse the data in a detailed way, but become aware of basic patterns, gain a feeling for the data, and reflect on its social and personal relevance (Pousman et al., 2007). They are open-minded and receptive to serendipity, discovering interesting information they don't expect to find. They tend to gather insights in a passive and eclectic manner, collecting notable pieces of information (Smuc et al., 2010). Dörk et al. (2011) refer to them as "information flâneurs."

1.3 Digital collections website & Europeana

Digital collections websites are online platforms that curate and provide access to digitised versions of physical artefacts, documents, artworks, photographs, and other cultural or historical materials.

They often serve a purpose beyond simply replicating physical museum's exhibitions in a virtual space. More importantly, they aim to provide the public with access to the entirety of a museum's collection, rather than just selected highlights (Kreiseler et al., 2017). Larger platforms that aggregate collections from multiple museums play an even more important role, offering a broader view of a vast cultural heritage through a single point of access and increasing global accessibility.

Basic function

The basic functions provided by a digital collections website have been analysed and are listed as follows.

Search for an item

Search is the most common feature on digital collections websites. Users can search for specific items using keywords from the metadata. Typically, filters or advanced search functions are also provided to refine the search results.

Home page

On the homepage, digital collections websites vary in their interfaces. However, it is common to see a search bar prominently displayed, along with some randomly featured items or galleries recommended by the system.

Browsing through catalogue

Catalogues typically categorise cultural items by various dimensions, such as theme, topic, period, and organisation. Online users can find the items they are looking for by browsing through these categories.

Information page

The Information page opens when users click on a specific item. On this page, users can save images to a personal gallery, zoom in and out, download, like, and share on social media. Detailed information about the item is provided, including its title, description, and metadata (such as creator, type, and date). Additionally, related items are often suggested randomly.

Europeana



Figure 1. Logo of Europeana



Figure 2. Home page of Europeana

Among all digital collections websites, Europeana (2024) stands out and is selected as the exploration context for my project. As the largest cultural heritage portal in Europe, Europeana, created by the European Union, serves as a comprehensive repository of digitised cultural heritage collections from over 3,000 institutions. This platform was selected for several compelling reasons:

Richness

Europeana offers a vast and diverse array of cultural items across Europe, providing ample resources for exploration in this project.

Credibility

As an initiative by the European Union, Europeana is recognized for its credibility and authoritative status.

Representation of Digital Collections

Europeana exemplifies a significant digital collections website, reflecting a professional practice in the field.

Additionally, Europeana's vision aligns closely with the goal (see section 1.4) of this project (Europeana pro, 2024).

They build technology

They embrace technologies that foster innovative audience engagement with collections, which is in line with my project's focus on exploring creative interactions through technology.

They reach audiences

They work to share and promote cultural heritage so that it can be used and enjoyed by people all over the world, which aligns with my project's goal of making digital collections more inclusive and accessible to diverse users.

This shared focus on innovation and inclusivity makes Europeana an ideal context for this project.

As an initial step in this project, Europeana's interfaces were analysed in detail, as outlined in Appendix.

1.4 Design challenges

The current ways of accessing digital collections—such as keyword searches, curated highlights, and organised catalogues—are very useful for researchers and scholars who generally have specific interests and clear information goals when seeking items. However, these tools might limit casual users.

This is because casual users often visit these websites without a clear idea of what they're looking for, with little knowledge of the content. It is challenging for them to formulate search queries and contextualise the search results (Elsweiler et al., 2011). As a result, they might feel confused and uncertain when confronted with a blank search bar, particularly at the start of their exploration. Therefore, how to support individuals who have no specific goal and are unfamiliar with the content to engage with the digital collections becomes one of the possible challenges in this project.

Information-seeking behaviour can be categorised into specific and exploratory types. Specific searching is goal-oriented and focused, while exploratory searching is more open-ended and can lead to unexpected discoveries and serendipity. For casual users, exploratory searching is their primary approach when exploring the digital collections, and they particularly value the chance to stumble upon surprising and enjoyable results. This preference arises because serendipitous discoveries can be an exciting and pleasurable experience, which stimulate curiosity and lead to a positive mood (Kreiseler et al., 2017).

traditional However, most digital collections' interfaces do not encourage a casual, exploratory, and open-ended approach to information seeking (Cobrun, 2016). The common text-based searching could limit the unexpected discovery. Worse, some search algorithms can isolate users from ideas and opinions different from their own, a phenomenon known as filter bubble (Falkowski, 2016). Thus, another design challenge arises: these problems can restrict the exploratory possibilities for casual users, highlighting the need for more innovative and open-ended approaches.

Although Europeana is a highly professional and efficient platform for researchers and scholars, subsequent user research (see Chapter 3 below) has confirmed that the aforementioned issues also exist on the platform. This indicates significant room for improvement in supporting casual users' exploration.

Therefore, the project goal to explore an innovative way can support the casual user's exploratory searching, using Europeana as the context for my investigation. The described design gap can be summarised with following research question:

"How can we design an innovative approach to support casual users in their exploratory exploration of digital collection websites?"

1.5 Innovative experiments using new technology

Several large-scale institutions, like Google, the Museum of Monet and Microsoft, conducted some innovative experiments trying to integrate new technologies - such as chatbots, AI, AR, VR and immersive media - into digital collection websites, digital libraries or online museums. These efforts display a range of opportunities for interactions with digitalized culture and give a fair impression of state-of-the-art. Some of these projects are already operational, while others are still in development.

The analysis of these cutting-edge experiments has provided valuable insights into the feasibility and potential of the technologies, and serves as an important inspiration for the subsequent design phase. Thel have grouped these examples into 6 categories based on their functions and interactions, which are detailed in the following sections.

I chose these experiments as examples for this project because they represent various types of user interactions, such as chatting, personalisation, viewing connections, browsing, gaming, and content creation. All of these have the potential to be adapted to a digital collections website, offering different ways to enhance engagement with casual users.

1 Chatbot interaction

This category includes experiments featuring chatbot AI, where users interact with a virtual assistant that guides them and recommends artworks based on their input. At the beginning of my project, I was particularly interested in using chatbot technology, so I conducted a detailed into chatbot investigation various applications in both online and offline cultural contexts. For a comprehensive overview of this research, please refer to Appendix.



Figure 3. Europeana culturebot (2018)



Figure 4. Send Me SFMOMA (2017)

2 Personalised recommendation

This category encompasses various creative personalised recommendation systems designed to suggest artworks based on different criteria. These systems may use dimensions such as users' data feeds (e.g., weather, time, location), users' Instagram posts, or user-generated stories.



Figure 5. Artwork of the Day (2019)



Figure 6. My Life, My Met (2019)



3 Show connection between items

This category includes experiments that visualise connections between different items, such as those based on shape, semantics, or colour. By highlighting these relationships, users are introduced to additional related items.



Figure 8. Recognition (2016)



Figure 9. X Degrees of Separation (2018)

4 New way of browsing collections

This category includes examples that offer creative and innovative ways for users to browse multiple collections. For instance, some examples present artworks within a 3D interface, while others allow users to browse artworks through colours or emotions.

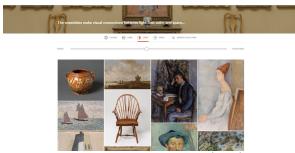


Figure 10. Barnes Foundation website (2024)



Figure 11. Freefall (2017)



Figure 12. ARTETIK (2022)

5 Gamification

The examples within these categories focus on engaging users through various interactive games.



Figure 13. Geo Artwork (2022)

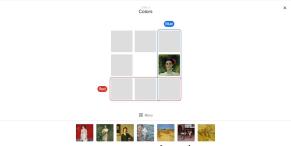


Figure 14. Visual Crosswords (2020)

6 Creative use of user input

The experiments in this category use users' inputs, such as their facial expressions or drawings, to reinterpret the artworks.



Figure 15. Artselfie (2018)

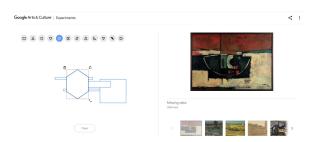


Figure 16. Draw to Art (2020)

1.6 Design approach

This project utilises the Double Diamond Design Approach (Design Council, 2019). The design process consists of four phases: discover, define, develop and deliver.

Discover

In this phase, I began with background research on the target users, contexts, and existing technologies. Following that, I conducted a literature review psychological theories exploratory behaviour, design principles for supporting casual users, theories for facilitating serendipity. This process helped me gain a deeper understanding of users, identify key design considerations, and draw inspiration for the design phase. Subsequently, I carried out user research through interviews, task-based observations, and a collage-making activity, which provided further insights into the target users, uncovered problems, and identified design opportunities.

Define

After analysing all the data and insights from the Discover phase, I was able to clearly define the problems to address and establish a design goal with four key interaction qualities: exploratory, serendipitous, supportive, and playful. The design goal is to invite casual users to explore with an easy starting point and support their divergent exploration on the digital collections website. Insights gathered during this phase informed the next stage of the process. By the end of this phase, a design brief was proposed, outlining the design goal and interaction qualities.

Develop

In this phase, I conducted a brainstorming session that generated numerous design ideas, resulting in a total of 10 idea clusters. From these, I developed four initial concepts and created visual prototypes for each. These prototypes were evaluated and compared by nine participants. Based on their feedback, I gained new insights and selected the concept 'Keywords Exploration Map,' incorporating elements from the other concepts. I then ideated and redesigned this chosen concept into an interactive working prototype. Finally, a second round of user testing with five participants was conducted to assess its usability and determine whether it met the design goal.

Deliver

In the final phase of the project, the final design was defined and an interactive prototype with higher fidelity was created. A final evaluation was then conducted using this prototype to gather feedback from real casual users. Five participants were recruited for the evaluation. The results were analysed and presented using both qualitative and quantitative methods. Qualitative data were collected through interviews and observations. quantitative results, the Interaction Qualities Evaluation Form, the System Usability Scale (SUS) (Bangor et al., 2008), the Design Requirement Evaluation Form, and AttrackDiff (Hassenzahl et al., 2003) were utilised.

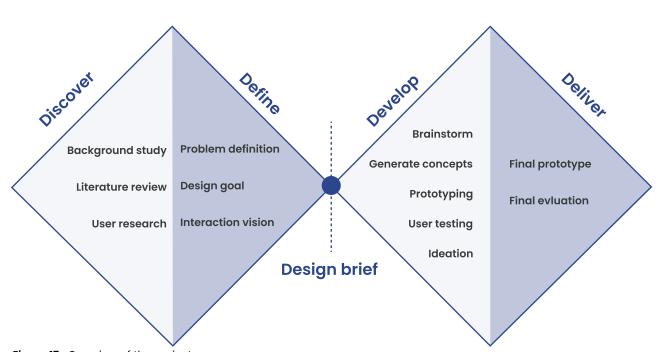


Figure 17. Overview of the project process

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Chapter overview

- 2.1 Psychological Theories Underpinning Exploratory Behaviour
- 2.2 Design Principles, frameworks, and recommendations on how to support causal users' exploration on digital collections site
- 2.3 Theories & framework on how to facilitate serendipity
- 2.4 Conclusion

Chapter 2

Literature review

To support casual users in their exploration of digital collections, it is important to first understand their exploratory behaviour through psychological theories. Secondly, previous studies have examined various frameworks and design recommendations for interfaces tailored to casual users, which warrant further investigation. Thirdly, findings from later user research revealed that casual users seek pleasant surprises and serendipity during their exploration. To address this, a literature review was conducted to explore the definition and process of serendipity, alongside factors that facilitate it.

2.1 Psychological Theories Underpinning **Exploratory Behaviour**

Exploratory behaviour & curiosity

Berlyne (1954) described exploratory behaviour as curiosity mapped across two dimensions, fluctuating between phases of decline and revival. The first dimension ranges from sensory (seeking for novelty to cognitive (seeking for stimuli) knowledge). The second dimension spans from diverse (seeking to explore a variety of sources of novelty) to specific (seeking indepth experience with a particular stimulus).

According to Loewenstein (1994), people engage in exploratory behaviour when they recognize a gap in their knowledge, driven by curiosity to close it. The theory suggests that curiosity is best sparked by gaps that are significant but not overwhelming. People are more likely to seek missing pieces when they understand the broader context. Small gaps may seem trivial, while large ones can feel daunting.

Implication to the project



This suggests that curiosity and exploratory behaviour can be stimulated by novelty and challenge, as well as by presenting a significant but not overwhelming gap in knowledge.

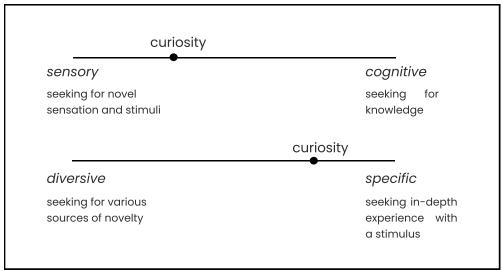


Figure 18. A visual representation of Berlyne's descriptions of the relationships between exploratory behaviour and curiosity

Convergent and divergent information behaviour

As described by Björneborn (2011), when people look for information, they are always employing a mix of two distinct types of information behaviour: convergent and divergent.

Convergent behaviour is goal-directed, focused, planned and involves narrowing down vision. It is driven by conscious information needs and is often aimed at solving problems, completing work tasks, conducting studies, or pursuing hobbies. Divergent behaviour is exploratory, openended, unplanned, and associated with broadening vision. It is motivated by subconscious information needs and is frequently oriented towards browsing for inspiration, curiosity, creativity, relaxation.

The description of the divergent behaviour reflects the fourth characteristic of casual users discussed in the previous chapter (see the section on Characteristics of Casual Users), who are noted for consistently engaging in exploratory behaviour. This suggests that casual users might prefer divergent exploration over convergent exploration. Therefore, there is a need to conduct a user research to validate this assumption and better understand casual users' real-life exploration behaviours

A possible example for casual users could be: the user visits a digital collections site to kill time. Since he does not have a specific information goal, he starts with divergent browsing, exploring the different content available. He comes across the works of Claude Monet and becomes fascinated by the artist. This curiosity leads to a convergent search for more works by Monet. Björneborn (2011) notes that convergent behaviour is well supported by tools such as the search bar, navigation menus, classifications, indexing, tags, filters and cataloguing. Therefore, this user could use these well-designed tools to perform efficient convergent Subsequently, a growing interest in Impressionism leads him back to divergent browsing, exploring works by other Impressionist artists.

Implication to the project -O-



A key implication is that people's information-seeking behaviour blends convergent and divergent exploration. Therefore, a digital collections website should support both types of behaviour.

User research is needed to investigate how casual users' divergent and convergent behaviours interact when using digital collections websites in real life. Do they typically start with divergent behaviour, engage more in divergent behaviour compared to convergent behaviour?

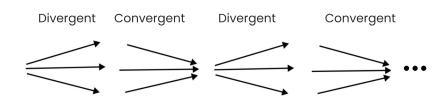


Figure 19. A visual representation of how divergent and convergent behabiour might interact with each other

Berry-pick

Bates (1989) introduced a new model of information exploration in the online information system, called 'Berry-pick', which is close to the real behaviour of information seekers. This model suggests that in real life, users often start with a broader topic or a single reference and then explore different sources. As they gather information, their understanding and queries evolve. They continually refine their queries and generate new directions based on what they encounter. Users are not satisfied with a single final set of results, but with the gradual selection and integration of individual pieces of information.

Implication to the project -O-



This implies that the design should facilitate a continuous process of informationseeking rather than focusing solely on delivering a single result.

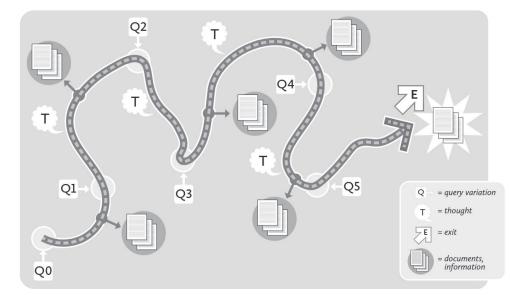


Figure 20. Search bar dominates the first screen

Casual-leisure information behaviour

Elsweiler et al. (2011) revised models of information behaviour by introducing casual-leisure behaviour, which differs from the task-based information behaviour. Their study describes it as an information behaviour that is typically motivated by hedonistic needs rather than informational needs, where people engage in searching for pleasure rather than to find information. Four observable differences between these two types of information behaviour are highlighted as follows:

- 1. Motivation: Casual-Leisure information behaviour is motivated by the desire to achieve a certain mood or emotional state.
- 2. Experience Over Results: In the situations of casual-leisure activities, the experience of finding information is often more important than the actual information
- 3. Undefined Needs: Casual-Leisure needs are usually vague or not well-defined. People may generate some temporary needs, but these needs may be created to fulfil the casual and hedonistic pursuit.
- 4. Success Criteria: The success of casualleisure activities often does not depend on finding specific information, as users can feel satisfied or meet their hedonistic needs even without it. But Mayr et al. (2019) also pointed out that people would appreciate it more if their observations could make sense.

Implication to the project -O-



The project should focus on designing the experience of looking for information over merely assisting users in finding specific results. To address casual users' hedonistic needs, the experience should be perceived as engaging, entertaining, or playful.

2.2 Design Principles, frameworks, and recommendations on how to support causal users' exploration on digital collections site

The design focus when designing for casual users

Walsh and Hall (2015) emphasised that because casual users often begin with vague or unclear intentions, the designed interfaces should be able to support their initial interactions with collections. When designing for casual users, the focus should shift from helping users find specific information to aiding them in understanding where to begin exploring and what is available.

Walsh and Hall (2015) also proposed vague suggestions that could work for casual users in their study, such as generating textual summaries of the content to give users an overview of the collection, creating an exploratory semantic map based on the topic structure, and showing highlighted content. They also emphasised that when designing for casual users, it is important to conduct a practical user study to observe how they develop their interests while exploring a digital collections website.

Implication to the project



This research indicates that the design should consider helping casual users to start their exploration and gain a general understanding of the available content at the initial stage.

Additionally, user research is needed to understand how casual users initiate their exploration and what their typical journey looks like as they develop interest on the website. This helps to define my goals for the subsequent user research and suggests that an observation approach on users' actual journeys is needed.

Design Considerations for Digital Collections Interfaces for Casual **Users**

Mayr et al. (2016) studied the visualisation of digital cultural collections to improve the casual user experience. They proposed several design considerations that could also offer valuable insights for designing the interfaces of digital collections websites for casual users. These insights are listed below.

Support Exploratory Search

The interface should adequately support an open, and exploratory search. It should facilitate gaining an overview and browsing through various topics (horizontal exploration), as well as engaging with details in a flow-like manner (vertical immersion).

Keep Cognitive Load Low

The interfaces should minimise cognitive load, allowing casual users to easily understand, orient themselves with minimal effort, and discover interesting information in a relaxed manner.

Enable Intuitive Modes of Interaction

Interaction with digital collection interfaces should be simple and intuitive, utilising natural metaphors and building on users' existing knowledge.

Balance between guidance and free exploration

Another important design question raised by Mayr et al. (2016) that needs to be considered when designing is: What is the right amount of guidance for casual users? The researchers noted that excessive guidance restricts casual users' desire for free exploration, while insufficient guidance leaves them unable to navigate the collection effectively.

Implication to the project



The implication from this study is that the design should offer an intuitive, simple, and relaxing experience with minimal cognitive load. Moreover, the design should support an open and exploratory search covering both horizontal exploration and vertical immersion. Additionally, it is important to provide a certain degree of guidance to help users orient themselves while still allowing for free exploration.

Four functional principles that enhance exploration in digital collections

Kreiseler et al. (2017) proposed four principles-view, functional move, contextualise, and participate—that enhance exploration on digital collections websites. These principles allow users to discover collections from their individual perspectives, uncover hidden connections, collect items of interest, and experience a sense of pleasure, aligning with the motivations and needs of casual users.

View

The first principle is to use generous interfaces that employ information visualisation to showcase the collection's richness and diversity. The study also reveals that while thumbnail lists are a traditional design structure allowing users to view a variety of images, there is a need for more innovative ways to showcase a collection's richness.

Move

The movement of information exploration should be designed as an experience akin to that of an information flâneur, who navigates to get a sense of the information spaces with joy and curiosity, guided by coincidences and impressions—a concept introduced by Dörk et al. (2011).

This principle proposed the following suggestions:

- 1. users should be given a sense of orientation, allowing them to understand their location
- 2. users should be given a sense of orientation, allowing them to understand their location

- 3. the interfaces should avoid creating dead ends and isolated pages
- 4. users' trajectories should not be overly planned or curated, allowing them to explore their own paths.
- 5. Incorporating elements of chance, such as a "random object" button or exceptional ways to get to the next item

Contextualize

The third principle enhances exploration by helping visitors understand individual objects within their broader historical and spatial context. This can be achieved through two methods:

- 1. Present objects with additional information, such as textual annotations, multimedia content, or guided tours.
- 2. Linking objects to each other, as this helps users understand the overall significance and structure of the collection, offering a more comprehensive view.

Participate

The final principle addresses the need to break the illusion of being alone on the website by fostering a 'social media' community. This principle draws inspiration from offline museum exhibitions, where the presence of other visitors helps create a sense of community among those with shared interests. Digital collection designs could benefit from incorporating similar social signals. This principle encourages users to socially engage with the digital collection by liking, sharing interesting findings, creating personal collections, and browsing creations by others. Users can find relevant information and also experience serendipity based on the traces left by others, a concept known as social navigation, introduced by Dieberger et al. (2000). One successful example of this approach is Rijksstudio.

Implication to the project -O-



In summary, this theory suggests four methodologies to enhance the user's exploration experience: offering a **generous** viewing experience, providing flexible and open-ended pathways that incorporate elements of chance to move, placing objects within a broader and deeper context or establishing the connections between objects, and facilitating social participation among users. These insights can serve as valuable inspiration for the later design phase.

2.3 Theories & framework on how to facilitate serendipity

In the later phase of the project, user research revealed that casual users value pleasant surprises and serendipity. To address this, a study on serendipity was conducted, and the findings are documented here to give readers a theoretical background on how what is serendipity and how to facilitate it.

Definition

In 1754, Horace Walpole introduced the term "serendipity" to describe the unforeseen discoveries made by The Three Princes of Serendip, characters from an ancient fairy tale. Nowadays, the term is typically defined, in line with variations from the Oxford English Dictionary, as "the ability to make fortunate and unexpected discoveries by accident." Defined by Fine & Deegan (1996), serendipity is "the interactive outcome of unique and contingent 'mixes' of insight coupled with chance".

Process

According to McCay-Peet and Toms (2015), there are four crucial elements in the process of serendipitous experience: Trigger, Connection, Valuable outcome and Unexpected thread. The process of a serendipitous experience is visualised in Figure 21.

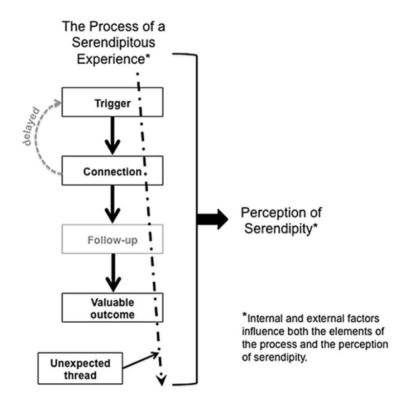


Figure 21. The process of a serendipitous experience

Trigger

The serendipitous experience always starts with noticing a trigger that can be a verbal, textual, or visual cue. There are two external factors related to the environment that can facilitate the trigger, and then enhance possibilities of serendipity: riching the triggers and highlighting the triggers.

Connection

The individual may then recognize a relationship between the trigger and their own knowledge and experience, which is to make connections. Three internal factors related to personal traits and abilities—openness, a prepared mind, and the ability to make connections—along with one external factor related to the environment—enabling connections—can facilitate this process. The factor of enabling connections is related to a trigger—rich environment, but it goes a step further; it also actively encourages individuals to think about and engage with those triggers.

Valuable outcome

For an experience to be perceived as serendipitous, it must have a positive aspect. Potential valuable outcomes of a serendipitous experience while exploring digital collection websites casually include getting relaxed, getting inspired, aesthetic enjoyment, pleasant surprises, enhanced new knowledge, better self-understanding, a sense of achievement and satisfaction, getting rewarding challenges, and etc.

Unexpected thread

This refers to an individual's perception of the unexpected, chance, accidental, or surprising element that is evident during the serendipitous experience.

Key insights -

The key insights for fostering a serendipitous experience involve three important elements: first, triggers should be enriched and highlighted to ensure they capture users' attention. Second, these triggers should facilitate connections with users. Third, the experience should yield positive outcomes, such as pleasure or a deeper understanding of themselves.

Ten design dimension that support divergent exploration & serendipitous

Björneborn (2011) identified 10 design dimensions that can enable and trigger divergent information behaviour and facilitate serendipity, across both physical and digital information space. These dimensions are listed below.

Accessibility	Unrestricted and direct access to all information resources is vital.
Diversity	Offering a rich and dense variety of topics, genres, media, activities and modalities can trigger the diversity of individuals' interest spaces that can lead to further exploration.
Display	A curiosity-teasing display and the show-off exposure of information resources could trigger users to explore.
Contrasts	Use contrasting elements to engage users' senses and create varied impressions. Adding humorous details can also enhance these contrasts.
Pointers	Signage, maps, markers, and cross-references are essential for guiding users' attention to unplanned discoveries.
Imperfection	Allowing imperfect 'cracks' and 'loopholes' in the controlled interface may open up for unplanned findings.
Cross-contacts	Opportunities for serendipity may arise when dissimilar different themes, genres, activity, modalities intersect.
Multi-reachability	Provide multiple access points and pathways for users to navigate from one place to another. More access routes increase the chances of encountering diverse resources, thereby expanding users' opportunities for discovery.
Explorability	It refers to interfaces that invite users to move, look around, explore and browse.
Stopability	It refers to interfaces that encourage users to pause, examine closely, and assess resources, complementing Explorability.

Table 1. Ten design dimension that support divergent exploration and serendipity

Building on these theories, I have also developed some potential ideas and practical considerations for the Europeana website for each dimension, which could serve as inspiration for the upcoming design phase.

Accessibility

If information is hidden in endless web lists, buried under multiple clicks, or requires highly precise keywords, opportunities for serendipitous discoveries would be limited. Europeana faces some similar problems.

Diversity

Europeana's extensive collection of over 58 million items across 13 themes and around 2,000 topics, including various media such as images, texts, videos, 3D models, and music, demonstrates significant potential to enhance exploration behaviour and serendipity.

Display

This could be one of potential design directions, since the later user research revealed that the current display of items and their information in Europeana is somewhat boring, reserved and repetitive.

Contrasts

Possible ideas include using vibrant colours, quirky icons, distinctive visual styles for different themes, providing a popular section vs a mystery section, or a highlighted recommended items section.

Pointers

Offline museums excel at this, using well-designed signage and clear physical maps to guide visitors. This approach can also be adapted and further explored in the design of online platforms. Some possible examples could be a pop-up hint or a guiding journey map that invites users to explore unexpected pathways.

Imperfection

Sometimes the search algorithms yield slightly off-target results, users would have chances to find something unexpected.

Cross-contacts

An example might be the simple display of jazz manuscripts alongside jazz music recordings. In this way, serendipity is encouraged when disparity is combined with proximity. The feature page on Europeana platform that displays different items related to the same topic together could support this. However, user research shows that current implementations are often limited, not visible, dull and cognitively demanding.

Multi-reachability

Some examples might include an interactive map with multiple access points that offer various routes or categorise artefacts in multiple dimensions (colour, emotion, time, location, etc.).

Explorability

For example, enabling users to rapidly and flexibly switch between different themes or topics, offering a visual overview of all content, displaying multiple artefacts simultaneously or incorporating surprising search results that divert users from their initial path can encourage exploration.

Stopability

Features like zooming in on items, showing additional details on hover, enabling bookmarks and tags, and providing related recommendations all help users to stop and look deeper.

2.4 Conclusion

Design considerations

Based on the findings from the literature review, I have identified several design considerations that I need to take into account in the later design phase. These considerations are listed below.

- 1. Though casual users mainly engage in an open-ended, exploratory searching, their information-seeking behaviour is still a blend of both convergent and divergent exploration. The design should take both types of behaviour into consideration, with an emphasis on supporting divergent exploration.
- 2. The design should focus on experience of looking for information over merely assisting users in finding specific results.
- 3. The design should consider helping casual users to start their exploration and gain a general understanding of the available content at the initial stage.
- 4. The designed experience should be perceived as engaging, entertaining, or playful.

Design requirements

I established four design requirements to ensure the design is suitable for casual users. These requirements will be used to evaluate the design in the final assessment.

1. Balance between guidance and free exploration

The design should provide a certain degree of guidance while still allowing for free exploration.

2. Continuous and fluid

The design should facilitate a fluid and continuous information-seeking experience rather than remaining static in the same place.

3. Open and exploratory

The design should support an open search, facilitating exploration that is open to diverse results, rather than focusing on a single information.

4. Simple and easy

The interactions should be simple with low cognitive workload.

Inspirations for design

- 1. Curiosity and exploratory behaviour can be stimulated by **novelty and challenge**, as well as by presenting a significant but not overwhelming gap in knowledge.
- 2. The four functional principles proposed by Kreiseler et al. (2017) offer valuable design inspiration:
- Offering a **generous** viewing experience
- Incorporating elements of chance and randomness to navigate between information
- Providing wider and deeper contexts on individual items
- Highlighting connections between objects
- Facilitating **social** participation
- 3. The 10 design dimensions that can facilitate serendipity were analysed in the context of the digital collections website. Among these, display, contrasts, pointers, cross-contact, multi-reachability, explorability, and stopability can serve as potential inspiration for the later design phase.

Implication on user research

The literature review clearly indicates the need for a user research to understand how casual users behave in real-life scenarios: how they initiate their exploration, what their typical journey looks like as they develop interest in the website, and how their convergent and divergent behaviours interplay during exploration.

Observation is recommended as a valuable approach to answer these research questions.

Chapter overview

- 3.1 Research goal
- 3.2 Participants
- 3.3 Procedure
- 3.4 Approach
- 3.5 Results
- 3.6 Conclusion
- 3.7 Research sysnthesis

Chapter 3

User research

To gain a deeper understanding of the user group, their current exploration experience on a digital collections website, and their expectations, a user research was conducted in this section. Europeana was used as a representative example of a digital collections website for this general research.

3.1 Research goal

Main question

How to support the casual user's exploration experience on the digital collection website?

Sub questions

- 1. What are their exploratory behaviours when interacting with digital collections websites?
- 2. How do they develop and find the things of interest on the digital collection website?
- 3. What would inspire them to explore on a digital collection website?
- 4. What is their ideal experience when interacting with the digital collections?

3.2 Participants

Two pilot tests were conducted to ensure that all exercises included in the user research session were time-controlled, practical and easy to understand. Six participants were recruited for the formal research session, aged between 20-35 years old, who are all interested in cultural topics and like to get engaged in cultural activities. All of them can be classified as casual users of the digital collections website after a brief analysis of their profile.

Recruitment method

Participants were recruited via convenience sampling and social media such as the Europeana Group in Facebook and the Culture community in Reddit.





Figure 22. Recruitment methods

Participants profile

Participants come from diverse cultural backgrounds, including Netherlands, China, Surinam and Philippines. All show a certain degree of interest in Europe's heritage, yet their familiarity levels vary.

Two participants used digital collections websites very often (3-5 times per week), 3 participants used them a few times (1-3 times per month), and 1 participant had never used these types of websites before.

When it comes to Europeana, half of them use Europeana before, but only 1 participant uses it more than once.

Their most common reasons for using digital collections sites are education or academic purposes, followed by enriching cultural knowledge, leisure, curiosity for learning new things, and research.

With the exception of one participant who was new to digital collections sites, the others stated that they had previous experience of using the sites casually, without any specific purpose, for leisure, curiosity and cultural enrichment. The one new user also stated that he/she would use it for fun in the future. Therefore, all participants can be classified as (potential) casual users of the digital collections website.

3.3 Procedure

The entire user research procedure is illustrated in Figure 23. All participants followed the same procedure.

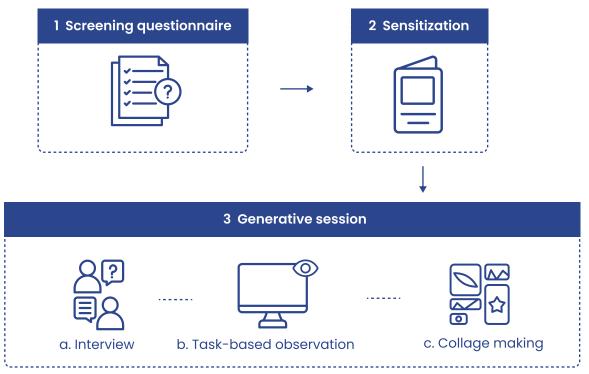


Figure 23. The entire research procedure

 $39 \hspace{1.5cm} 4$

Screening questionnaire

The research starts with a screening questionnaire with 6 questions in total, to help select the participants and know more about the participant profile, including their cultural background, level of interest and familiarity in Europe's heritages, whether they have used the digital collections websites and Europeana before, and the typical reasons for them to use the digital collections websites.

Sensitization

A sensitising exercise was conducted on Figma or was sent to the participant as the pdf version. They were given 3 days to complete. The goal of this exercise is to get the participants acquainted with the topic, encourage them to reflect about their past experiences with digital cultural collections, and to know about their preference and interest related to cultural contents. Only one participant who is a new user of the digital collections website did not complete the booklet, but the key questions from the booklets were included in her later interview session.

In total, the booklet consists of 4 parts:

Part 1-Introduce myself

Part 2-What types of collections do you most like to explore? Why?

Part 3-What contents are you looking for on a digital collections website?

Part 4-What makes a good digital collection website based on your past experience?

After participants completed the sensitizing exercise, they were asked to participate in the generative session.

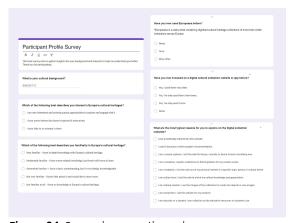


Figure 24. Screening questionnaires



Figure 25. Sensitizing booklets

Generative session

The 1-hour generative sessions were conducted with the six participants (3 offline and 3 online) individually. The session includes three parts:

- 1. Interview about past experiences (20 min)
- 2. Task-based observation (25 min)
- 3. Collage making activity (15 min)

1 Interview about past experiences

The goal of this interview is to know about participants' past experiences of using the digital collections websites and interacting with collections, and also their habits and preferences before, during and after exploring. For the participant who has never used the website before, questions were focused more on the past experience of interacting with collections both digitally and physically.

2 Task-based observation

The aim of the task-based observation is to know about participants' behaviour patterns and feelings when exploring a digital collections website as a casual user. Also, it helps to learn more about the current experience of using Europeana. The task for participants was to explore the Europeana website freely as casual users. More details about this session can be found in the table on the following page.

3 Collage making activity

The aim of the collage-making activity is to ask participants to express their ideal experience of interacting with the digital collections and know about what they expect from a digital collection website. Tools including random images and texts were provided to inspire them to express their thoughts and ideas.



Figure 26. Materials used in the first interview



Figure 27. Task-based observation (offline)



Figure 28. Task-based observation (online)

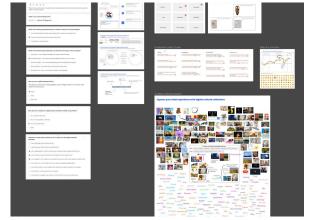


Figure 29. All the materials used in user research

The detailed procedure of the **task-based observation** study is described in the following table.

Brief introduction about Europeana website	Since the research does not focus on the learnability and the usability of the Europeana website, a short introduction about the basic functions, the contents, and the navigation of the website was provided.
Task of exploring the Europeana website freely as a casual user	Participants were asked to conduct a task, which is to explore the website freely as a casual user, and finish until they think they lose interest in the website. A scenario is provided to help them better immerse themselves in the task. The scenario is one day when the participants have nothing to do for today and desire to kill time, have fun and try to find something new and interesting on the Europeana website. During the task, the screen was recorded for later analysis and the participants were asked to think out loud. At the same time, the researcher would observe the steps the participant takes during the exploration process.
Draw the emotional journey map	Participants were asked to draw a journey map to express how their emotions evolved during the process.
Follow up interview	A follow up interview was conducted about their feelings of this exploring experience.

Table 2. Detailed procedure of task-based observation study

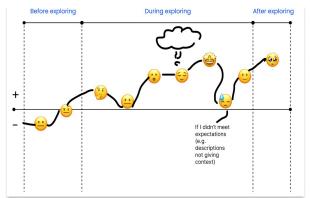


Figure 30. Emotional journey map



Figure 31. One of the collages from participants



Figure 32. One of the collages from participants



Figure 33. One of the collages from participants

3.4 Approach

Overall, my user research employed the following approach.



Interview

Before and after exploring Europeana website, participants were asked about their experiences with digital collections sites.



Think out loud

Participants were asked to share every thought on their actions when exploring the Europeana website freely.



Observation

During the task of exploring the Europeana website, the researcher noted down the steps the user takes, the collections they click on, the functions they use.



Collage-making

Participants were asked to use provided images and texts to create a collage for their ideal experience with digital collections.

3.5 Results

What are the casual users' exploratory behaviours?

How do casual users start?

Most participants started with a divergent exploration. They began by browsing diverse items or themes to see what was available, as they were unsure of what to look for initially. Even experienced users would do this, as they want to see if there are any updates. Only one participant (P3), confident in their interests, used the search bar immediately to look for a specific painting they knew in advance. However, P3 also began to conduct divergent exploration afterward. This exemplifies that it is also possible for casual users to start with the convergent exploration.

Most (Pl, P4, P5) typically started with the theme categories tool, which they found to be the most useful feature. They felt that it provided a clear overview of all the content. For P2 and P6, they began by randomly exploring the homepage, drawn to the latest stories and items featured there.



Figure 34. Theme categories tool

Overall, familiarity guided most participants in starting their exploration. Their initial clicks were often on specific items, topics, or story blogs that resonated with their past experiences, backgrounds, or tastes.

"I don't know what to search. so let's see whats there" -P6

What are casual users' exploring habits?

- Pay (no) attention to information

All participants paid close attention to the titles and summarised descriptions of items, themes, or galleries page, as they believed these provided a clear preview of what was available on the page.

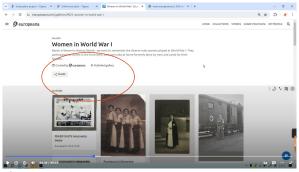


Figure 35. The title and summary on each page

However, their attitudes toward more detailed information varied. Most participants (P1, P2, P3, P6) focused primarily on visuals, often skimming or even ignoring large blocks of text. They felt that too much explanation of the artwork could be distracting, influence their personal experience, or simply make them feel bored. In contrast, other participants (Pilot1, P4, P5) felt that detailed information offered valuable context, helping them gain a deeper understanding of the items.

"I don't usually read any one of them, only if i see some interesting images" -P6

"I really need more contexts.. more than a description of the image" -P4

- Make associations & comparison

As participants explored the website, the various items they encountered acted as triggers, evoking their past experiences. They constantly made associations with their own knowledge, recalled personal memories or compared the items to those from the culture or country with which they were familiar. For example, a sword with a snake figure reminded P5 of a similar weapon from her own country, prompting her to look for the picture to make a direct comparison.

"I remember there was a weapon in the Philippines... also has a snaky kinds of thing on the weapon" -P5

- Make comments, raise questions

Participants frequently commented on various items and raised questions about them. However, this behaviour might have been influenced by the think-aloud task they were given; their exploration might have been different if they were navigating the website on their own.

- Google at any time

Some participants (P5, P6) used Google to search for additional information whenever they encountered something that piqued their curiosity or seemed unfamiliar. P5 noted that this behaviour highlights a key difference between exploring offline and online; the online environment offers a more intuitive and seamless way allowing users to continuously click and search for new things.



Figure 36. One participants searched with Google

- Make guessing and test themselves

Participants often formed expectations about items before clicking on them for more information. They enjoyed verifying whether their assumptions were accurate.

"I think it's Monet's water lily, right? ...ah yes." -PI

- Enjoy the interactive feature

Participants were consistently attracted to interactive features, believing they offered a more engaging experience, even though such features are quite limited on Europeana. They anticipated diverse interactions on the website, such as listening, dragging, sliding, comparing, and zooming in and out, rather than just clicking and viewing. Additionally, participants also appreciated the interactive guides or reminders from the website, as these features fostered a sense of dialogue with the platform, making them feel invited.



Figure 37. The interactive feature

- Attracted by the curated collections

Participants showed a preference for curated collections, particularly those connected through a cohesive timeline or vivid stories. They were also highly engaged with exploring the multiple artefacts brought together under a specific theme, which provides a cohesive experience. This suggests that thematic and narrative-based curation strategies are key to enhancing user and satisfaction.

"I like galleries because there have some connection here... more interesting to me" -P3

- Use filters to explore different themes related to one topic

Given that Europeana's collections encompass a wide range of items across various mediums—one of the platform's key features—participants leveraged this diversity to explore different items within the same topic. For instance, P2 investigated the topic of women's histories by applying different filters such as 'Art,' 'Music,' and 'Photography." However, this exploration method is somewhat hidden and typically requires users to have a good understanding of the website's structure to uncover it.

"I search 'woman history', and looked at how the website divided it into different sub-themes." -P2

- Self-reflect on knowledge gap

Occasionally, participants self-reflected on their knowledge gaps, especially when they encountered something unfamiliar that still resonated with their existing knowledge or personal experiences.

> "I thought I know them very well.. but it turns out that I learn something new here" -P2

- Get confused by the related items

Similar to other sites, Europeana also recommends related items at the bottom of the information page for each item, in order to support continuous information-seeking. Most participants would check this section to see what else they could explore next. However, they were often confused about why the recommended items were connected, which discouraged them from continuing their exploration. Their exploration often ends at the isolated information page.

- Explore artefacts through various pathways and categories

Participants had the tendency to explore the artefacts through multiple pathways and see them categorised by different ways. For instance, they would like to view artefacts based on different art movements, but also want to view the artworks based on different artists.

- Check social media

One participant (P6) was particularly inclined to explore the social media links provided on the Europeana website, following different people to gain diverse perspectives in the cultural sector. This participant also habitually checked Europeana's Instagram after using the website, believing that social media offered more up-to-date and popular content compared to the website.



Figure 38. One participant checked the social media

Another participant (P5), while not inclined to check social media, expressed a desire for a scholarly community where cultural enthusiasts could share knowledge and collaborate. Additionally, some participants (P2, P4) described their ideal experience of exploring digital collections as a relaxing activity, not confined to sitting at a computer. This feedback suggests potential future design opportunities for social media or app-based experiences, though these are beyond the scope of this project, which focuses on the Europeana web experience for casual users.

How do they develop the things of interest on the digital collection website?

Different people have varied strategies and preferences when exploring digital collections websites, leading to complex behaviour patterns. In reality, their behaviour is often a blend of the following patterns:

Cruising collections: For casual users, divergent exploration—exploring with a broad perspective and browsing through diverse items—was the most common behaviour pattern observed in the research. Browsing is their primary action. They quickly jump from one topic to another without focusing on anything specific.

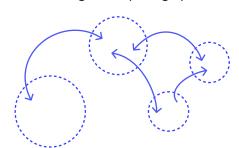


Figure 39. Visual representation of cruising collections

Digging into collections: But they also engage in the behaviour of digging deeper into specific themes. They might start with a broad topic, search within it, and then narrow down their focus to find areas of particular interest. If something captures their attention, they may even search for more information on Google or visit the original institution's site for further details.

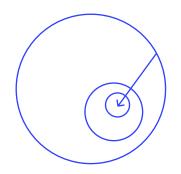


Figure 39. Visual representation of digging into collections

Some users randomly browse the site with an open mind, clicking on the visible items that catch their eye without intentionally seeking out specific interests. Conversely, some users actively utilise different navigation tools provided by the site to find content that interests them. They make deliberate efforts to uncover topics of interest.

When users encounter something that triggers associations—reminding them of other things they're curious about—or when they stumble upon something interesting and want to learn more about related topics, they might switch to convergent exploration, using the search bar to locate specific information. During this process, they might return to divergent exploration or continue searching for related items. Both are possible. Thus, their divergent and convergent behaviours often interact and trigger one another.

What would inspire casual users to explore on a digital collection website?

Familiarity (related to past experience, cultural background, own work, personal interest)

Participants often used familiarity as their primary criterion for navigating the website, gravitating toward areas of the collection they were already somewhat familiar with. Some directly searched for familiar items using the search bar. For instance, P4 and P5 searched for specific paintings, artists, or historical figures that were their favourites or well-known to them, while P3 used keywords closely related to his/her daily life, such as 'glasses' or 'cat.'

When it comes to browsing, participants were frequently drawn to items that resonated with their past experiences, cultural background, or personal interests. For example, P2 selected a photograph of an instrument that resembled one from his/her cultural background; P5 was intrigued by a costume drawing that reminded him/her of a character from a recently played game; P5 picked an image of a weapon because he/she think this could be used as an inspiration for his/her novels.

Familiarity also guided them to structure their exploration around particular topics. Pl chose to explore around "Sports and Climbing" due to her interest in sports and exercise, while P2 focused on items related to women's history because of his/her feminist beliefs. P5 wanted to find out more about 'fashion and costume' because he/she had done a lot of research on traditional costumes, but from many Eastern countries. P6 decided to go with the theme of 'Photograph' because he/she is a big fan of taking photos.

"I would try the fashion theme... like I said there are times where I ended up exploring about Wales, about their traditional costume." -P5

Moreover, curiosity was particularly sparked when participants encountered something that seemed familiar but had an element of the unknown. For instance, when P2 noticed a blog about various wines that he/she could easily recognize, but then discovered it was about the origins of the wines' names—something he/she didn't know. This piqued his/her interest, leading him/her to explore the blog further.

"I recognize these wines and am familiar with them, but I don't know the origins of their names or the different spellings used in other countries." -P2

- Credibility

Participants tended to explore contents curated from professional and authoritative perspectives, which they perceived as more credible. Overall, all participants expressed trust in the Europeana website, as it is founded by the European Union and presents cultural collections in a professional manner.

"i know this person, this author is the editorial head of the europeana team, so i trust the quality of this writing" -P6

- Novelty & unknown

Novelty could attract participants' attention, though this varied greatly depending on individual preferences and the specific content of the artefacts. For example, Pl chose to explore disability heritage because it was entirely new and unlike anything he/she had encountered before. In contrast, P4 avoided selecting completely unfamiliar items throughout their exploration.

Additionally, many artefact thumbnails feature unclear, complex or non-English preview information on Europeana. This lack of clarity discourages participants from clicking on completely novel items, because they often find them confusing and uninteresting.

Moreover, strange or unusual content also piqued users' interest, especially when it appeared on Europeana, which participants typically perceived as a highly professional, research-oriented, and serious platform.

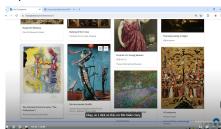


Figure 40. The item participants find crazy

"so I click on this cuz this looks crazy.
"-P3

- Visuals

For casual users, visuals play a more significant role in inspiring exploration compared to text. Participants' attention was typically captured first by images. Additionally, if the visuals were exaggerated or dramatic, they would further arouse participants' curiosity.

- Brief but interesting titles

A brief, intriguing title for artefacts or collections—such as a curious question, a thought-provoking statement, or a quote-like phrase—can effectively capture users' interest and encourage further exploration. When paired with an engaging thumbnail that offers a clear yet interesting preview, participants can form a general expectation of what lies beyond the click, while still feeling curious to learn more.

Paris is a woman
Women in history who shaped Paris

Figure 41. The title participants find curious

"This title is very interesting... very reflective" -P3

- Defect and error

Sometimes, defects or errors can also capture participants' attention. For instance, P6 was intrigued by an error message with an unpublished gallery on the Europeana website.



Figure 42. The error item participants find curious

"whatever there is error message, i tend to follow them" -P6

- Pointers, guidance and reminder

The pointers, guidance, or reminders on the interface can serve as triggers to highlight content and guide users toward potentially interesting items. For example, P1 noticed the prompt of 'search within the Sports theme,' which he/she saw as a strong encouragement to click and explore further.

- Relevant to current times

Participants were drawn to exploring collections or topics relevant to current times. They were more likely to engage with items related to contemporary news, ongoing controversies, or recent holidays and events. For example, P3 chose to explore the theme of 'Migration' because it is a widely discussed topic nowadays, and he/she believed that cultural perspectives could offer valuable insights.

"I really like the theme migration cuz I know, this is like something that is discussed currently, like very relevant. I know that art can be used to tell stories of different perspective." -PI

- Unique and unusual features

Participants were intrigued by the distinctive features on Europeana that are uncommon on other platforms. For example, P2 explored the music theme to see if it could play music and valued the 3D rotating feature for examining objects in the Archaeology theme.

"I haven't used this before and have never rotated a skeleton haha" -P2

Heterogeneity

The diversity and heterogeneity of collections can inspire participants to explore. For example, they were attracted to subtle differences among grouped items and showed increased interest in those variations. For instance, P2 focused more on a trumpet in a gallery of Beethoven's works, where the other items were paintings, because the trumpet stood out as a different type of object. However, the complete lack of the connection would discourage people from exploring, especially when they try to engage in convergent exploration. If the diversity and heterogeneity are excessive and the number of items overwhelming, resulting in a lack of clear connections among the objects, users may feel confused, overloaded, and unsure where to click. For example, when participants accidentally searched with a keyword that yielded limited usefulness on Europeana, the results often included numerous unrelated items spread across many pages, sometimes up to 42. In such cases, participants felt uncertain about how to proceed and were unsure which to click on.

> "I want to have a look at this, why this trumpet is display with other paintings?" -P2

> "When I search something, but it gives me something unexpected... that's really bad." -P4

- More interactive form of exploration

During the user research, participants were also asked about their past experiences with other digital collections websites. Some interfaces and interactions that they particularly exploratory found and encouraging were highlighted. examples included: an art and culture version of a TikTok-like interface, where users could continuously scroll for inspiration, and a feature combining Google Street View, which allowed users to explore a museum's indoor space online before visiting in person. These elements made users feel invited to explore further. Two insights can be taken away from these examples: first, an open and dynamic space with limitless options can make users feel invited to explore; second, exposing content before actual exploration can act as a trigger to spark curiosity.

What is their ideal experience when interacting with digital collections as a casual user?

This research question was addressed through the collage-making activity. I clustered the quotes from participants' explanations of why they chose specific images and text when creating the collages. From this analysis, I identified 14 elements that could define their vision of an ideal experience on a digital collections website. Four of them were highlighted, as they were the most frequently mentioned by participants. Details of the remaining 10 elements can be found in Appendix.



1) Get connection with others

Participants don't want to feel isolated when exploring the website. They expect a social media forum or a community dedicated to art and culture, where they can communicate, inspire each other, share different perspectives, and exchange experiences and knowledge.



3) Have an on-going and in-depth discovery adventure

Participants hope their exploration experience feels like an adventure of discovery, where uncovering an unfamiliar term leads to the discovery of other unknown items, much like delving deeper into rabbit holes for a closer, more detailed look.



2) Desire for surprise and new things

Participants express a desire for surprise during their exploration as a casual user. They want the experience to keep them curious, offering opportunities to learn new and unexpected things. Rather than personalised content, they prefer to be introduced to unfamiliar topics and have moments of unexpected interest.



4) Fun and playful experience

Participants desire a playful exploration experience, valuing fun and engaging elements such as games, audio, interactive visuals, or quirky details that make their journey more enjoyable.

As shown in Figure 43, elements 1, 2, 3 & 4 were the most frequently mentioned by participants, with four individuals highlighting them.

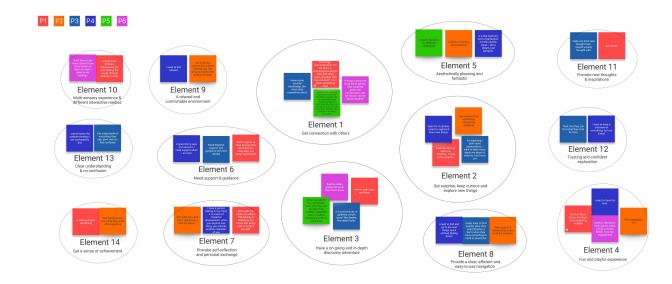


Figure 43. Clusters of participants' explanations of their collages

Since each participant had their own interpretation of the selected images and texts, the explanations, while sometimes similar, were distinct. Therefore, a quantitative analysis of the frequency of images and texts used does not make sense. However, Figure 44 shows which images and texts were used most frequently, offering a visual impression of users' ideal experience with digital collections.

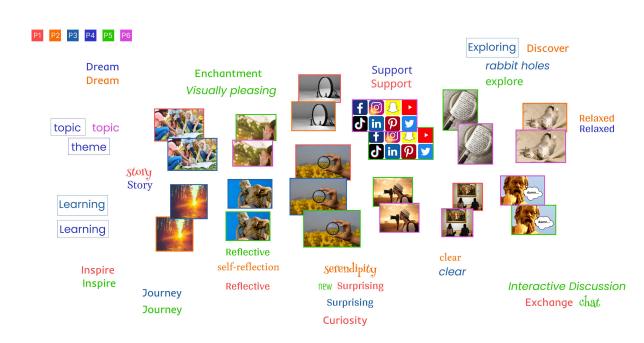


Figure 44. The images and texts that participants used most frequently

Problems casual users meet when exploring on Europeana

At the start of exploring

Struggle to start with the search bar (2)

Some participants (P1, P6) found it challenging to get started and often felt uncertain about what to do next, primarily because they didn't have a specific informational goal in mind, especially at the beginning. The search bar, prominently positioned on Europeana's landing page as the gateway to the platform, exacerbated this issue. Its design assumes that users have a clear objective and sufficient knowledge to generate effective and relevant keywords. However, for those without a well-defined focus, this feature can become a barrier, leaving them unsure of how to proceed with their exploration.

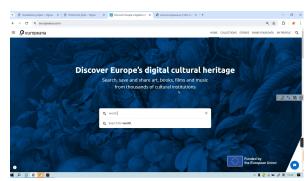


Figure 45. Search bar dominates the first screen

"It (the search bar on home page) urges me to search something here, but it does not give me any clue..." -P1

During exploring

Reliance on familiarity limits serendipity

During testing, it is observed that participants primarily navigated the interface based on their existing familiarity and interests. For instance, P6, who has a passion for photography, focused on the 'Photograph' theme and photographers he/she were already familiar with. The current interface lacks features that actively encourage users to venture beyond their familiar areas. This limits the happens of serendipity.

Incomplete information and lack of vividness in content



Some artefacts are presented with incomplete information, often displaying only images without detailed textual descriptions. While Europeana provides extensive metadata, participants find it too fact-based, fragmented, lacking narrative richness and coherence. They prefer more vivid content that offers context beyond what is conveyed through images alone. This gap in information often leaves participants feeling confused disappointed, as they are unable to fully understand or connect with the artefacts they are interested in.

"these are interesting data, but I do not see a description of what it is exact. I need a description for every artwork." -P4

"i end up getting confused. like the one earlier, just describing what the pictures shows without saying any further." -P5

Dull and static display of information (**)



Most of the items were curated as organised grids or tables, laid out like long lists that often extended across many pages. The detailed information provided for the artefacts usually consisted of just photos accompanied by blocks of text, with the story sections even requiring significant reading. Moreover, the interaction and exploration methods were not engaging, leading most participants to feel like they were just checking, and passively looking at the screen rather than truly experiencing and engaging with the items. Many participants (P1, P3, P6) described this type of content display as dull.



Figure 46. Metadata displayed as a long list

"(the collections) is very interesting, but the experience was just looking at the screen...I was just browsing them"-P3

Overwhelm by endless collections (



Participants were overwhelmed by the endless pages of collections, leading them to question whether they needed to review everything. The website's lack of clear highlights for the most valuable items, left them unsure about which items to focus on. This frustration would stop participants from continuing exploring.

"I don't know which one I should click on. Which one is more valuable? "-P1

Complex terminology & unfamiliar language



Participants were occasionally discouraged from exploring further due to complex terminology in artefact's titles and detailed descriptions that required a high level of cultural knowledge. Additionally, many items were described in unfamiliar languages, creating a barrier to understanding. While Europeana provides translation functions, participants found that the translated versions often seemed incomplete or significantly different from the original content, which further hindered their exploration experience.

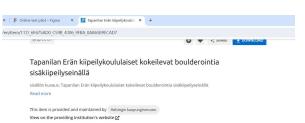


Figure 47. Unfamiliar language to participants

"I came across something I was interested in, but it's suddenly in a language I don't understand.. It seems interesting, but I am not sure what it is"-P4

Lack of welcoming elements and invitation to explore



Participants find the atmosphere of Europeana tends to be formal and distant, resembling a structured library storage. The guidance and support available to encourage users to delve deeper are limited, failing to create a fully welcoming environment. Participants expressed a clear desire for more inviting guidance and supportive orientation.

"It's like a vast library, more suitable for searching something precisely. "-P2

Limited support for divergent exploration

The interface of Europeana was deemed efficient for users who prefer convergent and specific exploration. As for the divergent exploration guided by diverse curiosity, the support is very limited. Europeana systematically curated artefacts based on themes or topics, providing a very clear catalogues. But from the observation, I found participants engaging in divergent exploration often need to repeatedly return to the theme category page in the home page, open multiple tabs, navigate through a long list of topics, and use the filters skillfully. This often involves a high cognitive load and requires significant familiarity with the Europeana website.

Lack triggers to quickly grasp the idea of the artifacts

Participants found it impractical to examine every artefact on the website due to the extensive size of the collections. They desired clear and engaging previews that provide a quick understanding of each artefact before they click on it and delve deeper.

Several participants (P1, P4, P3) mentioned that they want a clear indication of the artefact's medium-such as whether it is a painting, photograph, portrait, manuscript, or music recording. It helps users quickly categorise and understand the artefact at first glance. Currently, this aspect is not well-addressed, leaving users often confused.

"I do not know sometimes what type of the item is. I know where it is, when it is made... but what it is? a picture maybe. but it looks like a painting" -P2

After exploring

Exploration always ends flat (2)



The ending of most participants' exploration were always unimpressive, lacklustre or lacking in impact. They were left with a sense of "What's next?" This resulted in a feeling of incompleteness and dissatisfaction with the ending.

"so at this point, I won't even remember going back to the website... I think I would just end here" -P6

"(the whole experience) is fine, I was looking at some interesting artworks, but that's about it." -P2

3.6 Conclusion

Casual users' behaviour patterns and habits

Divergent exploration & browsing

The study shows that casual users typically begin with divergent exploration. At the initial stage, they conduct more divergent exploration than the convergent exploration. Browsing is their primary mode of interaction. When browsing, users might start their exploration with a selected theme or choose items randomly, often guided by familiarity. This suggests that providing an overview, incorporating elements of chance, and supporting familiarity can all help users begin their exploration.

Visual vs. information

Some users seek an aesthetic sensory experience focusing on visuals, while others are more interested in the knowledge behind them. However, for casual users, an overload of irrelevant information can be overwhelming and lead to boredom. Thus, the design should balance visual appeal with engaging information.

Cruising vs. digging into

Some users prefer to wander around diverse items across various topics (cruising collections), while others enjoy delving deeply into specific ones (digging into collections). These behaviours often overlap in practice. This variation suggests that while the design should emphasise divergent exploration, it must also consider the specific, in-depth searches. Providing flexible pathways for switching between these different modes of exploration will also be essential.

Desire more interactive way to explore

Instead of merely viewing and reading, participants sought various interactive ways to engage with the collections. Examples include exploring from different dimensions, using filters to examine various mediums related to a topic, Googling information they found intriguing, and checking social media for additional perspectives. They actively thought and reflected during the process, associating and comparing items with previous encounters, making guesses, and raising questions. This suggests that offering more interactive and dynamic exploration methods is needed.

Elements that inspire casual user to explore

The elements that could inspire casual users to click on and explore items can serve as valuable inspirations for later designing.

Familiarity

Familiarity emerged as the main criterion guiding their exploration. Participants tended to structure their exploration around topics they were already somewhat familiar with, often gravitating towards items that were recognizable to them. In contrast, reactions to novelty and unknown varied: some participants avoided exploring the unknown altogether. This suggests that exploration driven by extreme curiosity is not well-supported, highlighting a gap in facilitating serendipitous encounters. Thus, one design possibility in this project is to support a more diversive exploration that could enhance serendipitous discoveries.

Interactive exploration

Participants were also drawn to more interactive exploration methods, suggesting that the design should be both engaging and interactive.

Intriguing preview

Offering an intriguing preview that showcases content highlights before actual exploration, along with pointers or reminders guiding users toward potentially interesting items, can increase curiosity and engagement.

Heterogeneity

Heterogeneity not only inspires further exploration but also sparks serendipitous discoveries, reinforcing findings from previous literature.

High quality of the content

The degree to which participants were attracted to certain items largely depended on the content of the artefact itself. Factors such as high-quality and visually appealing images, interesting and easy-to-understand titles, credible information, and unique content not found on other platforms played a significant role. This highlights the need to further enhance the quality of content provided on the platform.

Casual users' ideal experience

The 14 elements defining the vision of casual users' ideal experience can serve as valuable inspiration for the subsequent design phase. Among these, four elements are most frequently highlighted, revealing key aspects of casual users' needs and expectations: Get connection with others; Desire for suprise and new things; Have an on-going and in-depth discovery adventure; and Fun and playful experience.

Notably, the emphasis on experiencing surprises and discovering unexpected elements—rather than relying solely on personalised or predefined exploration paths—underlines casual users' desire for a more open-ended and divergent exploration experience. This highlights their appreciation for serendipity and the joy of unforeseen discoveries.



Get connection with others



Desire for surprise and new things



Have an on-going and indepth discovery adventure



Fun and playful experience

Problems definitions

The issues encountered on Europeana website by participants can be categorised into four defined problems:

1. Sturggle to start with search tool and unsure what to explore next

Since casual users often start their exploration without a specific goal, they struggle with specific search tools, such as search bars. Meanwhile, the collections are extensive without clear highlights and do not offer effective cues to help users quickly grasp the nature of the artefacts. As a result, users may feel uncertain about what to start and what to explore next.

2. Fail to encourage users to explore, creating a sense of distance

The platform's atmosphere tends to be formal and distant. Also, complex terminology and unfamiliar language on item titles and information pages can further alienate users. Additionally, some items lack sufficient information. All these issues can discourage users from exploration, leaving them feeling confused and disconnected.

3. Limited opportunities for unexpected discovery and divergent exploration

Users primarily relied on familiarity to navigate the interface. While serendipitous encounters did occur, people mostly explored areas of the collection they were already somewhat familiar with, which could lead to information bubbles. Additionally, while the interface supports specific searching well, it does not encourage divergent exploration, getting access to diverse items and serendipitous discoveries.

4. Static and dull exploration

The display of information is often dull and static, with content that is fact-based and lacks vividness. As a result, users find that their exploration ends up feeling flat and uninspiring.

3.7 Research sysnthesis

For each identified problem, the ideal situations that address these issues were proposed. Based on them, the design requirements and the desired user experiences were defined, which guided the formulation of the project's design goals and interaction qualities in the next phase. Details are outlined in the following tables.

Insights from literature review	Insights from user research	Defined problems	Ideal situations	The design should be
	 Lacks of welcoming elements and invitation to explore Contains complex terminology & unfamiliar language Has incomplete information 	The interface fails to encourage users to explore, creating a sense of distance.	The design can make users feel that they are welcomed and encouraged to explore in this space, fostering a sense of discovery.	Exploratory
The design should support an open search, facilitating exploration that is open to diverse results, rather than focusing on a single information.	 Reliance on familiarity limits serendipity Lacks of support for divergent exploration Users desire for surprise and new things 	The opportunities for unexpected, diverse discovery and support for divergent exploration is limited.	The design can allow users to discover something beyond their expectations in an pleasant way.	Serendipitous
The design should consider helping casual users to start their exploration since they don't have specific information goal. The design should provide a certain degree of guidance while still allowing for free exploration.	 Struggle to start with the search bar Overwhelm by endless collections Lack triggers to quickly grasp the idea of the artifacts 	Users find it difficult to start exploring with the specific search tool and are sometimes unsure of what to explore next.	The design can support users to start their exploration easily and always provides suggestions for potential next steps.	Supportive
The designed experience should be perceived as engaging, entertaining, or playful.	 Dull and static display of information Lack of vividness in content Exploration always ends flat Users desire for fun and playful experience Users need more interactive way to explore 	The information display and the way of exloration is static and dull.	The design can make the process of exploration playful and interesting.	Playful

Table 3. Research systhesis

Chapter 4

Design brief

From the findings of the previous research, I have formulated a design goal and four interaction qualities to guide my project's development and serve as criteria for evaluating the design.

Chapter overview

- 4.1 Design goal
- 4.2 Interaction qualities

4.1 Design goal

My design goal is to **invite** casual users to explore with an **easy exploration** starting point, and support their divergent exploration on the digital collections website.

The intervention aims to make the experience more **exploratory**, **serendipitous**, **supportive**, and **playful**.

The design should be an online digital collections exploration experience, designed specifically for casual users. It should be a feature that can be integrated into the interfaces of the existing digital collections website, which in my case is Europeana.

4.2 Interaction qualities



Exploratory

My design should make users feel welcomed and encouraged to explore in this space, fostering a sense of discovery.



Serendipitous

My design should encourage diverse exploration, allowing users to discover something beyond their expectations in a pleasant way.



Supportive

My design should support users in getting started easily and moving towards further explorations.



Playful

My design should make the process of exploration more playful and enjoyable.

Chapter overview

- 5.1 Brainstorming session
- 5.2 Rapid mockups testing
- 5.3 Initial concepts
- 5.4 Concept evaluation
- 5.5 Conclusion

Chapter 5

Design cycle 1: divergence

Based on the findings from previous research, a brainstorming session was held, resulting in the development of ten idea clusters. Four initial concepts were then created and evaluated in the first round of user testing with nine participants.

5.1 Brainstorming session

Participants

Three designers were recruited to conduct a brainstorming session with me. All of them had a strong interest in culturally related topics. Two of them had experience in designing physical museum experiences, while another had worked on a project related to the digital experience of intangible cultural heritage and had used several digital collections websites.

Procedure

The session took around 1.5 hours and included 2 parts. Firstly, I introduced the context, the characteristics of the target users, the problems of the current user experience, the design goal and the four intended interaction qualities of my project. I also summarised the key insights from my user research and literature review that includes what kinds of elements can encourage casual users to explore and what the casual user would usually do during their current exploration experience. All this information was shown to the participants on the prepared materials so that they can check at any time.

Secondly, the brain-writing technique, a simple and effective method for generating ideas in short time (van Boeijen et al., 2013), was used with four 'how-to' questions. These questions were developed based on the four identified problems and the four intended interaction qualities. The process consisted of four cycles, each focusing on one 'how-to' question. Each cycle was divided into two phases. First was a 10-minute individual brainstorming when participants generated various ideas for the given question.

Once participants came up with an idea, they were asked to map it onto a large sheet of paper (Figure 48) divided into two sections: "cruising collections" and "digging into collections," depending on which type of behaviour their idea supported more. Then was the second phase for a 10-minute discussion. Participants clustered the ideas, inspired each other for new concepts, and selected their preferred ones.



Figure 48. The sheet of paper to map ideas

These are the four given 'how-to' questions:

Exploratory

-How to cultivate an atmosphere of exploration on the website?

Serendipitous

-How to encourage casual users to explore diverse collections, even those that are outside their expectations?

Supportive

-How to assist and invite casual users to start, since they don't have specific information to look for?

Exploratory

-How to help casual users to explore and learn the online collections in a playful way?

Ten ideas clusters

Ideas from the brainstorming session were clustered and there are 10 clusters in total.

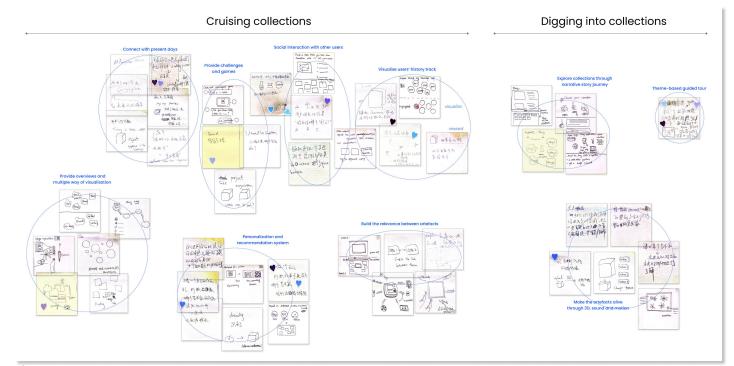


Figure 49. Ten idea clusters

1) Provide challenges and games

The previous desk research shows that curiosity is involved with a pursuit of novelty and challenge. This idea cluster was also inspired by many offline museums' exploration activities. Challenges such as treasure hunting or guessing games can work as a trigger and guidance for users to explore. This could also act as a starting point for users if they have no ideas of what to find on the website.

Some specific ideas include: challenge users to find a vase with a pattern of fruits and showcase what other users' finding; provide a "Guess who?" game where users need to search for information on the Europeana website to play the game at the same time.

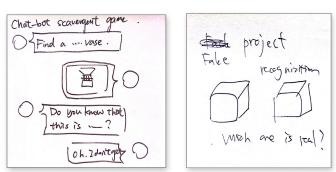




Figure 50. Idea examples of cluster 1

2) Social interaction with other users

Users often have varying preferences, attitudes, levels of familiarity, and opinions regarding the same artefacts. Therefore, exposing users to the perspectives of others can encourage them to venture beyond their usual circles of familiarity. This idea cluster is supported by the Kreiseler et al. (2017)'s 'Participate' functional principle.

One idea is to invite users to share their favourite artworks and explain their choices after each exploration journey, right before they leave the website. User research shows that users always like to make comments and raise questions on different artefacts. One related idea is to establish a scholarly discussion space on each artwork page, allowing users to comment, link the artefact with other pieces, and express their opinions. Additionally, tracking other users' exploration journeys could provide a playful way to inspire others to begin their own explorations. In this idea, each user can have personalised tags, such as "gardening enthusiast" or "Van Gogh admirer," enabling others to find and follow the users with similar interests. There are also ideas for instant social interactions that could make the exploration process more engaging and interesting. For instance, a voting section where users can choose for their preference, such as "Which cow painting do you like the most?" or an online Q&A knowledge battle between users.



Figure 51. Idea examples of cluster 2

3) Visualise users' history track

73

User research reveals that users view ideal exploration as a self-reflective process to better understand themselves and their own knowledge gaps (see in the Appendix). Therefore, visualising what users are already familiar with and guiding them to explore unfamiliar areas can help break down information filter bubbles.

This cluster includes ideas such as recording users' exploration history, visualising their knowledge map, and highlighting unexplored areas. Another idea is to implement a reward system where users can become collectors, earning rewards for exploring a sufficient number of artefacts related to a specific theme.

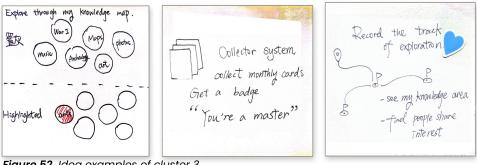


Figure 52. Idea examples of cluster 3

4)Personalization & recommendation system

Previous research indicates that familiarity, particularly when something appears familiar but not overly so, strongly motivates users to explore. Personalised recommendations based on users' familiar things could effectively help casual users to get started.

This cluster describes various interactive recommendation systems that recommend collections based on users' inputs. For example, the system can offer recommendations influenced by users' emotions, location, time, or even the weather. Another idea is allowing users to upload a picture from their daily life, which the system would then use to suggest artworks with similar features. Additionally, users could upload their own drawings or generate artwork using Al technology, and the system would recommend similar artefacts. Alternatively, users might answer interactive questions about their preferences, style, personality, and identity upon entering the website, enabling the system to provide customised recommendations based on their responses.

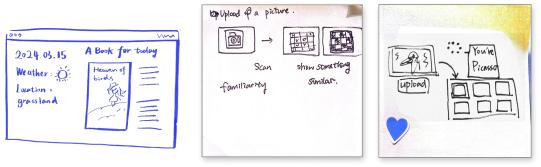


Figure 53. Idea examples of cluster 4

5) Connect with present days

User research indicates that connecting artefacts with contemporary events can motivate users to explore since individuals always perceive that history and culture can provide lessons and a different perspective towards the present world.

This cluster includes various ideas that show the connection with today's world such as "Today in History," which provides cultural items connected to the current date. Users can also input a specific date, and the system will generate related artworks. News can also serve as a potential trigger for exploration. Related ideas include curating artworks associated with the latest news or recent special events, such as the Olympic Games in Paris or Pride Week.



Figure 54. Idea examples of cluster 5

6) Build the relevance between artefacts

This cluster focuses on visualising the relatedness between artefacts. Previous literature review suggested that highlighting connections can encourage users to continue exploring while also deepening their understanding of artefacts. When browsing through data collections, it is often the nearby items that capture attention and lead to serendipitous discoveries (Thudt, 2012).

Specific ideas include connecting artefacts that share the same keywords in a semantic map or incorporating a sliding button between "related" and "not related" to generate more artefact connections.

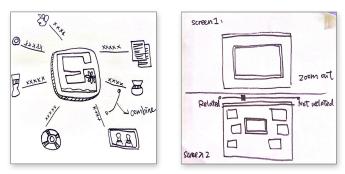


Figure 55. Idea examples of cluster 6

7) Provide overviews and visualisation

Visualisation could spark serendipity (Thudt, 2012). According to previous desk research, providing orientation and overview of the collections can help casual users understand what is available. This serves as a similar function of the physical maps in offline museums.

This cluster focuses on presenting the collections through various creative visualised maps. For example, users can access collections through different pathways, such as the collections are categorised and visualised by time, location, themes, semantic meanings, shapes, or patterns.

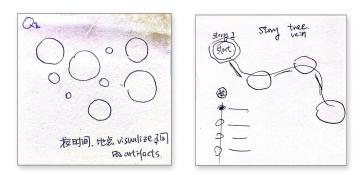


Figure 56. Idea examples of cluster 7

8) Explore collections through narrative story journey

Previous desk research indicates that narrative interaction systems can effectively assist casual users in their exploration. This is also supported by Europeana's current design, which includes a Story page featuring narrative blogs that mention many artefacts. However, the current approach focuses more on the story itself rather than the collections, and the presentation is rather dull and unengaging. Therefore, this cluster proposes ideas for a more interactive storytelling experience that encourages users to explore collections through the story.

Specific ideas include using podcasts to tell the stories instead of relying solely on text, or offering different chatbot narrators with unique personalities to tell various stories.

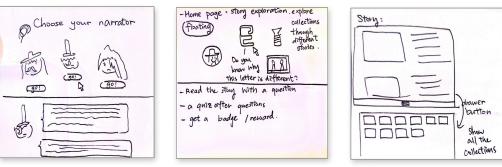


Figure 57. Idea examples of cluster 8

9) Make the artefacts alive through 3D, sound and motion

This cluster focuses on making the artefacts more interactive and playful in order to attract the users to explore.

Ideas such as make an artwork into a 3D version, make it into an animation like Harry Potter's photo, create AI artists with whom users can talk to, sounds and motion effects of the artworks in response to clicking.

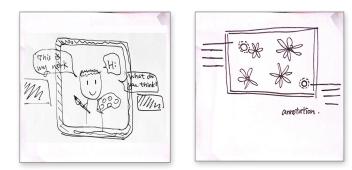


Figure 58. Idea examples of cluster 9

10) Theme-based guided tour

Provide several curated journey maps that can guide users to explore based on different themes. This idea helps to support and guide the casual users by providing which keywords to search, which stories to read, which is the highlight artworks on the website in order to better understand one specific topic.

Discussion

The cluster 10 of the 'Theme-based guided tour' was left aside. It is true that this concept is very supportive and guiding, which could help when the users don't know what to do on the website. However, the already curated journey does not provide an open and free exploration experience, which does not align with the design requirements. It also does not fully meet another design requirement, which was to provide a degree of guidance but still allow the casual user to have their own control. Moreover, this concept is a bit less sustainable. The theme should be upgraded from time to time, since the users always visit the website not only one time but frequently.

The cluster 9 of 'Make the artefacts alive through 3D, sound and motion' was left aside. This is because the concept focuses too much on a specific single item while in fact the Europeana website has millions of cultural items. It is not feasible since the cost to make every object 'alive' would be extensively high. Also, this idea does not fit with one of the design requirements, which is to support a continuous informationseeking experience rather than a process of accessing a single result. This concept is more suitable if there are some limited number of artefacts in Europeana that need to be highlighted. Nevertheless, it can become one of the features in the designed concept to make the experience more playful. Also, this idea highlights an important insight: multisensory experiences can make interactions with online artworks more immersive. This direction is interesting and valuable for future projects, as the online environment, including computers and digital collection websites, is not as immersive as offline museums.

The cluster 4 of 'Personalized and Recommendation Systems' was set aside. This is because even though this idea is very effective in helping casual users get started, it does not align with the design requirement that the experience should support open and exploratory searching. User research also indicated that casual users prefer surprising and serendipitous discoveries rather than personalised pathways.

I did not pursue Cluster 5, 'Connect with Present Days,'. But it is a potential idea to support casual users in starting their exploration. The considerations here was that although it could help users begin their journey, I also wanted to focus on encouraging users' diverse exploration. The ideas from this cluster did not align with this objective, so I chose to prioritise approaches that better supported a broad and varied exploration experience.

I did not continue with Cluster 2, 'Social Interaction with Other Users,' in the later phase. However, this remains a very potential direction. My main concern was that incorporating community elements might undermine the site's professionalism and credibility. User-generated content could make it difficult to differentiate reliable and unreliable between information, potentially impacting users' trust in the site's accuracy. This approach could introduce complexities to the project that I chose to avoid at this stage.

5.2 Rapid mockups testing

To determine which direction was more promising and feasible, I conducted rapid mockups testing. Using Figma, I created seven different low-fidelity prototypes that were only partially interactive. These prototypes were tested quickly with five participants, all of whom were IDE design students recruited through convenience sampling. This approach provided timely feedback on the concepts.

Key pages of the seven mockups are displayed in the Figure 59. These mockups helped to define the four initial concepts for the next phase.

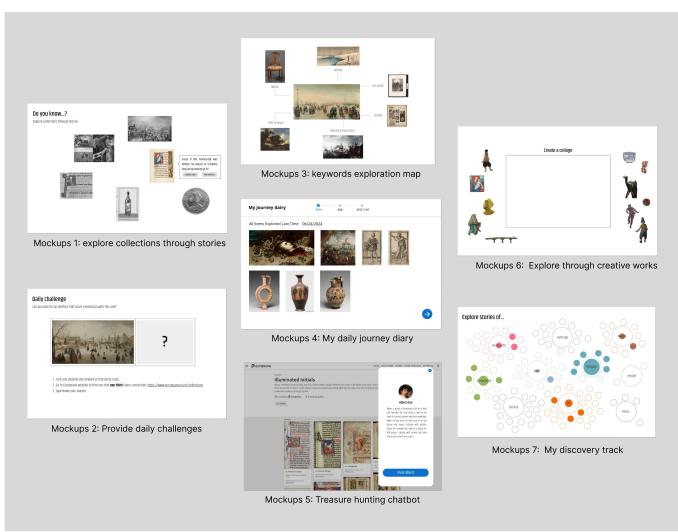


Figure 59. The key pages of the 7 mockups

5.3 Initial concepts

Based on the ideas generated during the brainstorming session and also insights from the rapid mockups testings, four initial concepts were developed. Visual prototypes were made through Figma for each concept. To select the concept and gather valuable feedback, an evaluation of the four concepts was conducted using the design goals and the four interaction qualities as the evaluation criteria.

Concept	The idea cluster inspired from	Inspirations from literature review	Inspirations from user research		
Keywords exploration map	Cluster 6 - Build the relevance between artefacts	-Cross-contacts -Highlight connections between items -Information flâneurs	-Users often browse between different items and themes first -Heterogeneity encourage to explore		
Story-driven explorer	Cluster 8 - Explore collections through narrative story journeys	-Elements of chance and randomness	-Users appreciate stories -Intriguing previews spark curiosity		
Treasure hunt with chatbot	Cluster 1 - Provide challenges and games Cluster 9 - Make artefacts alive	-Novelty and challenge -Curiosity-teasing display -Contrast	-A sense of achievement (ideal experience element)		
Discovery tracker	Cluster 3 - Visualise users' history track Cluster 7 - Provide overviews and visualisation	- Expose diversity	-Self-reflection journey (ideal experience element)		

Concept 1 offers an infinite exploration experience through keywords connections. Artefacts are always tagged with diverse keywords on the digital collections website for searching. Instead of confining their keywords and tags to a search bar, I came up with the idea to make them directly accessible and interactive, allowing users to wander between diverse items in a flexible and coincidental way.

Initially, users are presented with a random artefact positioned at the centre of the screen. Keywords related to this central artefact branch out with lines, connecting to other artefacts that share the same keywords. The connected artefacts are randomly chosen by the system. Clicking on these connected artefacts replaces the central item with the new one, generating updated keywords and new related artefacts. It allows users to continuously explore without a predefined endpoint.

Additionally, the design facilitates serendipitous discoveries and surprises through its dragging function. If all the keywords remain within a grey circle, the system will generate artefacts closely related to the central item. However, dragging keywords outside this circle shifts the focus to artefacts that are more distantly related. For example, if the keyword "wood" stays inside the circle, it might connect to a wooden board painting, maintaining the same medium as the central item. Dragging the keyword outside the circle could reveal a wooden chair, representing a different object type and providing a chance for unexpected discoveries.

How did I come up with it?

The core idea under this concept comes from the user research's finding that casual users often browse between different items and themes first to develop their interest. Also, based on the user research that artefacts are often hidden behind the keywords and casual users always find it difficult to generate correct and useful keywords, I came up with an idea of exposing the keywords in Europeana with different artefacts directly to them without a need for searching.

It is also inspired by the literature study that cross-contact could facilitate serendipitous, and hightlighting the connections between items could enhance users' exploration's experience.

The idea is a discovery space where different artefacts are connected through the shared keywords and users can move between different items quickly and flexibly, exploring them in an unstructured and nonlinear way just like what the concept 'information flâneurs' described in the literature study. This concept is also inspired by the finding from user research that heterogeneity can inspire users to explore and trigger serendipitous discovery. Therefore, I want to purposefully put the different items together to produce surprise.

Concept 1 Keywords exploration map



Figure 60. Concept 1-Keywords exploration map

Concept 2 offers an exploratory experience through a series of interconnected items presented within narrative stories. On the initial page, users are greeted with various floating story entry points, which are randomly distributed. A 'Change' button allows users to shuffle and refresh these entry points, providing new story options.

Hovering over an entry point reveals an intriguing, challenge-like question related to the visuals, giving users a general preview of the story and sparking curiosity. Clicking the 'Explore' button directs users to the story page.

The narrative unfolds in manageable segments rather than lengthy blocks. As users click the 'Next' button, the story progresses, with relevant artefacts gradually appearing as the narrative develops. At the end of the story, all the artefacts mentioned will be presented together. Clicking on these artefacts provides detailed information and metadata.

How did I come up with it?

This concept builds on the user research findings that casual users appreciate the story pages because they find narratives more engaging and vivid compared to simple fact descriptions. This **narrative** approach is one of Europeana's unique advantages. Therefore, I wanted to leverage this characteristic, inviting users to discover collections through narrative stories.

The current method of accessing stories through a static list of thumbnails is seen as dull and non-exploratory. Literature suggests that incorporating elements of chance and randomness can support casual users in starting their exploration. Inspired by this, I created the first page featuring items floating randomly, with a "change" button to shuffle them as the main way to explore stories. User research also indicates that previewing intriguing content can spark curiosity. Therefore, I created a feature where hovering over a story reveals a compelling question, designed to trigger users' interest and encourage further exploration.

Concept 2 Story-driven explorer

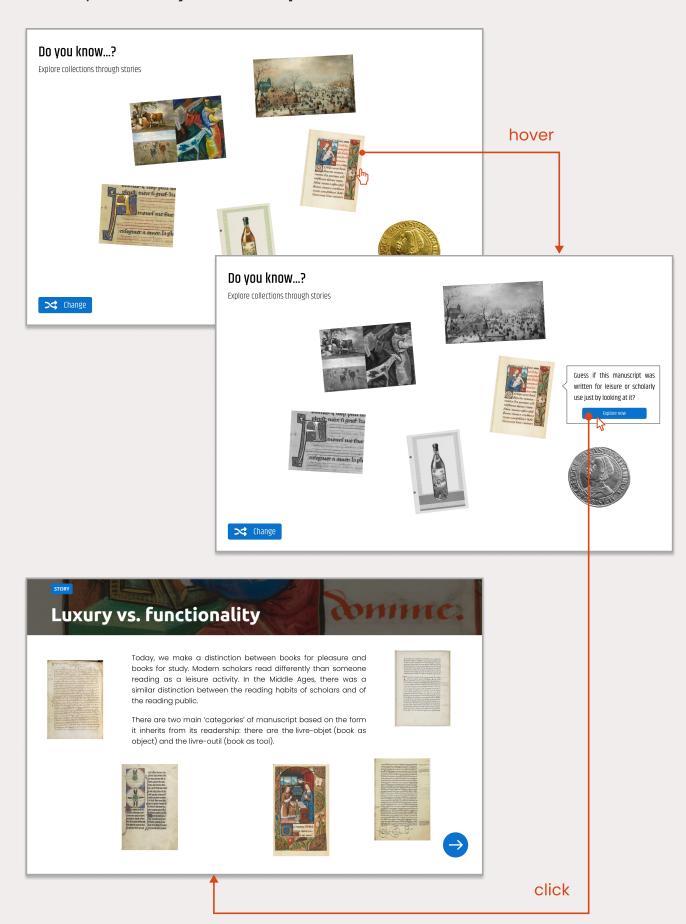


Figure 61. Concept 2-Story-driven explorer

Concept 3 offers a treasure-hunting exploration experience using online chatbots. The exploration involves finding the hidden "ghosts" within different pages of Europeana and completing treasure-hunting challenges raised by them through artefact exploration.

Each ghost specialises in a particular theme. For example, Albert, a manuscript expert, appears randomly on pages related to manuscripts. When users discover a ghost, they can engage in a chat with them through a conversation interface. During the conversation, the ghosts would provide a treasure-hunting challenge, which include hints such as a description of the items' characteristics or part of the images of the items.

or using the filters, to find the answer. After users find the item, they can send its image to the ghost. Then, the ghost would tell the users about some interesting knowledge and give them a stamp as a reward.

Additionally, the ghosts may suggest exploring further by recommending other.

The treasure hunts typically involve finding

items that fit a certain topic rather than a

specific single item. For instance, a ghost

might ask users to find manuscripts with

animal-like initials. Users need to conduct

some extent of exploration in Europeana

website, such as searching with keywords

exploring further by recommending other ghosts to users, encouraging them to continue their journey on Europeana.

How did I come up with it?

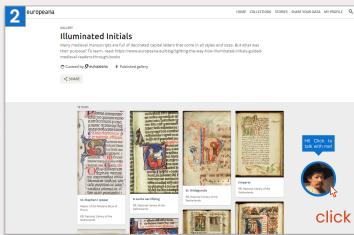
The core idea behind this concept emerged from the early findings that **novelty and challenge** can ignite curiosity. Also, combined with the previous insights that casual users enjoy making guesses about artworks and testing their assumptions, I developed the concept of an online treasure hunt challenge featuring riddles related to various cultural items.

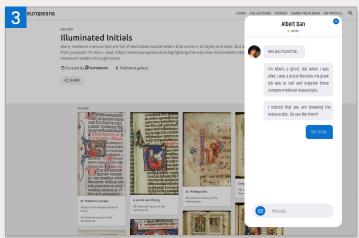
I chose to use a ghost chatbot instead of a traditional information display because literature suggests that **curiosity-teasing display** and **contrast** can enhance serendipitous discovery. By turning standard information into interactive conversations with a 'ghost,' this concept contrasts with the serious tone of Europeana.

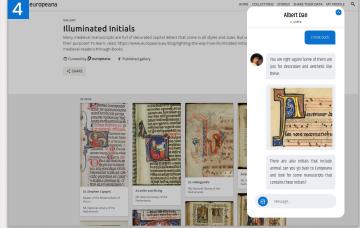
From the user study, one element users expressed in their ideal experience with digital collections is the desire for a sense of achievement (see in Appendix). Thus I incorporated a reward system into the design, where users receive a stamp as reward when completing their exploration. The reward system is also inspired by what offline museums usually do.

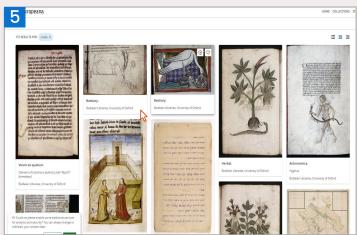
Concept 3 Treasure hunt with chatbot

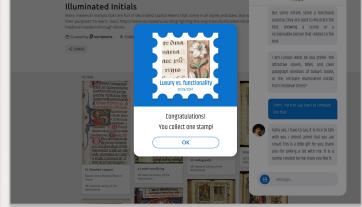












6

Figure 62. Concept 3-Treasure hunt with chatbot

Concept 4 is a visual map that logs everything users have explored on Europeana, while simultaneously revealing areas they have yet to discover. This approach may encourage users to venture into unfamiliar territories, potentially reducing information bubbles increasing the likelihood of serendipitous discoveries. Additionally, as casual users begin their exploration, this map can guide their first steps, allowing them to decide whether to continue exploring familiar content or to try something new.

How did I come up with it?

Concept 4 was developed from idea cluster 3, "Visualise users' history track." Early desk research suggests that diversity can lead to serendipitous discoveries. However, despite Europeana's rich content, the potential for such discoveries remains limited. This is because users often gravitate towards items they are already somewhat familiar with, unaware of the many areas they have yet to explore. Because of this, I came up with the idea of exposing Europeana's diversity visually, making users more conscious of their familiarity biases. By combining this with user research insights, which indicate that engaging with digital collections can prompt self-reflection on knowledge gaps, I decided to create a 'discoveries' map that helps users to collect all the artefacts that they have already discovered and highlights unexplored areas, encouraging users to venture into new territories.

The map displays themes as bubbles, with each bubble representing a different theme. Themes that users have explored more extensively will have more artefacts clustered around. When users hover over a bubble, it reveals the number of artefacts they have explored within that theme. Bubbles with fewer or no surrounding artefacts indicate areas that users have not yet explored. Hovering over these bubbles provides a brief summary of the content available within the theme. Clicking on them will direct users to a page within that theme, showcasing diverse sub-topics related to the theme.

Concept 4 Discovery tracker

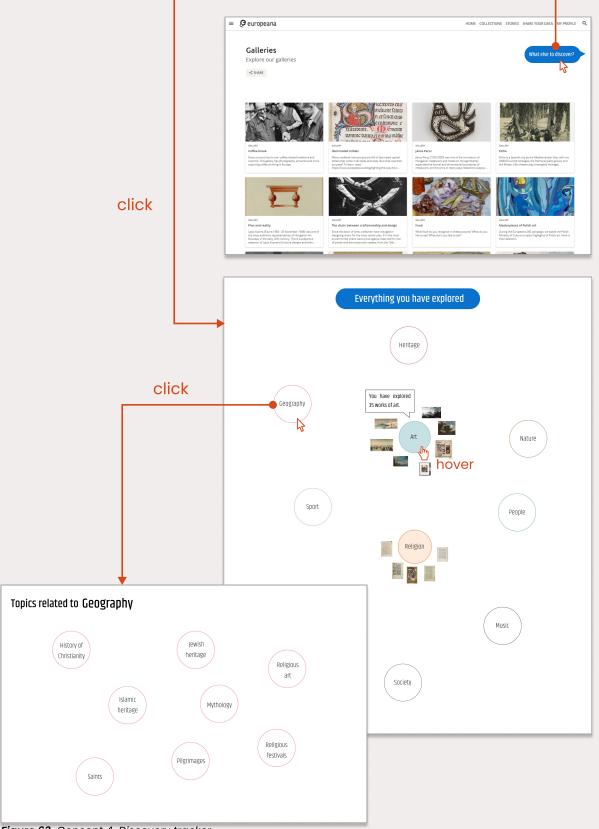


Figure 63. Concept 4-Discovery tracker

5.4 Concept evaluation

Goals

The primary goal of the evaluation is to test whether the concepts achieved the intended interaction qualities, and to further explore which direction is more potential and desirable through comparison between the four concepts.

Participants

Nine participants were recruited, including three casual users from previous user research. Five had used digital collections websites before for various reasons, while the others were new to this context. They were asked to imagine themselves as casual users looking to have fun on a digital collections website while testing.

Procedure

The evaluation session was conducted individually with a mix of both online (Zoom & Figma) and offline form. First the project context, the problems and the design goal of the project was briefly introduced to participants. The concepts were presented and explained one by one to participants as visual prototypes without the interactive functions. This approach ensures that the fidelity of the interaction design does not influence the test results. Then, participants were asked to score four statements from 1 (strongly disagree) to 5 (strongly agree). The four statements represent the four interaction qualities that the design aims to achieve, as shown in below. Participants were asked to explain why they chose the scores, and discuss their feelings and attitudes towards each concept. At the end of the testing, the participants were asked which one is their most desired one. All the participants were tested with the same procedure, method and the same concept's visuals.



Exploratory

I feel welcomed and encouraged to explore in this space, which fosters a sense of discovery.



Serendipitous

I believe this designed experience allows me to explore something beyond my expectations in a pleasant way.



Supportive

I believe this designed experience offers an easy starting point to support me in beginning my exploration.



Playful

I find the interaction with the collections to be playful and enjoyable.

Data collection

All testing's data was collected, analysed and structured based on the four interaction qualities. The data includes two types: the qualitative data and the quantitative data.

The PMI (Plus-Minus-Interesting) method (van Boeijen et al., 2013) was utilised for deeper analysis and comparison regarding the qualitative data.

For the quantitative data, a scatter plot displaying the average scores for each interaction quality related to each concept, along with a preference chart showing the number of participants who selected each concept as their most desirable, was illustrated.



Figure 64. Overview of PMI analysis

 $9 \hspace{1.5cm} 90$

Qualitative data results

Keywords exploration map

Exploratory [4.17/5]

The interaction of this concept was described as simple and relaxed with less cognitive workload.

Participants feel welcomed to explore because it is a free and open-ended exploration while users can have their own control, despite the fact that the systems also make part of the decisions for them. They feel encouraged to explore here because it is infinite and divergent with various different topics gathering together. Another reason is that users think they can explore deeper and deeper like a rabbit hole or an endless wikipedia clicking tour where they can gain some knowledge at the same time.

"It is like a wikipedia tour, just clicking things after link after link. you start with a random fact about amsterdam and end up a history of roman." -P8

"It is an endless exploration. I will just click, click, click.... It is like a divergent mind map with diverse topics, I am not limited." -P2

"I hope after using this, I can find some topics that interest me. Then I want to know more and deeper about it." -P4 Several participants would like to see more information and contexts, especially for the middle artwork. But also one participant mentioned that he/she would enjoy wandering among those different visuals much more than reading the texts.

Some participants like wandering globally and randomly without a specific exploration aim through this concept. In contrast, others hope the concepts will help them develop their interests by delving deeper into a specific topic and learning more about it. Currently, this concept doesn't support the latter preference due to the lack of information.

"You can explore deeper and deeper, like a rabbit hole" -P6

"The interaction is fun, simple and relaxed. Just clicking. Suitable to kill time." -P1

"It seems like I am generating something based on my own lead." -P3

"I think keywords are not completely enough, i need more contexts and more information, like if i hover here, some fun fact appears" -P7

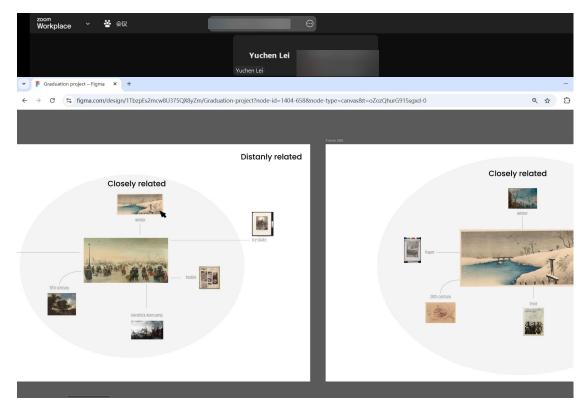


Figure 65. Online testing with concept 1

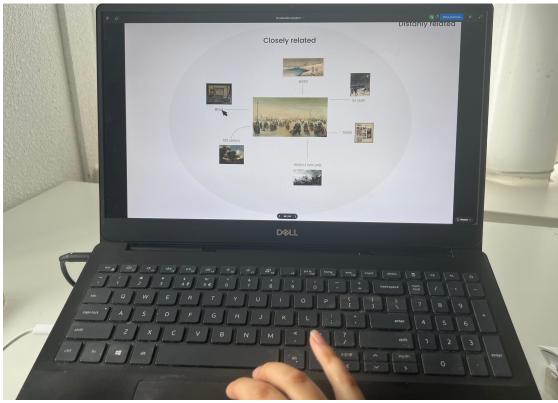


Figure 66. Offline testing with concept 1

 q_1

Serendipitous [4.67/5]

All participants think this concept will definitely provide serendipity and surprise. This is because first, it is the system that provides the options for users; second, the concepts reveal the connections between items which may also become something beyond their expectations; third, the dragging interaction can help to generate something totally different or even opposite.

"It suddenly shows something really different when you drag outside, it will spark some interest." -P3

"If I see something that I am familiar with, but it shows something different, that would make me curious." -P2

"I would feel surprised by the connection between artworks, I will start thinking about how they are related?" -P7

Supportive [3.28/5]

Participants think this concept does not support them very well at the beginning because the first artwork shown in the middle is selected by the system in a purely random way, which might not fit with users' interest at all. They hope they can start from something that they are familiar with or interested in. Also, one participant mentioned that from this concept he doesn't get the point that there's a large database in the website because the first thing he sees would be the one artwork randomly provided by the system, and this would discourage those experts users who still want to have a search for a specific item.

However, participants also agreed that the keywords would support them by providing more about the items' contexts, although some of them hope to see more information related to the items that interests them.

"I'd rather start by picking a topic I'm interested in first. Then I can move on to this. Just showing me a picture right away, the pic might not match what I'm expecting to see, then I just turn it off." -P4

Playful [3.89/5]

Participants consider the dragging interaction inside and outside the circles fun and interesting. But they think it is more like a serious play and it depends a lot on the content of the items and the different connections between items.

"The dragging interaction is fun. If I drag very far away, it may show something completely opposite." -P2

Others

Most participants mentioned an usability problem that they cannot figure out that the keywords can be dragged outside the circle immediately. A reminder or a hint is needed. Also, one participant thinks the title of 'closely-related' and 'distantly-related' is a bit vague where different users may have different definitions towards them.

"It is hard to get to know that the keywords can be dragged here" -P9

"I thought it was generating items from one media to another; or from 2D to something 3D." -P2

Story-driven explorer

Exploratory [3.94/5]

Participants had varying opinions towards the function of automatically generating story entry points randomly with the click on the 'change' button. Although participants think the interaction is as simple and spontaneous as refreshing the social media, they also think the pure randomness provided by the system discourages them to explore because of the lack of control. The heavy text reading in the later phase of this concept also makes users lose their interest.

The questions exposed before users click on the stories do play a powerful role in sparking users' curiosity and stimulating them to explore. "It is very easy, you just click the button, and keep clicking on it until something interesting appears. It will refresh like facebook or youtube." -P7

"I need more control by myself. It is too random without a connection" - P4

"I also need the selected visuals to be very compelling for me, because a text-only reading would be too much." -P2

"The question is triggering and makes me curious, like a treasure hunting" -P5

Serendipitous [3.83/5]

Participants had varying opinions towards the function of automatically generating story entry points randomly with the click on the 'change' button. Although participants think the interaction is as simple and spontaneous as refreshing the social media, they also think the pure randomness provided by the system discourages them to explore because of the lack of control. The heavy text reading in the later phase of this concept makes users lose their interest.

"It is not very open-ended but predefined and also focused on limited topics, I know what will happen next." -P8

"I may keep clicking on the change button if something I'm not interested in appears." -P4

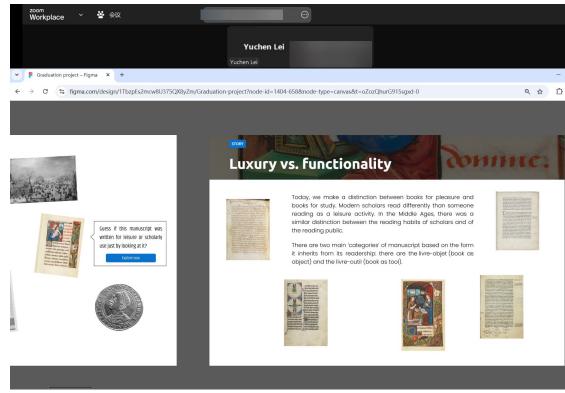


Figure 67. Online testing with concept 2

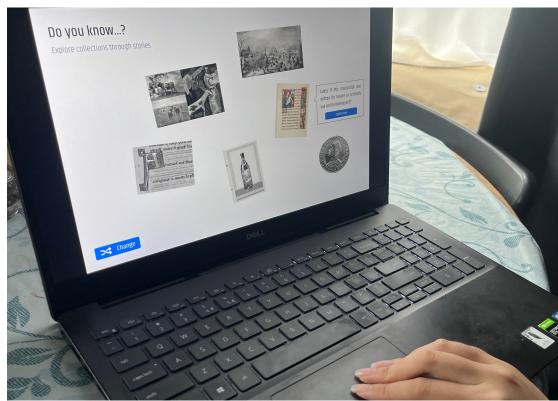


Figure 68. Offline testing with concept 2

Supportive [3.83/5]

Concept 2 was seen as the second highest in the quality of 'supportive', as it provides users with an experience similar to visiting an offline museum with a guided tour. The questions presented before clicking on the stories also help participants by offering a general context and an idea of what to expect.

"Like a museum exhibit, deliberately stack different pieces of art from different contexts next to each other, then it will let you know about a story." -P9

"I like the keywords in the first part because it gives you the context and prompts you to think." -P8

Playful [3.11/5]

Concept 2 was perceived as the least playful due to the extensive text blocks, which could be dull and overwhelming for casual users. But participants think the popping questions are fun and interesting because they look like riddles.

"I would only skim quickly about the texts, no one read everything from top to bottom." -P3

Treasure hunt with chatbot

Exploratory [3.94/5]

Regarding the idea of providing a treasure hunting challenge online, participants have varying opinions. For most participants, this concept makes users feel guided and encouraged because the treasure hunting tasks and the riddles actually offer users with a more specific and clearer goal, which could serve as a good starting point for exploration.

However, some participants mentioned that this concept would take them a lot of effort, so this may be too much for them especially when they are just browsing the website alone. For them, they think the concept is more suitable for teenagers and those who have a lot of time. One participant gives a very negative attitude towards this concept, because she feels a little bit intimidated and she is worried that she cannot figure out the answer to the riddles and find treasures. Moreover, participants also think the reward in the end is not motivating enough since it is virtual and meaningless to them.

"I feel like this one takes me a lot of effort, I am too lazy to search, I just want to click click click... it is too much for me, maybe this one could for teenagers or kids" -P2

"Originally I might just skim through things on the website, but with this ghost assistant, it feels like I have a driving force and a clearer goal" -PI

"I think the reward is not motivating. I don't want it. Maybe I need something that was created by myself or something that can be shown on my home page?" -P3

Serendipitous [3.72/5]

Participants believe that the serendipity offered by this concept is limited compared to concepts 1 and 4. This is because the journey is predefined, restricting exploration to a narrow range of topics and reducing the chance of discovering something entirely new. However, participants appreciate that this concept allows for deeper exploration of specific items, uncovering details and knowledge that they might not notice when browsing the website on their own.

"The riddle given by the ghosts makes me do some deep searching, which would make me find some details that I would not even notice on the artwork, like the initials on manuscript." -P8

"It might not trigger something completely different, because you are exploring the same topic. It would not goes too beyond my expectations" -PI

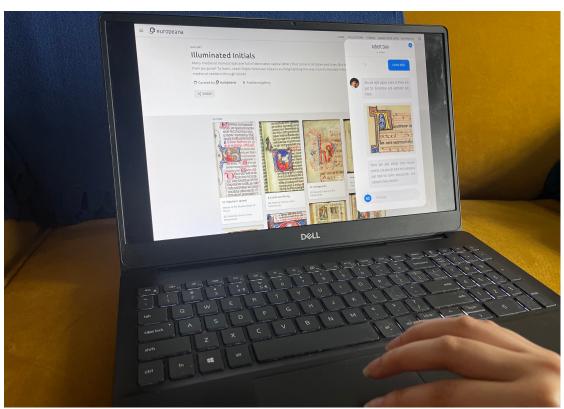


Figure 69. Offline testing with concept 3

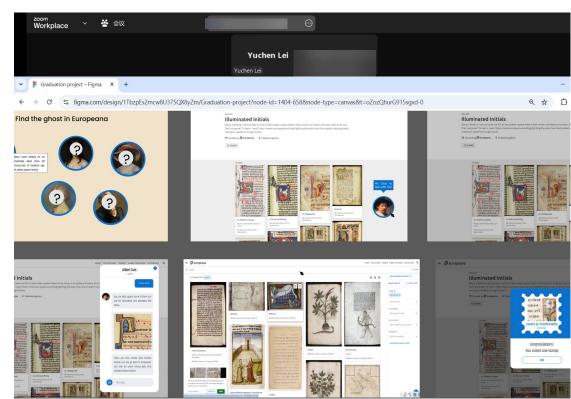


Figure 70. Online testing with concept 3

Supportive [3.83/5]

A personified chatbot helps users feel assisted and creates a sense of companionship. The treasure hunting challenge offers participants a clear starting point for their exploration. Additionally, the introduction of each ghost provides users with summaries of the website's content, making them feel guided.

"It feels like someone is accompanying you. It will guide you like the NPC in games, they will let you know what to do next." -P2

"At first I was confused and didn't know what to do. But now it at least gives me one starting point." -P5

Playful [3.67/5]

Participants think the concept is fun and fantastic, like Harry Potter, because it is a real game which has elements including challenges, personification and rewards. Also, they think the concept is educating them so that they can know deeper about each item. Participants find that talking to different ghosts with different personalities is interesting.

"It is fun that you can chat with them. If the ghosts have different strong personalities, that would be super fun." -P1

Others

Participants are sceptical about the longterm viability of this concept. They believe that after trying it once and becoming familiar with the website, they may no longer use this feature.

"I think this would be interesting when you see it for the first time. but In the long run, it feels more like a one-time experience, when you are familiar with it, you don't need it any more." -PI

Discovery tracker

Exploratory [4.11/5]

Reviewing their own exploration history, along with the areas they have yet to explore, was regarded as a personal and reflective experience by participants. Participants think this could help them to better know about their interest and prompt them to think about why they haven't noticed these areas before. The unexplored areas would spark their curiosity and trigger them to explore. Participants considered that seeing lots of circles surrounded by their familiar artworks gives them a sense of achievement that encourages them to further explore as a collector.

However, participants also mentioned that this concept would not work for a new user who hasn't explored anything yet on the website.

Serendipitous [3.94/5]

Participants felt that visualising unexplored areas could help break down filter bubbles and encourage them to venture into unfamiliar territory. However, compared to Concept 1, this approach offers less serendipity, as users might already have expectations about what to find when they decide to select an unexplored category.

"It triggers my curiosity, I might start noticing and thinking why I didn't pay attention to these things." -P7

"It gives me a feeling of achievement. I am like a collector or an expert in a specific area." -P2

"When I see something that I haven't explored before, I am curious to know about it." -P4

"This only suits when I have already made some progress on the website." -P5

"It is more like a summary of what you have done so far. If i choose a category, i could expect what i am going to see there." - P8

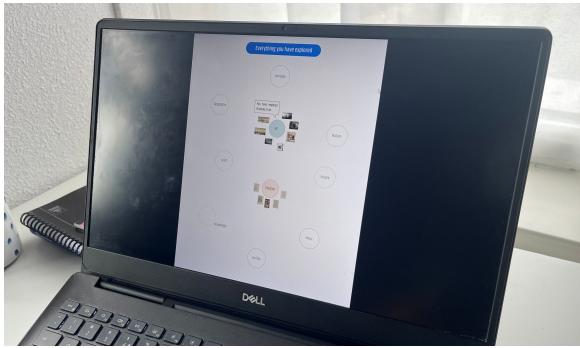


Figure 71. Offline testing with concept 4

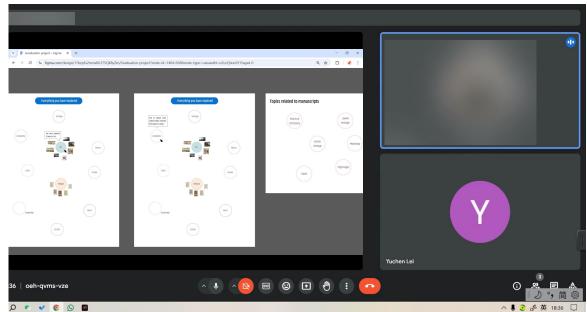


Figure 72. Online testing with concept 4

Supportive [3.89/5]

This concept is considered as the most supportive one. Participants feel that this concept offers a clear overview of the website's content and helps them keep track of their exploration history, much like a to-do list. They believe that visualising their current progress serves as a helpful starting point for future exploration. But this does support the users who haven't done anything yet. Therefore, some participants suggest that this concept has the potential to be combined with Concept 1 to provide a comprehensive overview of their exploration activities in Concept 1.

"It has a clear overview like a list, showing what I have and haven't done yet." -P7

"What I have already done would be a starting point to support me to explore." -P2

"If this is your first time using this website, it does not help to support me, I still don't know what direction I want to explore here." -PI

Playful [3.61/5]

Participants find the current exploration history map somewhat dull, as it consists mainly of text and the category titles are too broad. However, they can see the potential and the improvement room to transform it into a more engaging and fun experience by incorporating more visuals.

"It only has texts now, so this makes the interface look a bit boring. but the concept itself is interesting." -P3

"The theme provided here is too broad, I don't know what they would contain, so I don't know which one to go with." -P2

Quantitative data results

The average scores for each interaction quality regarding each concept were calculated and mapped in a scatter plot (Figure 73). This diagram could offer a clear and comprehensive overview of participants' perceptions of each concept from the four different perspectives. The concept of keywords exploration map was considered as the most exploratory, serendipitous and playful, but it is not as supportive as the other concepts. The most supportive concept is the Discovery tracker.

In addition, participants were asked to select and rank the two concepts they found most desirable as casual users of the digital collections website. The concept ranked as the most desirable received 2 points, while the second choice was awarded 1 point. The total scores for each concept were then calculated and are displayed in Figure 74. This graph could allow for a deeper understanding of the participants' preferences. They identified the 'Keyword Exploration Map' and the 'Discovery Tracker' as the two most desirable concepts for casual users.

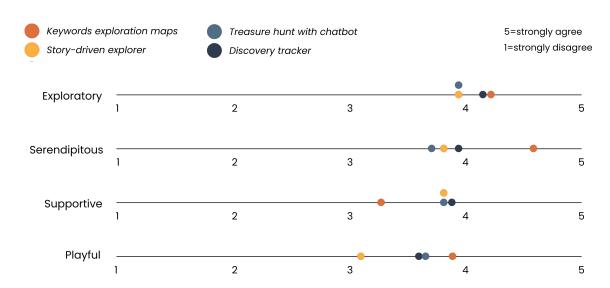


Figure 73. Average scores for each interaction quality

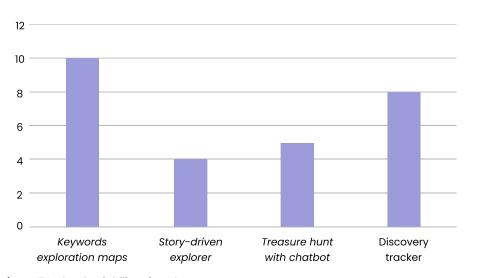


Figure 74. The desriability of each concept

5.5 Conclusion

From the results of the concept evaluation, I have determined the direction for my project. The Keywords Exploration Map is selected because it proved to be the most exploratory, serendipitous, and playful concept, although its supportive quality needs further refinement. Therefore, there is still room for improvement. Advantages from other concepts can be integrated as appropriate. Key insights to guide the next design cycle are as follows:

1. A more supportive starting point

The evaluation results highlight the need for a more supportive starting point in the exploration experience. Users indicated that random images provided by the system might not align with their interests, potentially discouraging their further exploration. They generally prefer not to encounter pure randomness without any conceptual scaffolds. Therefore, the element of 'chance' should be balanced well with some level of user control or choice.

Discovery Tracker ranks as the most supportive concept because it offers a clear overview of the website's contents and helps users keep track of their exploration history. Some features from Discovery Tracker could be potentially integrated into the final concept.

2. Need more information and contexts

Now Keywords Exploration Map offers more of an aesthetic and sensory experience focusing on visuals. Some participants expressed a desire for more detailed information about the items, particularly the central artefact. But previous user research indicates that extensive reading materials are not suited to casual users' needs.

This finding resonates with Elbert and Temme's (1992) study, which found that visitors' enjoyment of paintings increased when accompanied by written information, though overly long descriptions diminished aesthetic appreciation.

Therefore, more information about the collections should be provided but it is crucial to strike a balance in the amount. Also, the layout of the information display should be clear and concise. During testing of the **Story-driven Explorer**, participants found the feature that pops up an interesting but brief information related to the artefact when hovering over it to be playful and engaging, sparking their curiosity. This feature can be included in the next prototype.

3. Consider the convergent exploration

Although this project primarily focuses on supporting casual users' divergent exploration, some participants mentioned that after exploring diverse items, they might develop an interest in specific topics and wish to conduct more focused searches. This feedback aligns with previous literature, which suggests that both convergent and divergent exploration should be considered when designing.

4. Avoid usability problem

One usability problem that should be addressed is that most participants had difficulty discovering that the keywords could be dragged out. Providing a reminder or hint could help clarify this feature. Additionally, there is some uncertainty about whether the terms 'closely-related' and 'distantly-related' are too vague, as different people may have different interpretations of these terms.

5. Could be more playful

Currently, users feel engaged during their exploration, but the experience tends to be more like a serious play, indicating that there is potential for it to be more playful. The perception of playfulness heavily depends on the dynamic nature of the interactions. Therefore, in the next phase of ideation, interactions should be designed to incorporate a playful vibe.

6. End of the exploration

Participants frequently noted that the Keywords Exploration Map encourages them to click and explore more and more endlessly, but it lacks a clear conclusion. User research revealed that participants were often dissatisfied with the flat ending of their exploration. I found that users feel a sense of achievement when viewing all their exploration results or checking their own collections. Adding a feature to conclude their exploration journey by displaying all their discoveries could make the experience more enjoyable and fulfilling.

Chapter overview

- 6.1 Concept development
- 6.2 Integrated concept
- 6.3 User testing
- 6.4 Results
- 6.5 Conclusions

Chapter 6

Design cycle 2: convergence

In this chapter, an integrated concept was formulated, and an interactive prototype was created and tested with five participants in the second round of user testing.

6.1 Concept development

Based on the conclusion of the concept evaluation, Keywords Exploration Map was chosen as the final concept. The design can be defined as a new exploration experience that allows users to wander through diverse items through keywords connections in an open-ended and divergent way.

As outlined in the conclusion of the previous chapter, the benefits of other concepts, such as the Discovery Tracker and Story-driven Explorer, can potentially be integrated into the next phase of my concept. Additionally, other improvements discussed in the prior chapter's conclusion should be implemented to further refine the integrated concept. All improvements are listed below:

1. Add a supportive starting point

To strengthen the 'supportive' aspect, elements from the Discovery Tracker, such as providing a clear overview of the website's content through themed categories, were integrated into the Keywords Exploration Map. As a result, I redesigned the beginning of the exploration journey. Instead of starting with a random artefact selected by the system, users are first presented with an overview of all the themes available on Europeana and can choose one that interests them. After selecting a theme, users are shown today's trending artefacts within that theme. They can then select a specific item of interest, which will serve as the starting point for their exploration journey.

Other ideas for providing a more supportive starting point were also explored but were not pursued for several reasons:

One idea was to introduce an interactive Q&A feature at the beginning of the exploration to personalise artwork recommendations based on users' interests, allowing them to start with something familiar or aligned with their preferences.

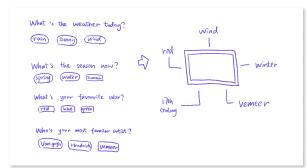


Figure 75. Sketch of the Q&A feature

However, this idea was set aside because it would lengthen the user journey and reduce the element of randomness and diversity in the overall experience.

Another idea was to begin the exploration with an artwork generated by dicing keywords. This concept is more playful than simply choosing a theme, but it results in overly random outcomes for users.



Figure 76. Dirty prototype of dicing the words

2. Provide more information & contexts

To address users' desire for more information about artefacts while avoiding lengthy texts, I added a feature that displays detailed information—such as the title, creator, date, and description—in a pop-up when users click on the central item.

Additionally, incorporating elements from the Story-driven Explorer, I designed a feature that shows a brief, engaging preview of information when users hover over related thumbnails. User research has confirmed that this approach not only attracts users to continue exploring but also helps them explore more efficiently with reduced effort and cost.

3. Add a 'see more' function to support convergent searching

The concept evaluation revealed that after engaging in divergent exploration of various items, users may develop an interest in a specific topic or artist. They then have the potential to shift to convergent exploration, seeking more content on their newfound interest.

I added a feature allowing users to click on keywords to explore more related artefacts to the keywords. For example, clicking on 'winter' will reveal a broader selection of artworks associated with the topic of winter. This enhancement helps users move from broad, divergent exploration to a more focused investigation of topics that interest them. The effectiveness of this feature will be tested in this round.

4. Solve usability issue

To solve the usability issue, several improvements were implemented:

- 1. An animation guide was added to better explain the exploration function, inspired by Google Arts & Culture's experiments like X Degrees of Separation.
- 2. A clearer hint was added for the dragging function, with an arrow indicating where to drag.
- 3. A toggle switch was introduced to separate the function of exploring closely-related items and distantly-related items. Further testing is needed to determine if this clarifies the exploration function for users.

5. Add some playful elements

To add a sense of playfulness, I replaced the original straight lines with curved, spring-like lines. When dragged, these lines mimic the effect of a spring, enhancing the interactive experience with a more engaging and dynamic visual metaphor. Also, many details of the interaction effects were carefully designed to enhance both coherence and enjoyment, such as how elements appear and transition during user interactions.

6. Consider the entry point of this function in Europeana current website

Since the final design is a feature that can be embedded into the digital collections website, it's crucial to consider its integration, especially the entry point within the current Europeana design.

7. Add a fulfilling ending

Another feature incorporated from the Discovery Tracker is its ability to track exploration history. This capability led to the design of an ending feature that allows users to view a summary of their exploration journey. This feature provides a meaningful conclusion to the exploration experience with a reflective summary, helping users understand their interests better. It also encourages users to continue exploring even after leaving this function on Europeana. The journey summary includes all the artefacts and keywords they have explored, as well as an overview of the themes they have frequently engaged with and those they have yet to explore.

8. Spatial hierarchy testing

Alongside the improvements identified in the concept evaluation session, I conducted spatial hierarchy testing by creating several interface ideas to explore whether there is a better alternatives to the existing radial map format and dragging function. I quickly prototyped these approaches and conducted rapid tests through peer review sessions with three IDE students. Some examples are listed below:

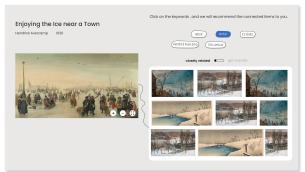


Figure 77. ideation 1

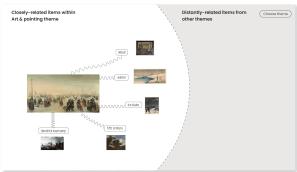


Figure 78. ideation 2

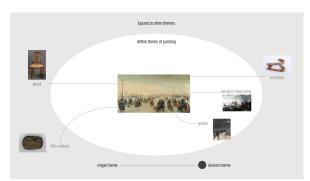


Figure 79. ideation 3

Placing the keywords on the right side of the screen, this approach shows related items in the area below when a specific keyword is clicked. It is clear and practical, but it gives the interface a more traditional research website feel, reducing the sense of playfulness and exploration.

Moving the central artwork to the left side creates more visual space for users to drag keywords to the right. While this design offers a cleaner layout with more white space, participants noted that it diminishes the feeling of the artwork being the central focus from which keywords radiate.

Replacing the dragging function with a toggle switch. In 'diverse theme' mode, the connected lines extends beyond the white circle, and the items change automatically without a dragging action. This approach reduces user control and may make results feel too random and boring.

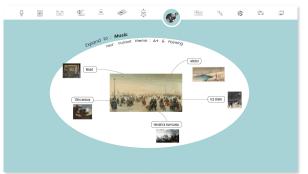


Figure 80. ideation 4

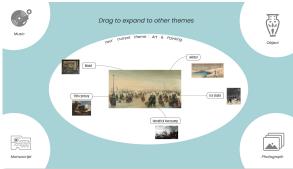


Figure 81. ideation 5

The final choice:

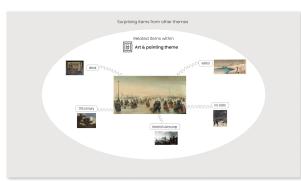


Figure 82. ideation 6

This idea introduces a feature in the navigation menu that lets users select which themes to expand to. Users can choose the themes they want to explore first, and then drag items outside the circle. This approach provide more user controal, but this approach may lead to a cluttered interface with too many functions. Users need to choose, click, and drag in the same space, potentially overwhelming and confusing users.

This idea is similar to the previous one, allowing users to drag keywords to different areas representing various themes located at the four corners, causing the items to change accordingly. However, this approach suffers from the same issue: it presents too many choices and functions on a single page, potentially overwhelming and confusing users. Additionally, with Europeana offering 13 themes, it is not feasible to display all themes effectively within this design.

The final choice is to use the central divergent radial format with the dragging function, without requiring users to select themes. This radial format evokes a sense of exploration, which was preferred over other interfaces. The dragging interaction enhances user control and adds a playful element. Consequently, my integrated concept builds on these ideas.

6.2 Integrated concept

Based on the findings from the literature review, user research, and the first design cycle, an integrated final concept was developed. This concept is called Wander More. A user journey map was crafted to illustrate the exploration experience of Wander More, which is presented on the next page.

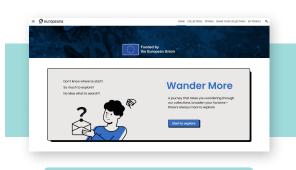
This is the link for the integrated concept's prototype in Figma:

https://www.figma.com/proto/ v0G6dTOTVkgofNQshuk7WZ/Integratedprototype?node-id=15-358&nodetype=frame&t=bDJI0em3gbilypsH-1&scalin g=min-zoom&contentscaling=fixed&page-id=0%3A1&startingpoint-node-id=15%3A358&show-protosidebar=1

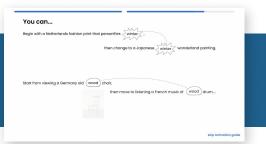




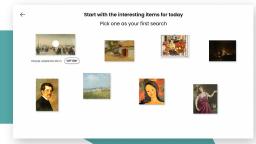
3 Choose a starting point











Enter into Wander More

Watch or skip the animation guide that introduce Wander More's functions

Choose a theme of interest

Pick one item of interest from today's trending items within the selected theme to get start

4 Explore items through keywords connection



Click on keywords of interest to see more related items specifically to the selected keyword.



Switch to 'get surprise' mode. Drag the triangular handle at the end of the line, then you can explore the distanly-related items from different themes!

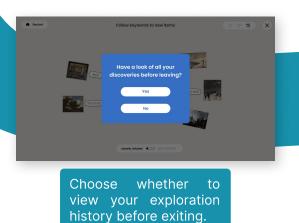


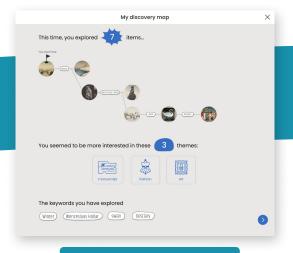
Clicking on a related item's thumbnail moves it to the centre, generating new keywords and new related items. Here, you can continue clicking on items of interest endlessly!

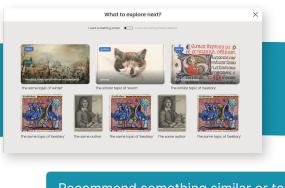


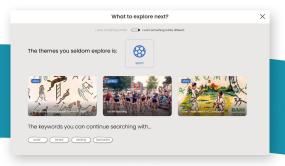
The selected item jumps to the centre, with related pieces sharing the same keywords arranged around it.

5 View the exploration history to wrap up







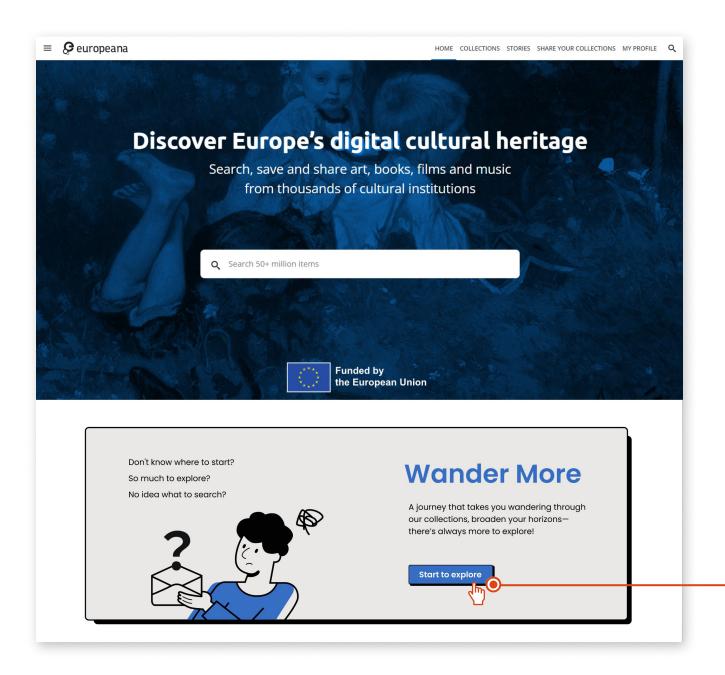


Recommend something similar or totally different to explore next

Figure 83. User journey map of the integrated concept

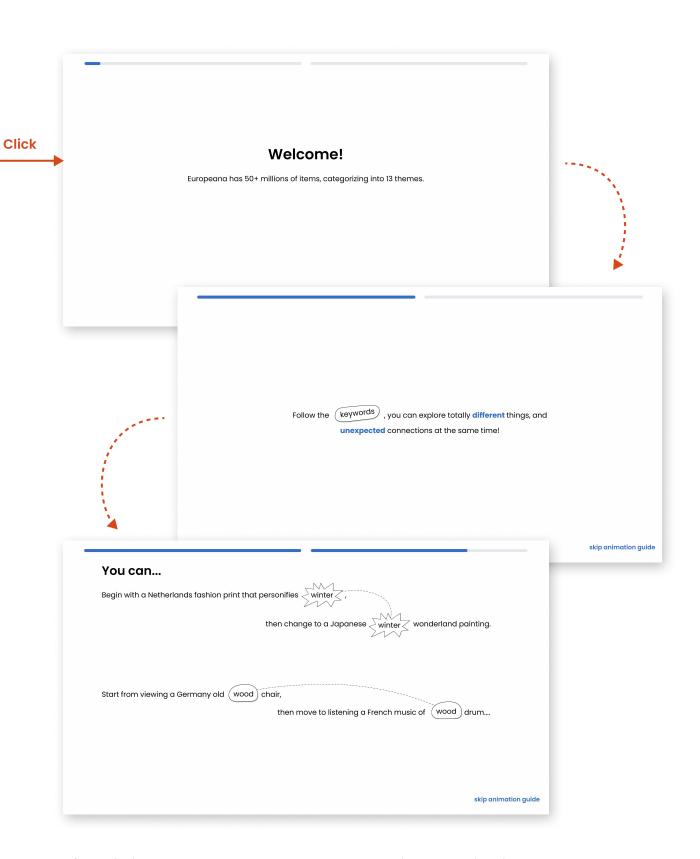
View exploration journey

Entry point



I integrated my design, Wander More, into Europeana's current landing page, positioning the entry point just below the search bar. Users need to scroll down to access it.

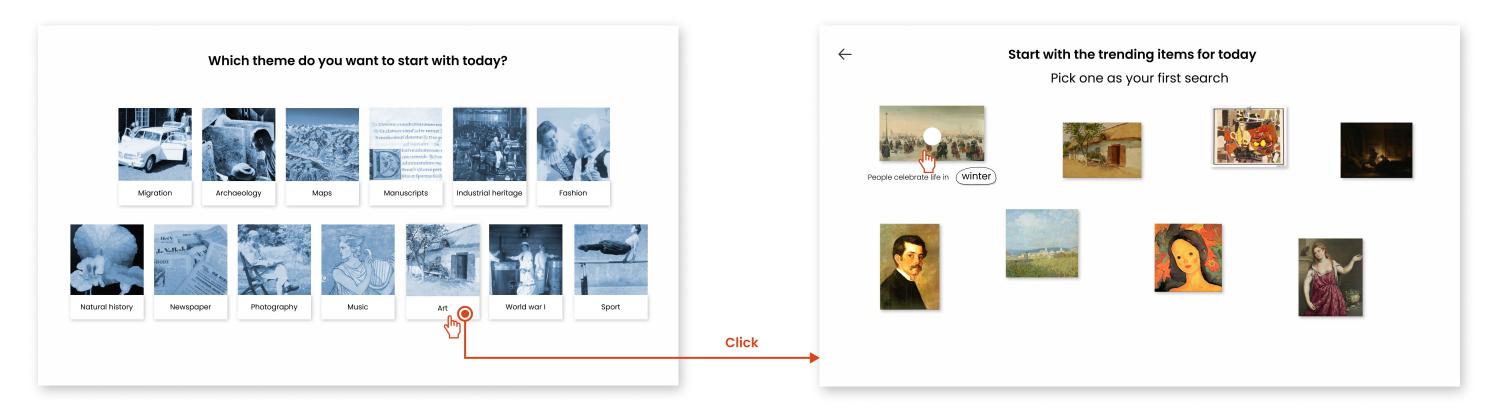
Introduction Animation



After clicking the Start to Explore button, an animated guide introduces the Wander More function and gives a basic overview of Europeana's collections. Users can also choose to skip the animation.

118

Starting point selection page

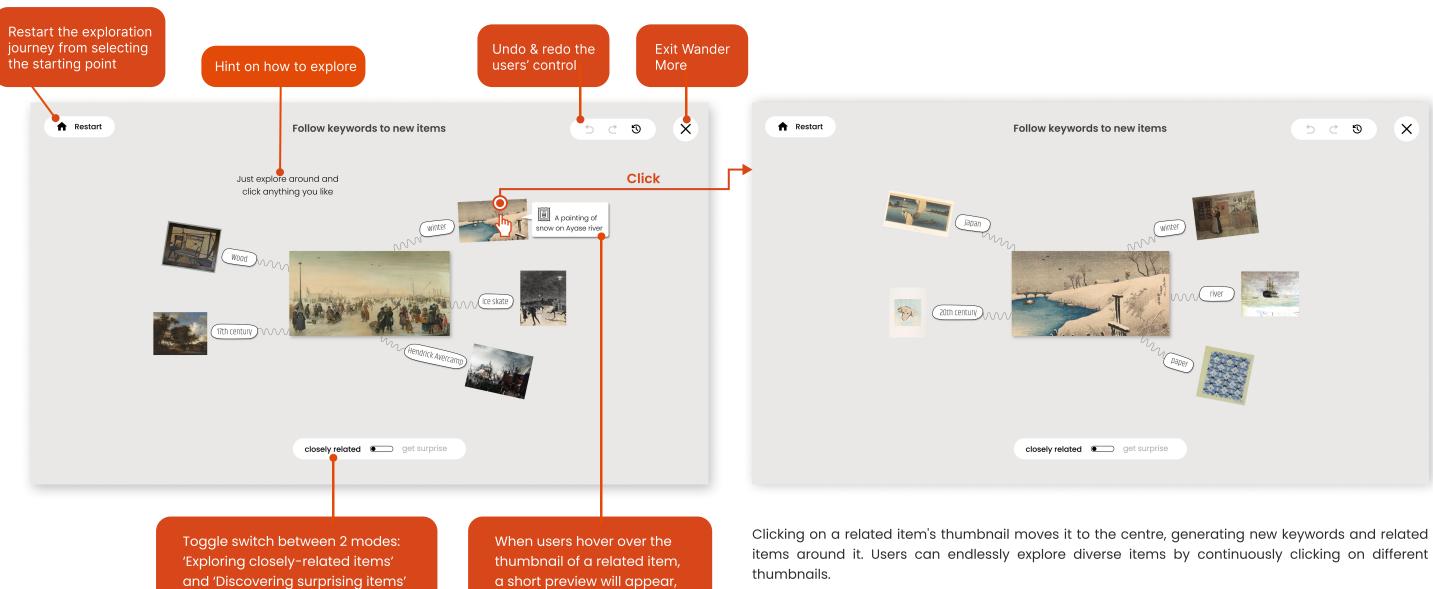


Users first select a theme they want to start with.

Next, users can choose an item from the today's trending items within the selected theme as their starting point for the exploration journey.

When users hover over an item, a short description with a highlighted keyword appears, providing a preview of the item's content.

Exploration page - Continous clicking

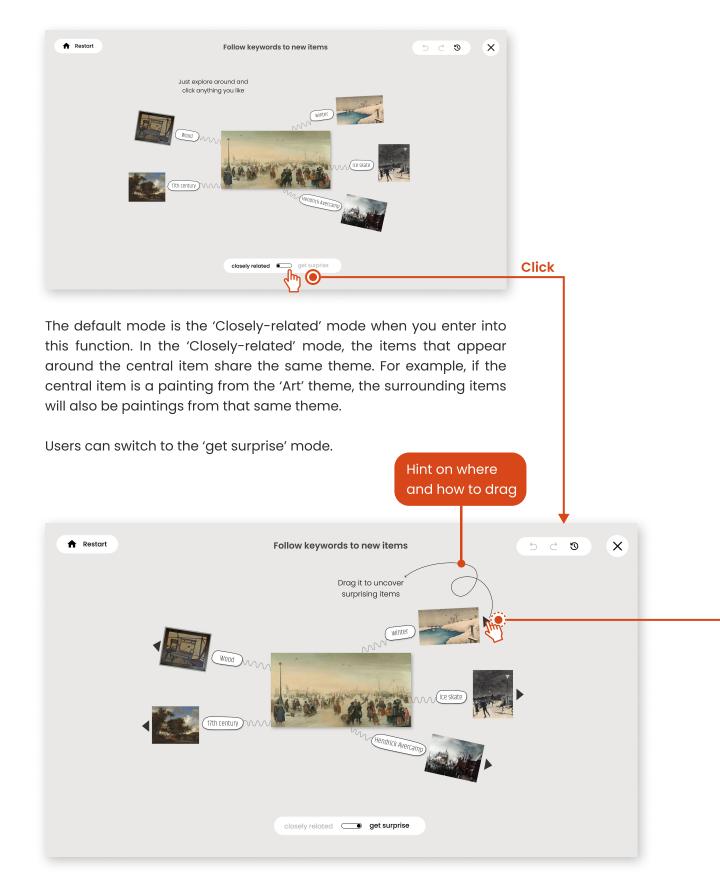


showing the title and type of

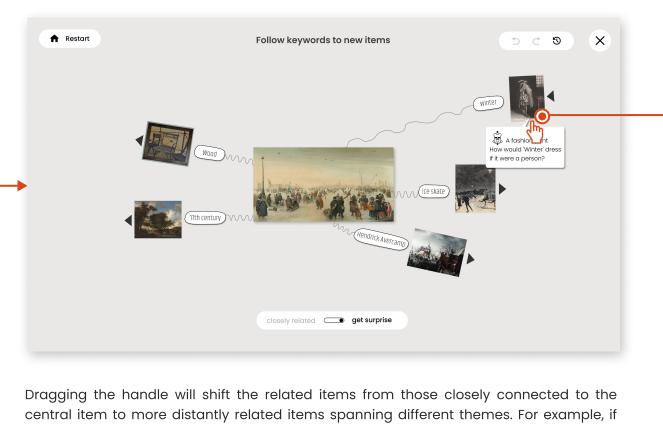
the item.

The selected starting item becomes the centrepiece, with related items sharing the same keywords arranged around it. These keywords are linked to the content, creators, materials, or time periods of the item.

Exploration page - 'Discover surprising items' mode



Upon switching to 'Get Surprise' mode, a hint for the dragging interaction appears, and a triangular drag handle becomes visible.



central item to more distantly related items spanning different themes. For example, if the central item is a painting, the items might change to include an object, a fashion print, a music recording, or a photograph, etc.

Click

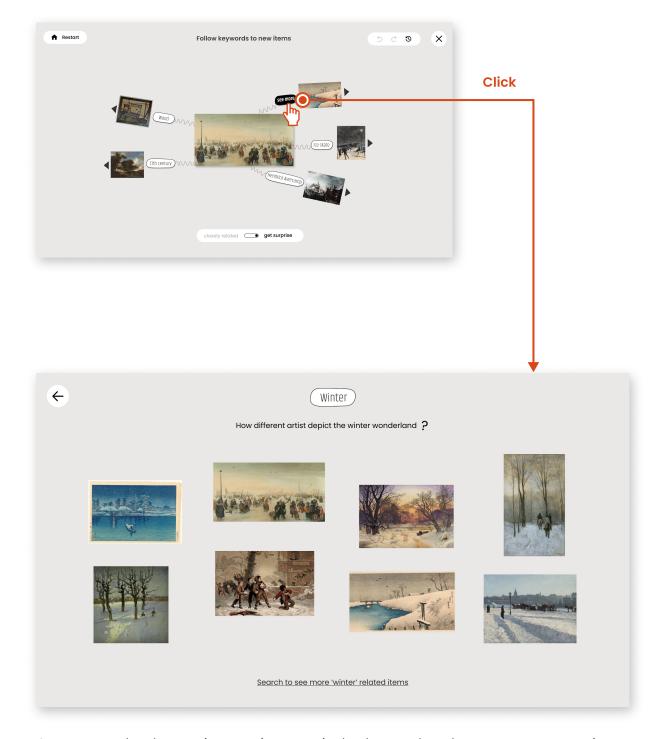


Users can also click on the surprisingly-related items, which will move them to the center and generate new keywords and related items.

123

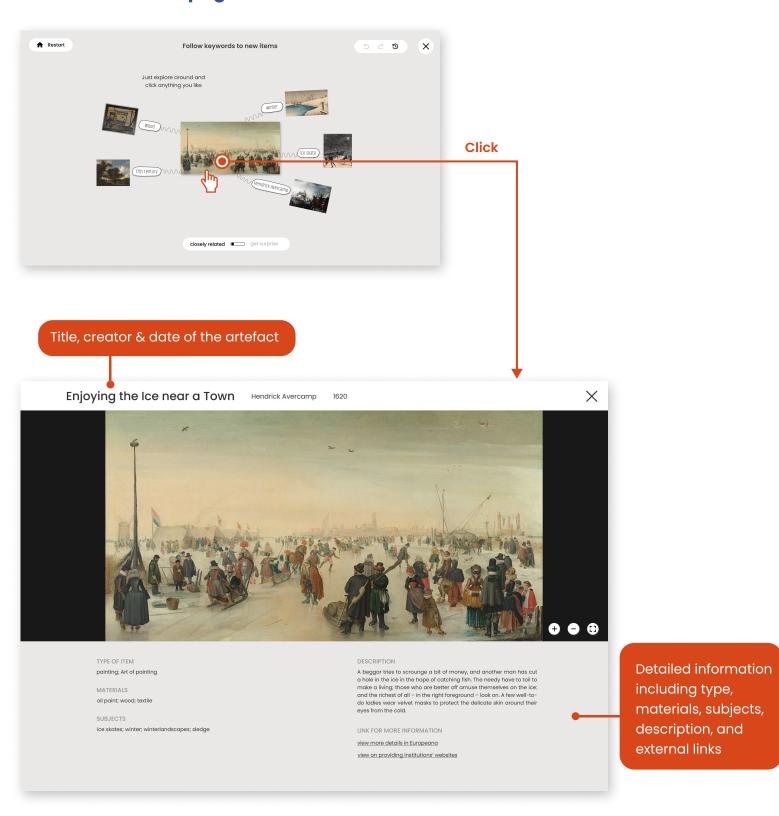
Drag

See more page



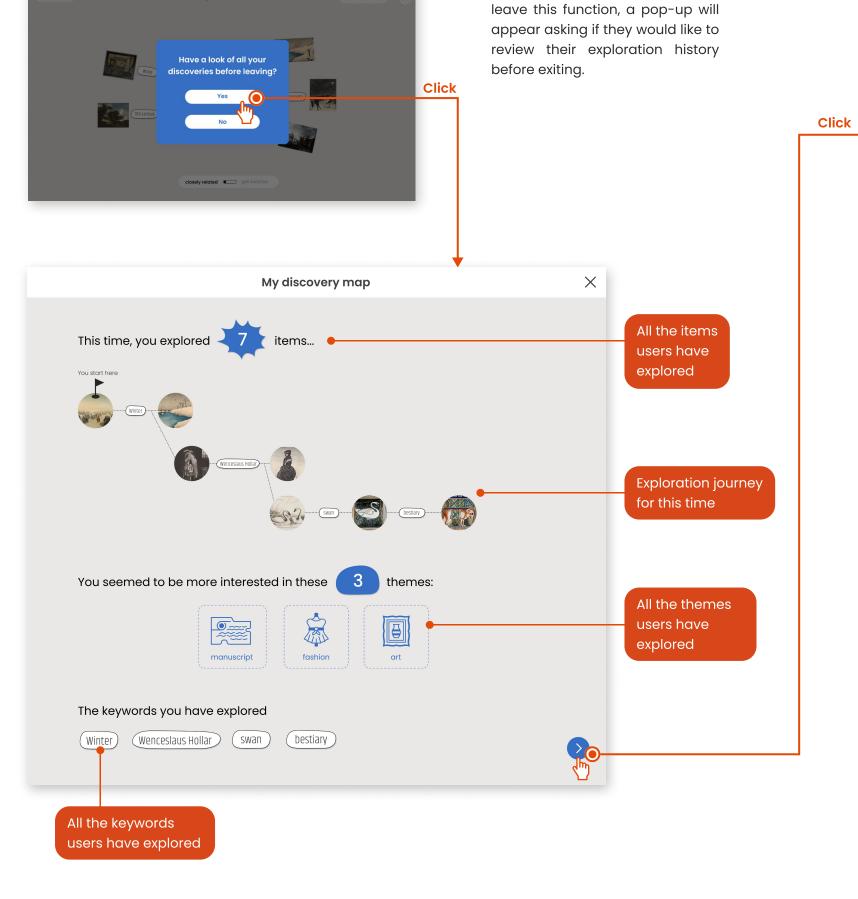
Once users develop an interest in a particular keyword and want to see more items related to it, they can click on the keyword to conduct a specific exploration. This action will display more related items associated with the selected keyword, allowing for a more focused and deeper exploration.

Item information page

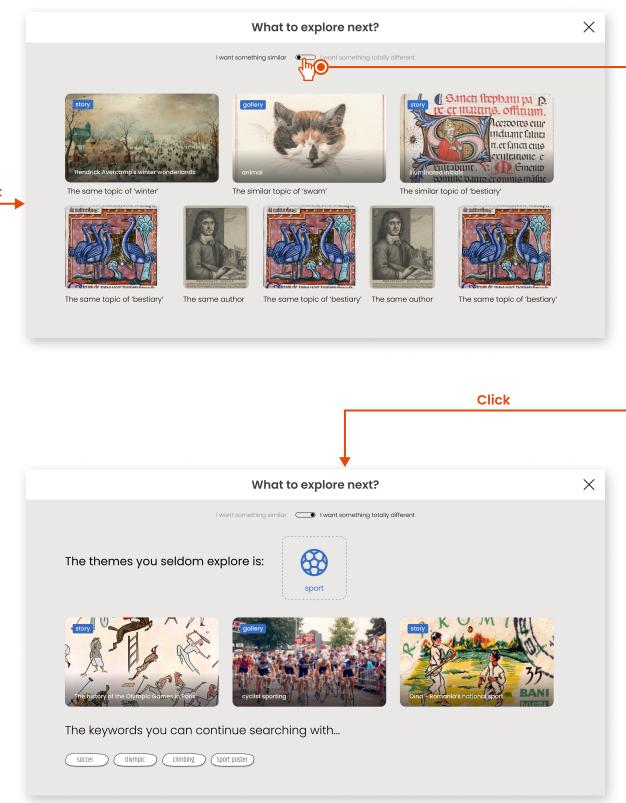


By clicking on the central item on the exploration page, users can access detailed information about it.

Exploration history page



When users click the exit button to



The system will also provide recommendations for users on what to explore next. Users can choose to see something similar to their current exploration or try something entirely new that they haven't encountered during their journey.

6.3 User testing

Goals

The main goal of the second-round user test was to evaluate users' **overall feeling** of the whole experience and the **usability** of the entire concept. The integrated prototype was tested to gather feedback on whether the 'supportive' quality had improved and to identify any additional areas for potential improvements.

Participants

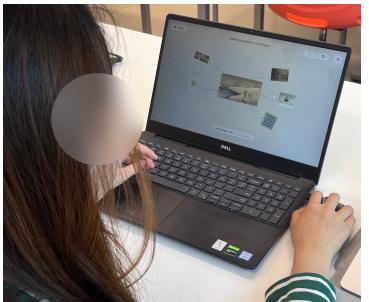
Five participants were recruited through convenience sampling. There were three experienced users of digital collection websites and two users who were new to digital collections but are cultural enthusiasts with a passion for visiting offline museums.

Procedure

The tests were conducted both online and offline with the same procedure. First, participants were introduced to the context of the project and the activities involved in the test. They were then asked to go through the prototype. There were no specific tasks during the test, but basic instructions were provided to guide participants through the entire experience. The instructions are outlined below (Table 5). Following this, a semi-structured interview was conducted to gather feedback on their overall experience. Finally, participants completed the same evaluation form used in the first round concept evaluation, assessing the four intended interaction qualities (exploratory, serendipitous, supportive, and playful). Additionally, they filled out the System Usability Scale (SUS) to evaluate the system's usability.

Part 1: Entering & getting introduced	1.1 Enter into the Wander More function 1.2 Watch the introduction animation		
Part 2: Choosing a starting point	2.1 Choose one category of interest 2.2 Choose one item of interest to get start		
Part 3: Exploring	3.1 Explore diverse items 3.2 Try the 'Get surprise' mode 3.3 View one artwork's detailed information 3.4 Try to see more items related to one keyword		
Part 4: Wrapping up	4.1 Exit the function 4.2 View the exploration history		

Table 5. Instruction of the test



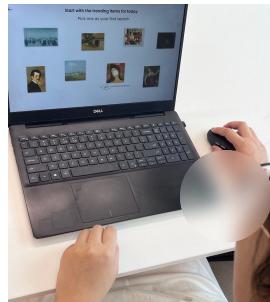


Figure 84. Offline user tests

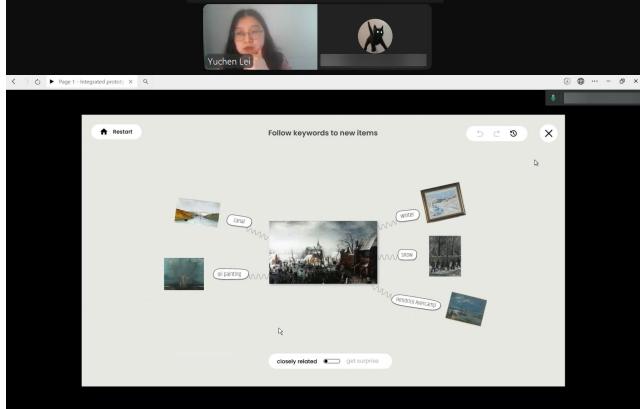


Figure 85. Online user tests

Methods

Several techniques were used to collect data during the user tests. Qualitative data was gathered through interviews, observation, and thinking out loud, while quantitative data was collected using the interaction qualities evaluation form and the System Usability Scale (SUS).

Thinking out loud

During interacting with the prototypes, participants were asked to share their thoughts aloud.

Observation

Participants' navigation and interactions with the system were observed, and any incorrect attempts were documented.

Semi-structured interview

After testing the prototypes, participants were asked to share their overall feeling, their favourite aspects and any parts they disliked.

Interaction qualities evaluation form

This form is the same with the one used in the first round concept evaluation. It asked participants to evaluate the concept based on four qualities of the designed experience: exploratory, serendipitous, supportive, and playful. It also helped assess whether the concept showed improved 'supportive' quality.

System Usability Scale (SUS)

The System Usability Scale (SUS) (Bangor et al., 2008) is a reliable and valid tool for measuring perceived usability, using a 10-item questionnaire. Participants rated each of the 10 statements on a scale from 1 (strongly disagree) to 5 (strongly agree).

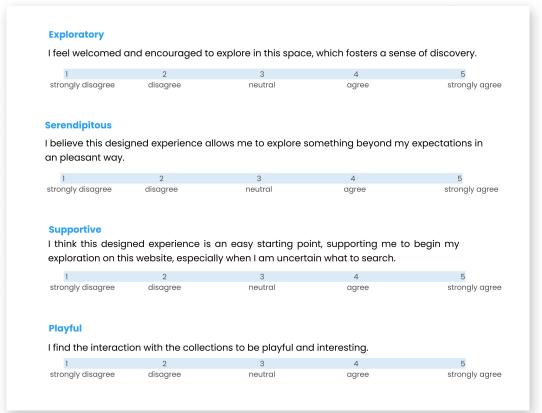


Figure 86. Evaluation form of the four interaction quealities

	The System Usability Scale Standard Version		Strongly disagree		Strongly agree		
		1	2	3	4	5	
1	I think that I would like to use this system.	0	0	0	0	0	
2	I found the system unnecessarily complex.	0	0	0	0	0	
3	I thought the system was easy to use.	0	0	0	0	0	
4	I think that I would need the support of a technical person to be able to use this system.	0	0	0	0	C	
5	I found the various functions in the system were well integrated.	0	0	0	0	O	
6	I thought there was too much inconsistency in this system.	0	0	0	0	C	
7	I would imagine that most people would learn to use this system very quickly.	0	0	0	0	C	
8	I found the system very cumbersome to use.	0	0	0	0	C	
9	I felt very confident using the system.	0	0	0	0	O	
10	I needed to learn a lot of things before I could get going with this system.	0	0	0	0	c	

Figure 87. System usability scale (SUS)

6.4 Results

Qualitative data

1 What do people think of the overall experience (function & interaction)?

1. Four out of five participants actively mentioned that the exploration experience is **relaxed** and **approachable**, contrasting it with the serious and boring nature of academic encyclopaedia websites. Some of them noted that the experience resembled wandering through a physical museum and lowered the threshold to exploring digital collections.

"I have a similar feeling of wandering aimlessly around the physical museum... with different artefacts hanging on the wall... I just enjoy viewing them" -PI

2. Regarding the function of the experience, most participants agreed that it could help them gradually **develop an interest** in specific items or artists, and motivate them to **continue exploring**. One participant also noted that this experience can help them get a **basic understanding** of the contents in Europeana.

"The style between these two artworks is really different, but they are drawn by the same man. I'm curious about this... I may continue clicking on the artworks from this artists." -P2

3. Participants also exhibited some level of **confusion**, especially when first interacting with this concept. This confusion stemmed from various usability issues, which will be discussed in detail in the later section.

2 What do people like and dislike of the concept?

1. Some participants don't like the entry point, suggesting that it could be made more noticeable and placed in a more prominent position. Currently, the search bar of the original Europeana website still dominates the page, and users don't realise immediately that they need to scroll down to find the entry for the "Wander More".

"The entry should be more attractive...
When I enter this website, I still feel that it urges me to use the search bar..." -P4

- 2. They like the introduction animation with dynamic interactions.
- 3. Most participants appreciate the theme selection page, as it supports them start their exploration by narrowing down their options of interest.

"This is helpful, just like the map in the physical museum..." -P4

4. Four out of five users mentioned that they like the dragging function because it is **playful** and helps them discover something **different**.

"I like it. when I drag it, I can start to see something different. I'm not into 'winter', but I can imagine if there's a word like 'feminism', I desire to see diverse types of things related to it." -P3 5. Participants appreciated the function of viewing the exploring history, because they think it gives them a sense of **achievement**, clearly showing their exploration progress. But they expressed a desire to view their exploration track **during the process**, rather than only after finishing the exploration.

"I really like this map showing the history of exploration. It looks lovely and I would love to take a screenshot. It reminds me a lot of my skill tree!" -P5

6. Several users expressed a desire to add artwork they like to their personal collections. This feature is already available in Europeana's current design through a 'Like' button. It should also be incorporated into my design.

Improvements

- 1. Provide the users with the ability to check their exploration track during the process.
- 2. Create a more noticeable entry point
- 3. Provide users with the ability to add the artwork they like into their personal collections

3 How do people perceive the usability of this system?

The usability issues listed below were identified both through user testing and from feedback provided by the supervisory team.

1. Most participants understood the **dragging function**, but some only succeed after 2 or 3 attempts or still require a hint from me. This is because the prompts on where to drag are unclear, disappearing too quickly and not prominent enough. Users are also unsure when to release and what to expect. Including an example animation with clearer instructions could help.

Another usability issue with the dragging function is that when the mouse hovers over an artifact, it enlarges and obscures the triangular drag arrow, making it hard for users to interact. This should be addressed in the next iteration.





Figure 88. Drag handle issues

"I just wanted to drag the marker, but where did it go?" -P2

2. Participants found the function of **clicking on keywords to see more** related items very useful. However, the current interaction design for this function confuses users, as they assume that keywords and images are a bundle and that clicking on either will produce the same results, but they actually yield different effects. Additionally, participants felt the number of related artworks displayed after clicking on keywords was too limited and wanted more results.

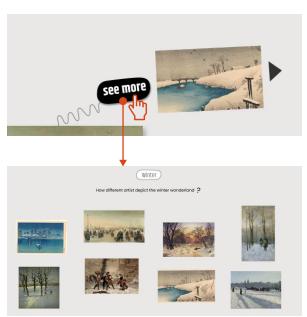


Figure 89. Clicking keywords issue

"I didn't expect this. I thought the keyword and the related image were a bundle, and the keyword is really small. I didn't expect it to lead me to another function." -P3

3. On the theme selection page, two participants noted that it's unclear whether a theme has been selected because there is no visual feedback when hovering over a theme.

4. The supervisory team noted a potential usability issue that needs attention when moving to the next ideation. They found the toggle switch for 'Closely-related' mode and 'Get Surprise' mode could be confusing, as users might not immediately recognize what is 'surprising' after switching.

In fact, in 'Closely-related' mode, the design shows items that are closely related within the same theme as the central artifact, while in 'Get Surprise' mode, it displays items that are distantly related and from diverse themes. However, this distinction is not clearly conveyed, making it difficult for users to understand the difference between the two modes.

Improvements

- 1. Make the prompt of the dragging function clearer
- 2. Seek a better solution for the 'see more' function if possible. If a more effective solution cannot be found, consider removing this function, as it may currently cause confusion for users.
- 3. Add a select indication in the page of the theme selection page
- 4. Clarify the distinction between 'Closely-related' and 'Get Surprise' modes.

One solution is to change the ambiguous title "Get Surprise" to something clearer and more understandable. 'Distantly-related' might be a better choice.

The system could be designed to display information about newly generated artefacts immediately after they are dragged out, to emphasize that these items come from different themes. Alternatively, consider using clearer visual cues or labels to highlight the thematic differences.

Other solutions could be removing the toggle switch, adding a circle, and asking users to drag outside the circle, in order to receive distantly-related items.

The animation guide can offer tutorial-style instructions to clarify this function.

The supervisory team also provided insightful suggestions to address this issue. For instance, they proposed using straight lines to connect artefacts in "Closely-related" mode and spring-like lines to connect artefacts in "Get Surprise" mode. Another suggestion was to display some unique patterns when switching to "Surprise" mode.

Quantitative data

Exploratory [4.6/5]

Participants thought that the inviting introduction animation, the connections between artefacts, the radial layout, and the display of exploration history all encourage them to explore further.

Serendipitous [5/5]

All participants rated the serendipitous quality a 5 out of 5, because the display method of placing different artefacts together and the dragging function provided a pleasant sense of surprise. But they also mentioned that their ratings were partly based on an idealised experience they imagined. Due to technical constraints, the content of the artefacts is pre-set by me, and currently, only specific artefacts can be interacted with, which cannot offer the infinite exploration experience described in the concept. While there is some element of serendipity in the artefact content, it is still somewhat limited.

Playful [4.3/5]

Participants' feedback indicated that the dragging element, the spring-like metaphor, and the dynamic animations on the website all contributed to the concept's playfulness.

Supportive [4/5]

Compared to the first round of concept evaluation, the 'supportive' quality has improved and is now adequate, though it remains the lowest score among all the qualities. Most participants think the design does support them to start their exploration easily.

However, participants' perception of the design's supportiveness varies, largely based on their personal preference for the amount of user control they desire.

Four participants rated the quality above 4 overall. Some felt the design was supportive because it gave them a sense that the system was following their choices, responding to their actions and guiding them along the way. They also mentioned that showing exploration history and the theme overview at the start enhanced the supportiveness.

In contrast, one participant with a clear preference for specific interests found the level of user control insufficient, wanting to explore only within those interests and to have a more personalised starting point. Another participant felt that the system always presented many choices, which sometimes made it hard to decide, reducing the sense of supportiveness.

"It feels like I'm in control... the artworks were generated by me." -P3

"I prefer to have more control, it would be better if I can choose to explore only focusing on my interests, like the ancient wonders of Egypt..." -P4

To further enhance the quality of 'supportive,' incorporating features such as a search bar, a detailed overview of the entire collection, or a personalised system at the starting point could be beneficial.

However, these additions might affect the 'serendipitous' and 'exploratory' aspects of the experience. At this stage, the 'supportive' quality is already adequate, as the concept also needs to maintain a level of diversity and randomness to facilitate free and open-ended exploration. Therefore, I can conclude that the concept already provides a suitable degree of user control and support for casual users. It is particularly useful for those who are completely unsure of what they are looking for.

SUS score [79]

Overall, despite encountering several detailed usability issues, the prototype achieved a score of 79, which can be considered a good performance in terms of usability, as shown in the Table 4.

According to Saruno (2011), the grade and the adjective ratings for different scores were shown in the Table 4, based on a research survey with 5000 participants.

SUS Score	>80.3	68-80.3	68	51-68	< 51
Grade	Α	В	С	D	E
Rating	Excellent	Good	Average	Poor	Awful

Table 4. SUS evaluation result

SUS score of my design concept: **79**

6.5 Conclusions

Based on the results of the second round of user testing, the following improvements were made to advance to the next ideation phase and develop the final prototype:

1. Add a 'My Track' section where users can view their exploration history while they explore.





Figure 90. My track

- 2. Enhance the visibility of the entry point by integrating it into the first screen of Europeana. A small hover-over interactive animation was added as a decorative element.
- 3. In the 'My Track' section and the exploration journey summary, users can like items and add them to their personal Like gallery on their Europeana profile page. They can also download them.



Figure 91. Like & download

4. The phrase 'Get Surprise' was changed to 'Distantly-Related' to reduce confusion. The toggle switch was removed to simplify the interaction. Users now drag keywords outside the circle to shift items from closely-related to distantly-related, making the interaction more intuitive and understandable.

5. A clear and concise tutorial animation was created to guide users on how to explore using this function. The animation included a demonstration of the dragging feature, clearly showing how to drag keywords and what happens afterward.



Figure 92. Tutorial animation

6. The prompt for clicking thumbnails and dragging keywords was made clearer. When users press a keyword, a 'Drag' prompt with an arrow appears, showing how and which direction to drag.



7. The function of clicking on keywords to see more has been moved to 'My Track' and the exploration journey summary. This integrates with Europeana's search function, opening a new window with search results for the keyword. This change is more logical, as users often develop specific interests after exploring a wide

range of collections.



Figure 94. Click to search more

8. A selection indicator was added to the theme selection page. It would change color when hovering over.



Figure 95. Select indicator

9. Since distantly-related items share the same keywords but come from different categories, the type of each item was clearly labelled to distinguish between closely-related and distantly-related items.

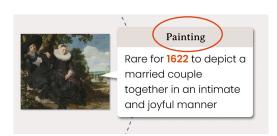


Figure 96. Type of item's label

- 10. After dragging an item outside the circle, preview information about the newly generated items appears immediately.
- 11. In the preview information, text related to the keywords is highlighted in bold orange font.



Figure 97. Preview information

12. The exploration journey summary based on theme category is visualised, allowing users to clearly see which items belong to each theme and how they connect with other items and keywords.

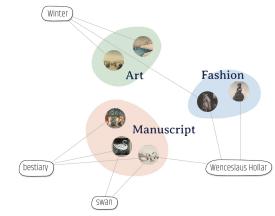


Figure 98. Exploration journey summary based on themes

- 12. The recommendation parts for what to explore next were removed to make the ending session clear and concise.
- All of these improvements can be found in the Chapter 7 of Final Concept.

Chapter overview

- 7.1 Highlights of Wander More
- 7.2 Final user journey
- 7.3 Working prototype

Chapter 7

Final concept

Based on the findings from the previous user tests, a final design called Wander More was developed. A working prototype was created for the final evaluation.

7.1 Highlights of Wander More

Wander More is an innovative online tool for exploring digital collections, designed to invite casual users with an easy starting point and support their divergent exploration. It aims to offer an exploratory, serendipitous, supportive, and playful experience with digital collections.

The design is presented as an integrated feature within Europeana, a digital collection website. I chose to integrate my design into Europeana rather than create a standalone website because of Europeana's large user base, which will greatly boost the visibility and usage of the design. Additionally, Europeana's search and catalogue sorting functions cannot be fully replaced. Wander More will work best when used alongside these existing functions.

Here are the key features of the final design:

1. Keyword-driven exploration network

The visually-focused and divergent network connecting related items through keywords provides a simple and playful way to endlessly explore digital collections. In this network, items are linked by keywords. Clicking on a related item moves it to the centre, generating new keywords and related items.

2. Dragging keywords

During exploration, users can drag keywords outside the circle, causing related items to shift from closely related to distantly related. This feature provides a playful interaction and opens up opportunities for users to encounter a more diverse range of items in a serendipitous manner.

3. Also supports deep and specific exploration

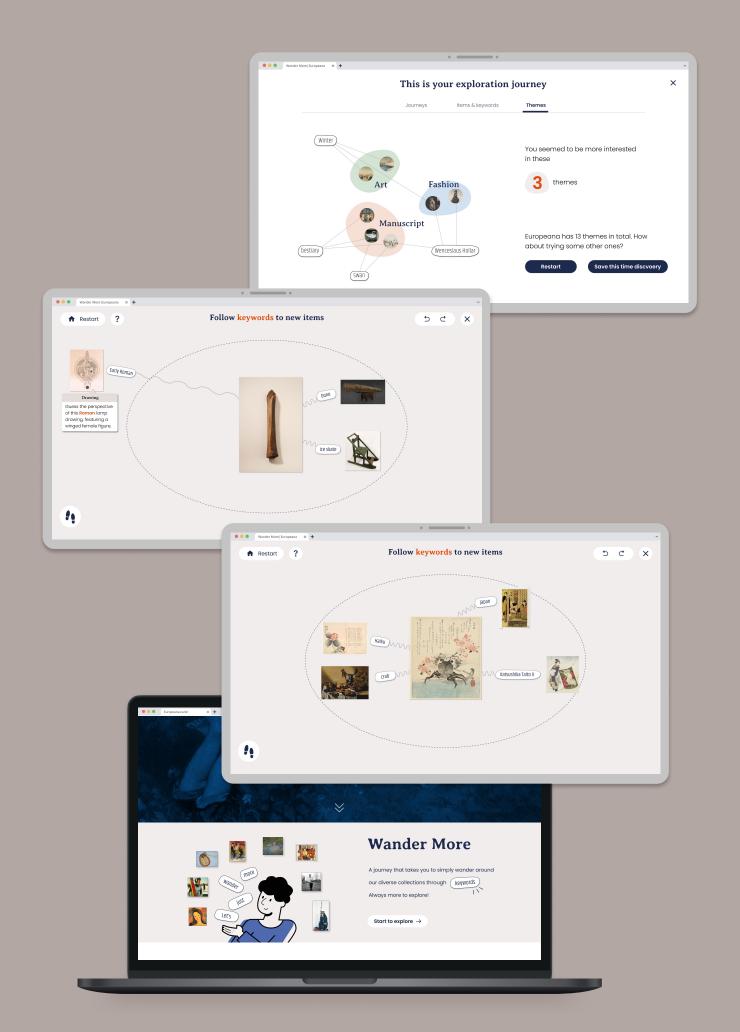
While the design primarily focuses on divergent exploration, it also supports deep and specific exploration through several features. Clicking on the central item opens a detailed information page, hovering over related thumbnails displays a brief but engaging preview, and clicking on keywords in the 'My Track' section opens a new window with search results for that keyword.

4. Exploration journey summary

At the end of the exploration, users receive a summary of their exploration journey in 3 different formats. It compiles all the items and keywords they have explored. This feature not only encourages further exploration but also helps users see their personal interests and achievements clearly.

Here are the links of the final design:

https://www.figma.com/proto/wj7KXVRwxzL9TKPIR5GPcz/Final-Prototype-for-Testing?node-id=282-1333&node-type=canvas&t=HPCntFzu8MopzHTX-1&scaling=min-zoom&content-scaling=fixed&page-id=0%3A1&starting-point-node-id=282%3A1333&show-proto-sidebar=1

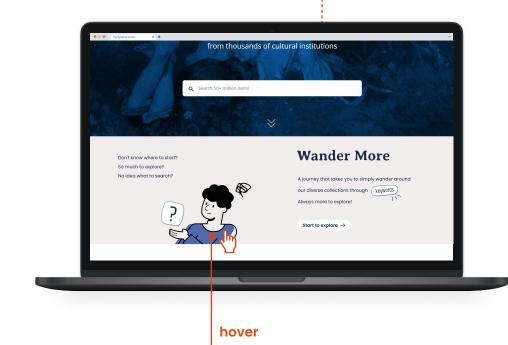


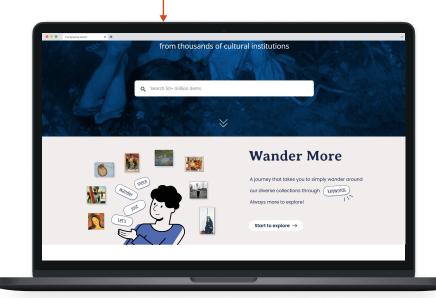
Before exploration

Enter into Wander More

The entry of Wander More is placed on the landing page of Europeana, just right below to the search bar of the Europeana current design. The search bar would not dominate the whole with Wander More function exposed a little bit on the first screen after entering Europeana. A white arrow is added after the search bar to suggest that this page can be scrolled down.



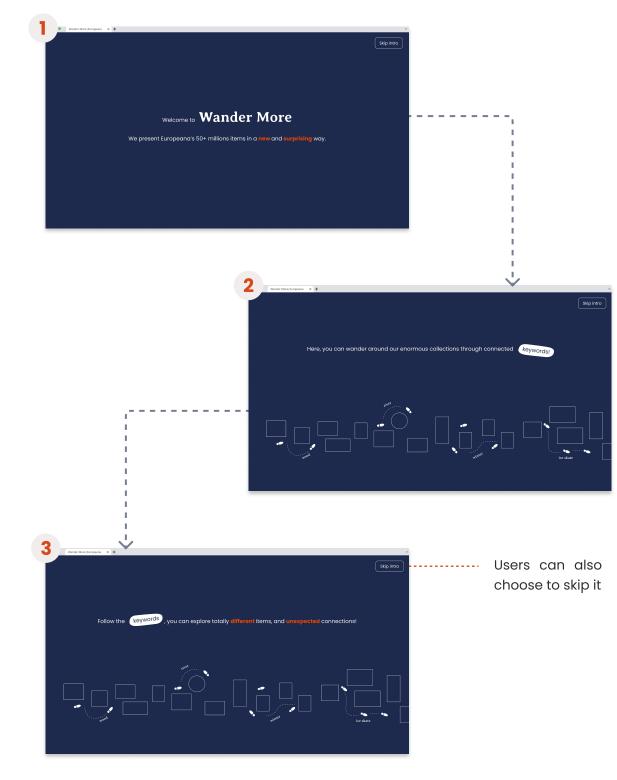




Additionally, to make the entry point more attractive and noticeable, a small interactive animation is included as decoration.

Watch animation guide part 1

When users first access this feature, they will begin with an animation guide. It consisted two parts. The first part is a compelling introduction to this innovative feature from a conceptual perspective. The key pages of the first part are shown below, with transitions between them omitted.

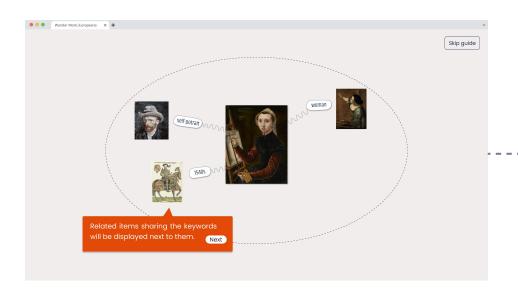


Before exploration

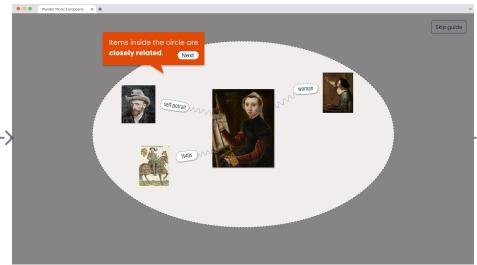
Watch animation guide part 2

The second part of the animation is a concise tutorial with practical instructions on how to use this feature to explore. Users can choose to skip the guide on subsequent visits. Only key pages of the second part are shown below. The full detailed animation could be found in Appendix.

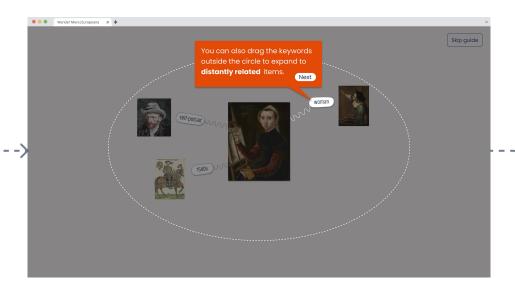
In the tutorial, the following key information is emphasized to users:



Related keywords and the related items that share the same keywords will be displayed around.



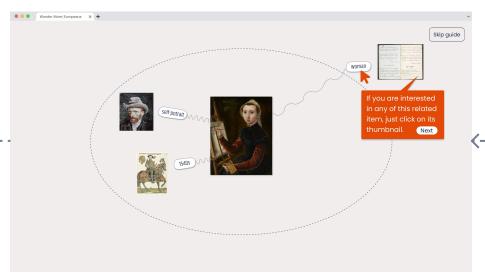
2 Inside the circle are the closely related items.



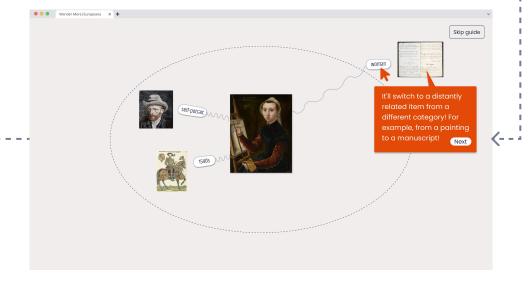
Users can drag keywords outside the circle to reveal distantly related items. After clicking 'Next,' an animation demonstrating the dragging and switching of items is shown to inform users about the effect.



After that, new keywords and related items will appear around it.



Clicking on any thumbnail will move the item to the center.



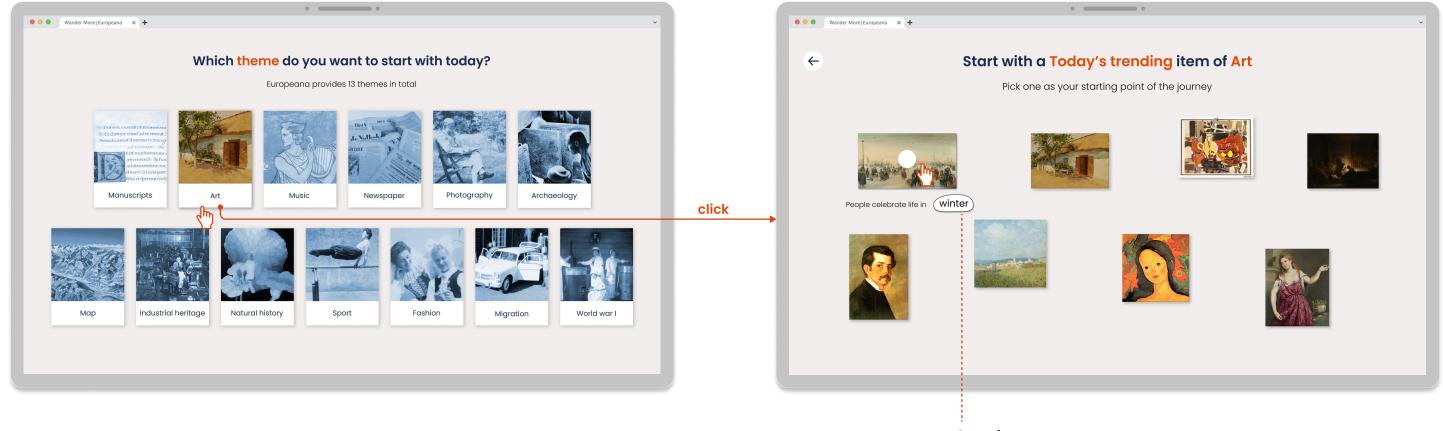
After dragging, the items will change randomly to something sharing the same keywords but from a different category.

Start exploration

Select a starting point

After being introduced to the feature, users arrive at the starting point selection page, where they need to choose an item of interest as a starting point of their exploration journey.

To help users choose more effortlessly, the system first asks them to select a theme of interest from Europeana's 13 available themes. After choosing, users can pick an artefact from the daily updated trending items under that theme, curated based on recent events, news, and relevant dates. This selected item becomes the starting point of users' exploration.



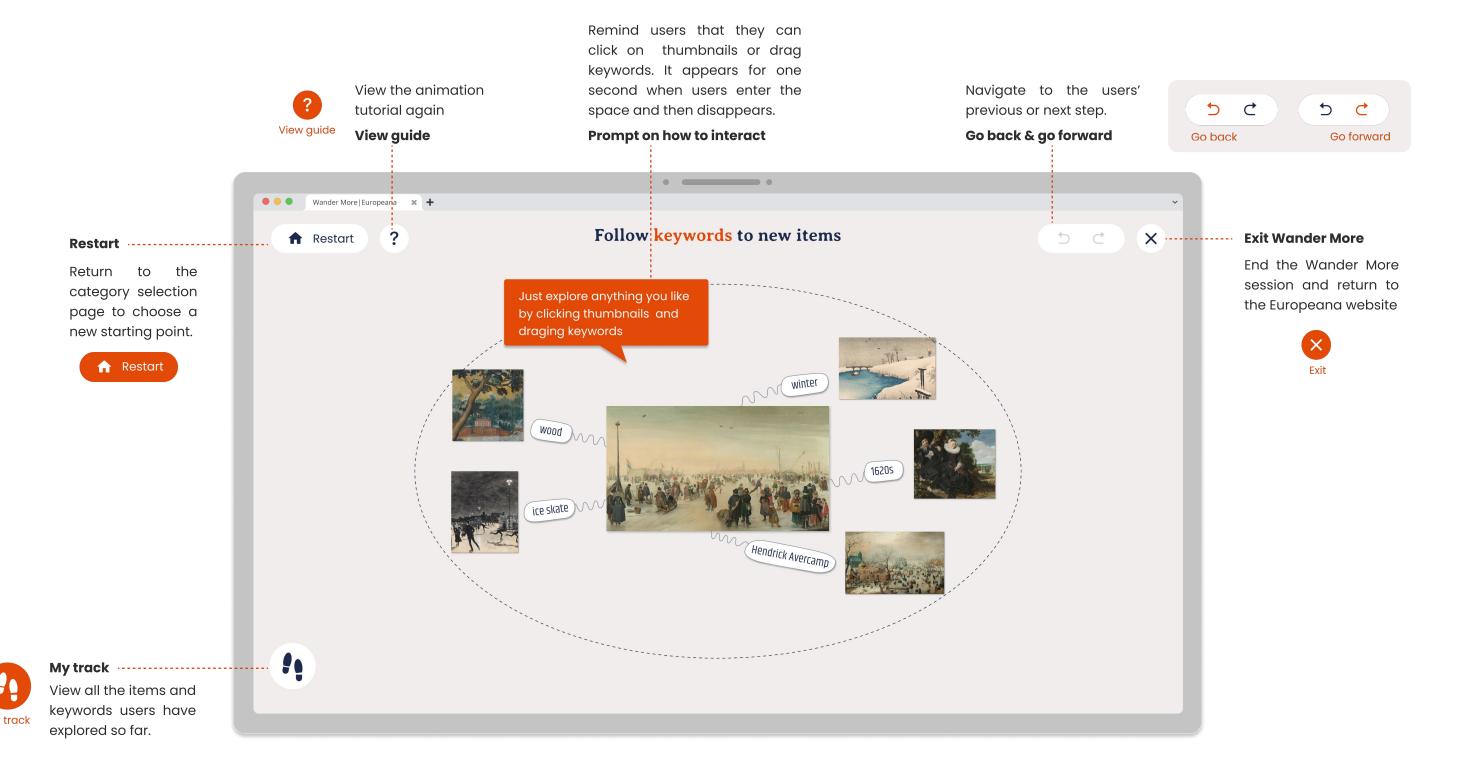
Keyword preview

When hovering over an item, a short preview with one highlighted keyword appears. This gives users a better understanding of the artwork's content, helping them decide more efficiently and with less effort whether to select it.

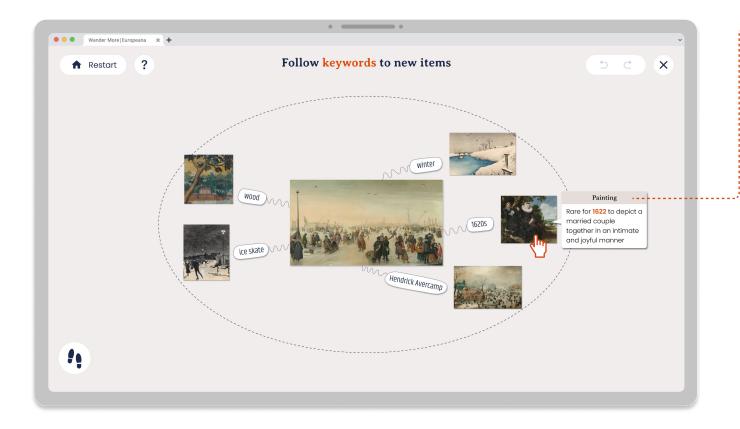
Explore digital collections Enter into exploration page

Then users enter into the exploration page, which is the main page of my design. Exploration begins from here! The selected item jumps to the center of the screen, with related keywords and items that share with the same keywords gradually appearing around it. This process is supported by a smooth and gradual transition animation, ensuring users are not overwhelmed.

The buttons on this page would be clearly explained as follows. All buttons are designed to display a brief explanation of their function when hovered over. The button's appearance when hovered over is shown next to its annotations.



Explore digital collections Clicking on thumbnails



Biref but interesting preview

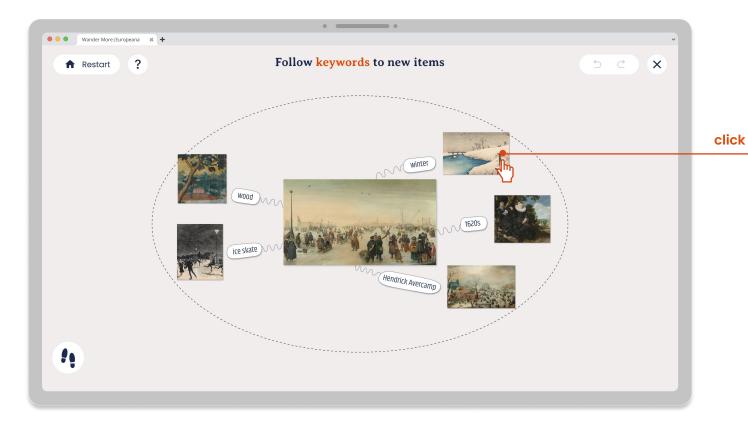
Hovering over a related item's thumbnail displays a brief, interesting preview of the item's information.

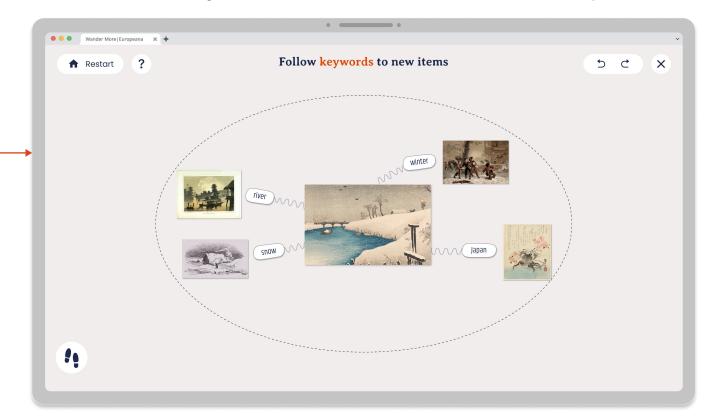
In the preview information, texts that match or relate to the keywords are highlighted in bold orange font.

Moves to the related items

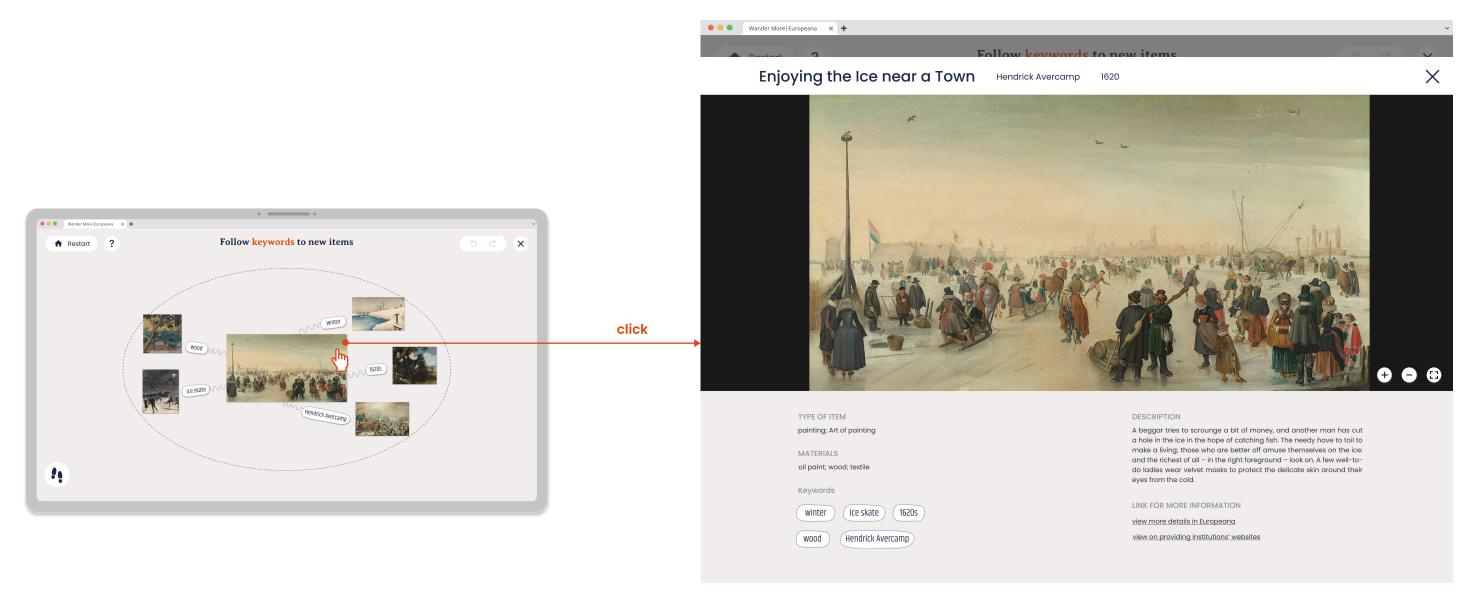
Clicking on a related item's thumbnail moves it to the centre, with new keywords and related items generating around it.

Users can continue clicking on the items thumbnail of their interest in an endless way.





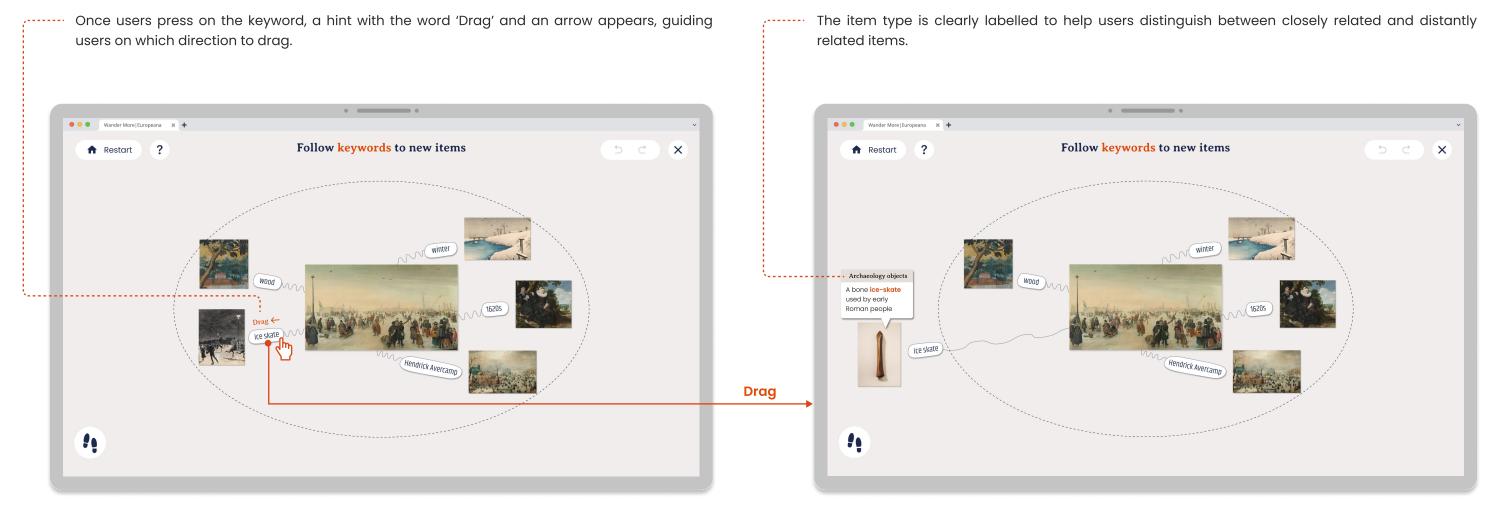
Explore digital collections Clicking on the centre item



Click on the central item. Then the detailed information page of the item would pop up.

This page provides information including the title, creator, date, item type, materials, keywords, description, and links for further details.

Explore digital collections Dragging the keywords



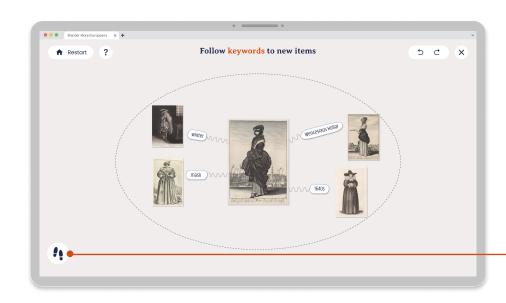
The previous animation guide has told the users that inside the circle are items that are closely-related to the central one. For example, if the central one is a painting, the items inside the circle are also the painting.

Users can drag the keyword outside the circle, and the item will switch to a distantly related one that shares the same keywords but belongs to a different category. For example, as shown in the figure above, the item changes from a painting of ice skating to an archaeological artefact—a Roman-era ice skate made from bone.

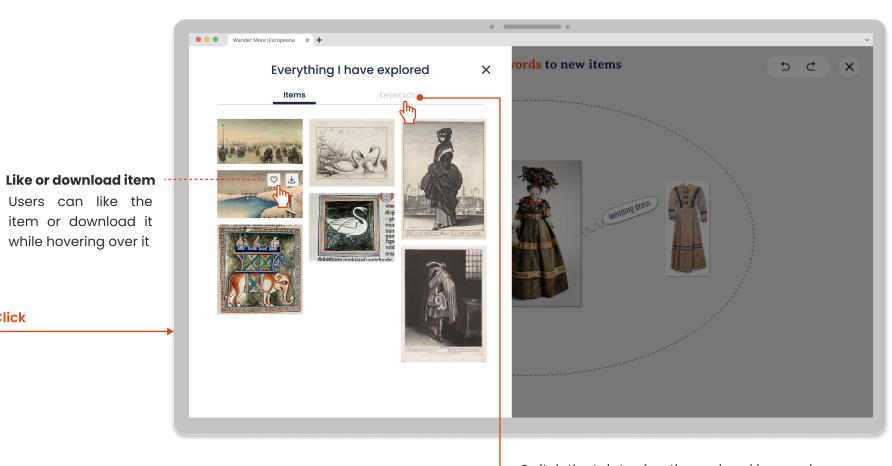
The preview information for the distantly related item is automatically displayed immediately after users release the mouse from dragging. This feature provides users with an immediate overview, highlighting the distinction between closely related and distantly related items.

During exploration

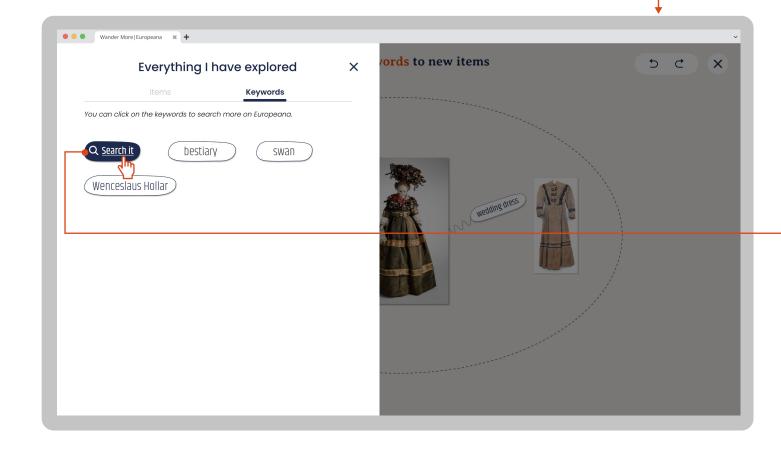
View my track



During exploration, users can view their exploration track. By clicking the "My Track" button in the lower-left corner, a drawer will appear displaying all the items and keywords the users have explored. Only items that users click on to move to the centre will be recorded.



Switch the tab to view the explored keywords.



Click

Search more

The keywords in the "My Track" section are clickable. If users develop an interest in a specific keyword, they can click on it, and the system will automatically open a new window displaying search results for that keyword on the Europeana website.

159 160

Click

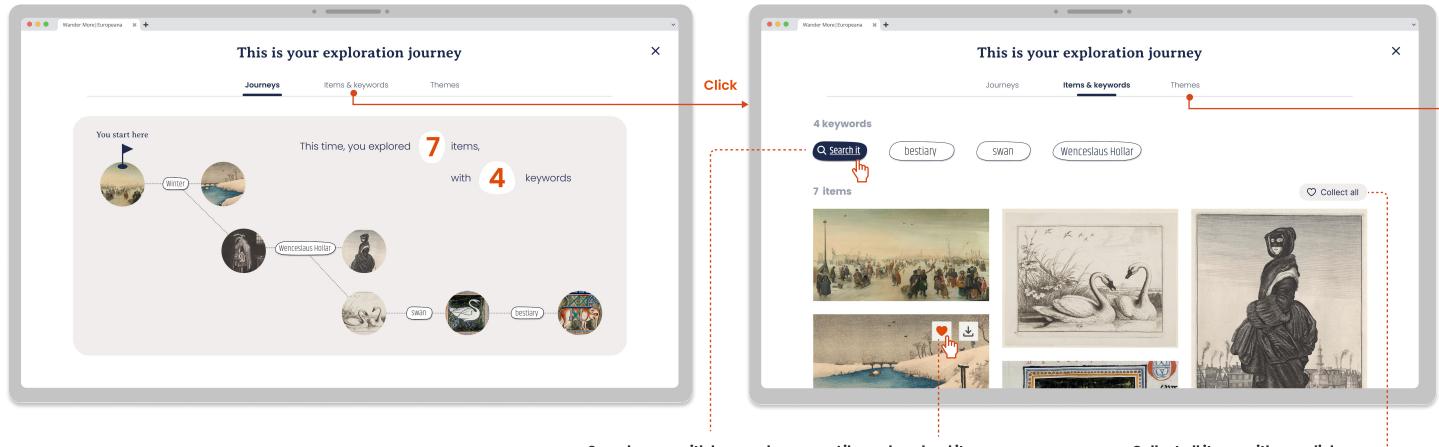
Ending exploration

View the summary of exploration journey

When users decide to exit Wander More, they would receive an overview of their entire exploration journey, summarizing all the items and keywords they explored. Only the items they clicked on that jumped to the centre are recorded.

The first summary they see presents the items in the order they were explored, offering a clear, chronological view of the user's journey. This helps show how their interests evolved and adds a sense of progression, illustrating how each step led to the next.

Switching the second tab allows users to view all the items and keywords they explored as a grid or list format. This provides a comprehensive summary, making it easier to review previously explored content.



Search more with keywords

Here also supports the function to search more with the keyword by clicking on it.

Like or download item

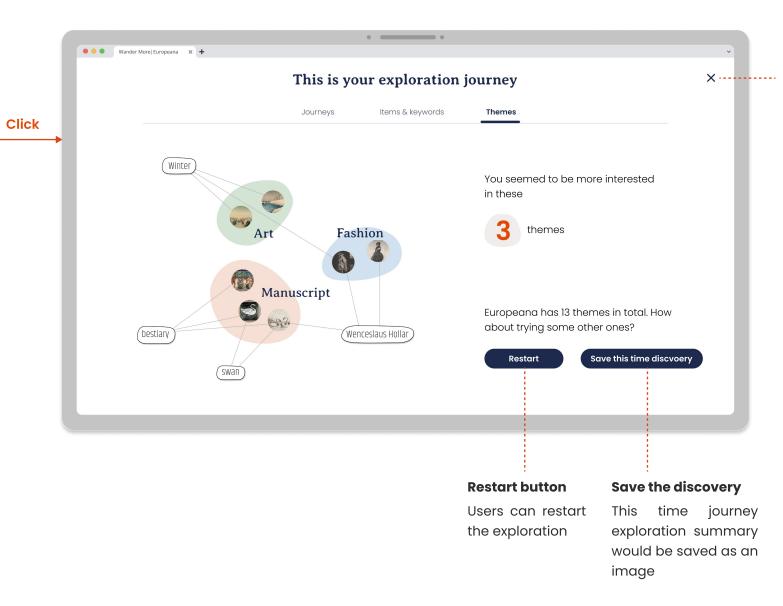
When hovering over the item, users can add the ones they like to their personal gallery or download them directly.

The items they like will appear in the 'Like' gallery on their profile, a feature already available on Europeana.

Collect all items with one click ······

Click on this button would add all items here to the users' 'Like' gallery.

Switching to the third tab lets users view all items and keywords categorised by themes. This provides a broader overview of their exploration, helping them understand their preferences for different themes, and identify unexplored themes.



Return to Europeana home page

After viewing their exploration journey, users can click the exit button to return to the Europeana homepage.

7.2 Final user journey

1 Entry point

Don't know where to start?

So much to explore?

No idea what to search?

A journey that takes you to simply wander around our diverse collections through (keywards)

Always more to explore!

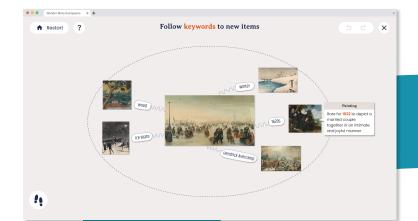
Enter into Wander More

2 Watch animation guide



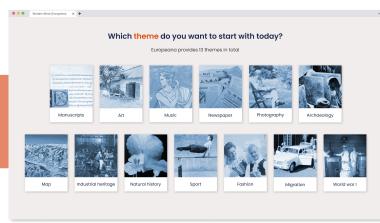
Watch or skip the animation guide that introduce Wander More and the tutorial guide

4 Start to explore collections

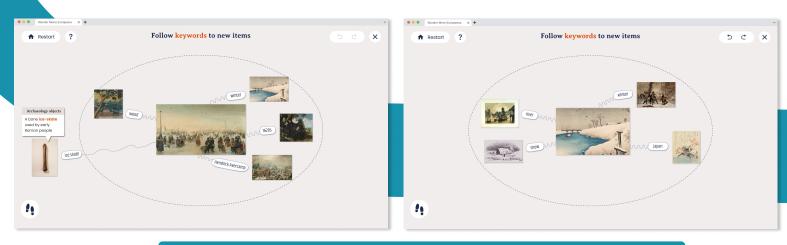


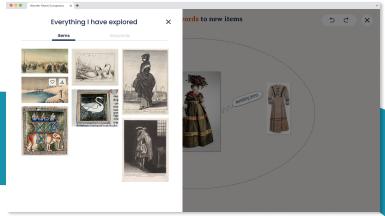
3 Select starting point





Select one item as a starting point

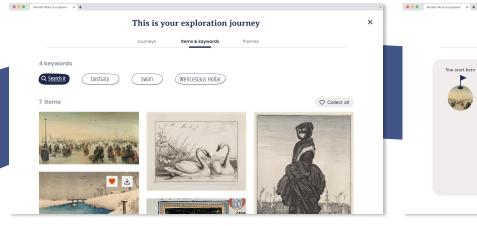


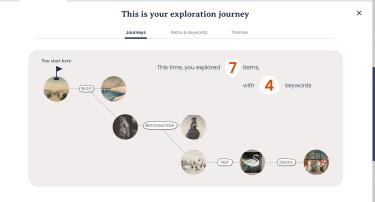


Click, drag the items and view the information to explore in an endless way!

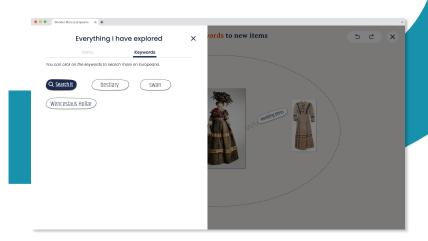
View the track. Like or download items

5 End with a summary of exploration journey





View the summary of exploration journey from three different perspectives



Use the keywords to search more

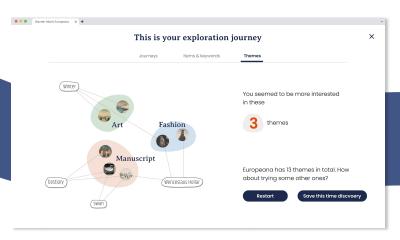


Figure 99. User journey map of the final design

7.3 Working prototype

The final prototype was fully created using Figma. After exploring other tools, such as Protopie and P5.js, I found that Figma was the most efficient tool for simulating the ideal situation. The whole prototype was demonstrated as follows in Figure x.

This is the link for the prototype in Figma:

Starting point transition Entry point Animation 1 Exploring page M O)OI. À My track page Wrap up page -

Figure 100. Working prototype on Figma

The concept offers an endless exploration experience where users can continuously click on items to generate new ones. However, this experience is difficult to fully achieve in a prototype. To optimise effectiveness and provide a sufficiently rich experience with diverse information resources, two rounds of clicking were implemented: 10 items can be clicked to generate new items and keywords, 32 keywords can be dragged outside the circle to generate distantly related items, and 64 items display preview information when hovered over. All item information was manually curated by me, sourced from the Europeana website and the Rijksmuseum studio. A component with 9 variants (shown in Figure 101) was created to allow a keyword to be draggable and switch between items. In total, 64 similar components were made.

Since Europeana also includes music recordings, audio interaction was considered and successfully implemented in Figma using a plugin called Punchcut Audio Player. When users encounter a music recording item, they can click the play button to broadcast the audio and click it again to stop the playback, as shown in Figure 101.

Interaction within a component

After delay

_verina

While pressing

Design of a component

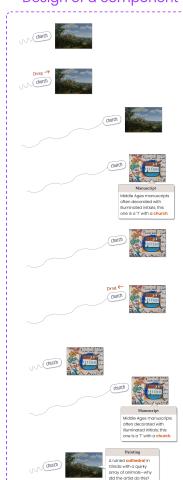
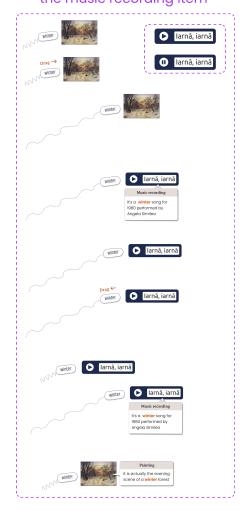


Figure 101. Components

The component containing the music recording item



During prototyping, I prioritised creating the functions that needed to be tested, leaving out those that are minor, not core to my design, or already achievable by Europeana. All the left-out functions are presented in the prototype but are not interactive. Some functions are partially simulations, but they effectively convey the concept and offer a high-fidelity user experience close to the ideal situation. Figure x illustrates which functions were fully implemented, partly-simulated, and temporarily left out without making it interactive.

Fully achieved functions

Entry point of the function

Animation guide & all instructions

Hover over the thumbnail to view a brief, engaging preview of the item's information

Drag the keywords outside the circle to change item from closely-related to distantly-related Click on a thumbnail to bring it to the centre with new keywords and items

Like and add the item in personal gallery

Partly-simulated functions

'Go Back' button returns users to the first selected item. Ideally, it would take users to their previous step. View detailed information of the central item. All are clickable, but most contain placeholder text instead of real information.

Select starting point. Only 'Art' theme and one specific item could be chosen. View the users' track during exploring. The items shown are preset, rather than those the user actually explored. Wrap up the exploraiton with a journey summary. The items shown are preset, rather than those the user actually explored.

The endless
exploration couldn't
be achieved, but two
cycles of clicking and
dragging was
achieved to simulate
the concept.

Click on keywords to search more on my track page. Only the keyword is clickable, and search results are simulated with a screenshot from Europeana.

Left-out functions

Go forward button

Restart button

Skip animation button

View animation guide button after entering the exploring page

Zoom in & out button

Download button

Chapter overview

- 8.1 Test setup
- 8.2 Results
- 8.3 Conclusions

Chapter 8

Final evaluation

This chapter discusses the results of the final evaluation.

8.1 Test setup

Goals

The overall goal of the final evaluation was to assess how well the final concept could meet the design goal and the desired interaction.

A list of research question was formulated based on the design goal:

a. Design goal

How well do users think the designed experience is exploratory, serendipitous, supportive, and playful?

b. Usability

How usable is the designed experience perceived to be by users?

c. Overall desirability

How desirable do users find the designed experience?

d. Design requirement from research

Based on previous research, 4 specific requirements were identified that need to be considered when designing to help casual users explore. They were listed as follows. To what extent does the final design achieve these requirements?

1) The design should provide a balance between providing guidance and free exploration.

- 2) The design should facilitate a fluid and continuous information-seeking experience, rather than remaining static in the same place.
- 3) The design should facilitate exploration that is open to diverse results, rather than focusing on a single information.
- 4) The interactions should be simple with low cognitive workload.

Participants

Five participants were recruited through convenience sampling. All are users of digital collections websites, with usage frequency ranging from weekly to several times a year. Each participant reported having visited the website at least once as a casual user to 'look around', have fun, or find inspiration.

Approach

Think out loud

Participants were asked to share their thoughts at each step and on each screen while using Wander More.

Interview

After testing the prototype, users were asked to share their overall impressions of the experience and indicate whether they would be likely to use the feature if it were integrated into the digital collections website ideally.

Obersving

Participants' interactions with the prototype were observed and screen-recorded, with any unexpected behaviour carefully documented.

Interactions qualities evaluation form

Whether the design goal is achieved was evaluated based on whether it meets the four desired interaction qualities: Exploratory, Serendipitous, Supportive, and Playful. The same evaluation form used in the previous two rounds of user tests was applied. Participants rated four statements, each representing one of these interaction qualities, on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree), as shown in Figure 107. The focus was on asking participants to explain their reasons for their choices and identify which aspects of the design influenced their specific scores.

Attradiff

The AttrakDiff-Short (Hassenzahl et al., 2003), a standardized questionnaire designed to assess product desirability, was employed. It consists of 10 questions, where participants rate their experience with the prototype on a 7-point scale between pairs of opposite adjectives, such as 'simple-complicated' or 'good-bad'. This tool was used to evaluate the overall desirability of final design. See figure 106.

System usability scale (SUS)

The System Usability Scale (SUS) (Bangor et al., 2008), a standardized questionnaire designed to assess product usability, was used. It consists of 10 statements, where participants respond on a 5-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. This tool was employed to evaluate how users perceive the usability of the final design. See figure 108.

Design requirement evaluation

Since the AttrakDiff form already evaluates whether the design is simple or complicated, which addresses the last design requirement, I added three additional questions in AttrakDiff with pairs of opposite words to assess whether the design meets the other three requirements: [Guided-Free], [Static-Fluid], and [Focused-Open]. See figure 106.

Procedure

All the testing was conducted online via Zoom and Figma, simulating the real context where casual users typically interact with the digital collections website alone at home.

Participants were first introduced to the project, including the context and the activities they would be undertaking during the session.

Next, the prototype was introduced to them. I explained that it was created using Figma, a tool for design mock-ups rather than a live, functional website, to highlight some technological limitations. For instance, not all buttons are clickable, some functions are simulated, and the digital collection content was created by me with the help of Europeana resources rather than by cultural experts.

Participants were then asked to go through the prototype, from entering the function to completing the exploration. Their task is to imagine themselves as casual users, wanting to have fun or kill time on a digital collections website.

When trying out the prototype, participants were encouraged to explore freely and interact with anything they wished. Guidance was provided only if they missed certain parts or encountered technological limitations. This is because, despite some minor technological limitations, the prototype is considered high-fidelity as it effectively conveys the designed concept and offers a good simulation of the ideal experience.

After using the prototype, participants were asked to share their overall impressions of the design and whether they would use it if it were to go live.

Participants were then asked to complete the interaction qualities evaluation form to assess how well the four interaction qualities were achieved. They were also asked to specify which elements of the design influenced their scores.

In the end, participants were aksed to fill in the other two assessment forms (SUS and AttarkDiff).

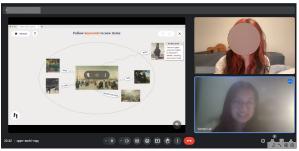


Figure 102. Final evaluation 1

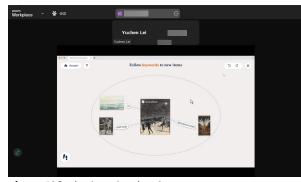


Figure 103. Final evaluation 2

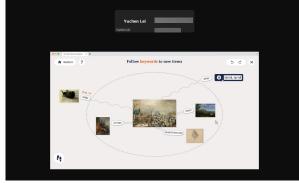


Figure 104. Final evaluation 3

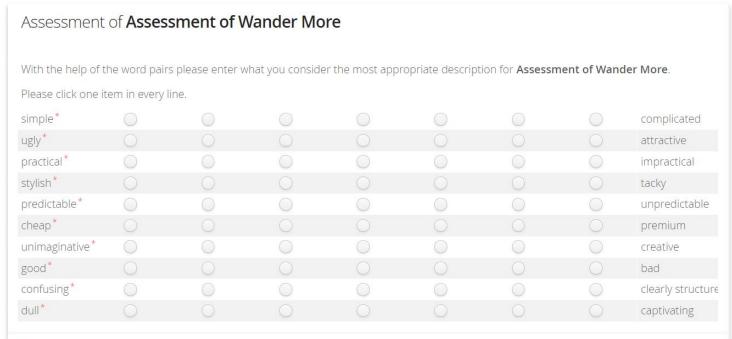


Figure 105. AttarkDiff-short

For me, this e	experience	is a	explor	ation.				
Guided	0	0	0	0	0	0	\bigcirc	Free
Focused	\bigcirc	Open						
Static	0	0	0	0	0	0	\circ	Fluid

Figure 106. Design requirments evaluation form

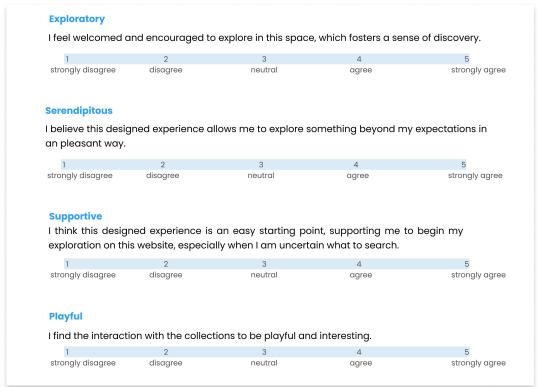


Figure 107. Evaluation form of the four interaction qualities

	The System Usability Scale Standard Version	Strongly disagree			ron agre	-
		1	2	3	4	5
1	I think that I would like to use this system.	0	0	0	0	0
2	I found the system unnecessarily complex.	0	0	0	0	0
3	I thought the system was easy to use.	0	0	0	0	0
4	I think that I would need the support of a technical person to be able to use this system.	0	0	0	0	0
5	I found the various functions in the system were well integrated.	0	0	0	0	0
6	I thought there was too much inconsistency in this system.	0	0	0	0	0
7	I would imagine that most people would learn to use this system very quickly.	0	0	0	0	0
8	I found the system very cumbersome to use.	0	0	0	0	0
9	I felt very confident using the system.	0	0	0	0	0
10	I needed to learn a lot of things before I could get going with this system.	0	0	0	0	0

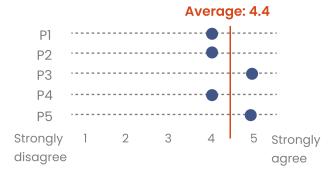
Figure 108. System usability scale (SUS)

8.2 Results

a. Design goal qualities

Exploratory

"I feel welcomed and encouraged to explore in this space, which fosters a sense of discovery."



- 1. Participants felt that the animation guide at the beginning of the exploration created an inviting atmosphere, encouraging them to start exploring.
- "It feels like it's warming me up and welcoming me to explore." -P3
- 2. The main factor that encourages participants to explore is the simplicity of the exploration interaction. They appreciate that it only requires clicking, dragging, or viewing information, with a manageable amount of content that is easy to read.
- "It is really simple... it is not like the other website that always have a complex filters... this simple interaction makes me want to explore more..." -P4
- 3. Participants find the summary of their exploration journey, particularly the count of items and keywords explored, to be very motivating as it provides a strong sense of achievement.

"If I explored more, and it says something you have explored 18 keywords, it would really encourage me" -P5

4. Users feel that this is a visually oriented exploration method, focusing on visuals rather than text, which also encourages them to explore.

"It is nice that it asks me to select one item based on visuals" -P2

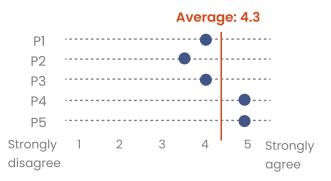
5. Participants noted that the randomness and unexpectedness of the experience would encourage further exploration. However, for some, this could also be discouraging; if they encounter something they don't like, they might lose interest completely.

"I am curious to know what is next." -P2

"For me, the keywords are bit too random... the inconsistency here might discourage me to further explore" -P1

Serendipitous

"I believe this designed experience allows me to explore something beyond my expectations in an pleasant way."



Although the prototype has several technological limitations, some participants still experienced a sense of serendipity during the test.

- 1. Participants find the dragging functions can always bring something surprising to them.
- 2. Serendipity also occurred when participants compared items inside and outside the circle. They appreciated the ability to drag items back to review previous ones, allowing them to see how these items are connected.

Sometimes, the two items are so contrasting that they provide a quirky comparison. Participants enjoyed seeing, for example, an 18th-century leisure sledge suddenly switch to a World War I medical sledge. They found the stark contrast between such opposite items to be fun and surprising. One participant described this comparison as 'humorous,' appreciating the unexpected and amusing nature of the experience. They felt that such surprising connections are particularly enjoyable for casual users who approach the exploration with an open mind.

"It was a European woman's portrait one moment, very noble, but then when I dragged it, it turned into a man. I love this kind of contrast; the connections don't actually make sense, but I enjoy the humorous surprise it brings. I'm always looking forward to what will appear next." - P5

3. Users were also pleasantly surprised by the music recording feature, as it provided an auditory interaction in contrast to the predominantly visual interactions with other artefacts.

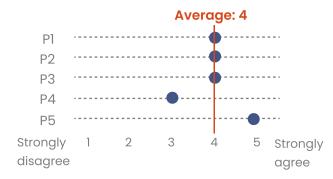
"It is surprising that I can also listen to something, the others is just looking around" -P3

4. Some participants saw potential for surprise moments when viewing the exploration journey summary. They mentioned that it could update their self-understanding. Additionally, having all items presented together allows for a deeper examination, enabling comparisons that could lead to serendipitous discoveries.

"I like seeing the summary of everything I've explored. I might find myself thinking, 'Did I explore this before?' or 'I never thought I'd like this.' It helps me discover a new side of myself, which is quite surprising." -P3

Supportive

"I think this designed experience is a easy starting point, supporting me to begin my exploration on this website, especially when I am uncertain what to search."



- 1. Users found it supportive because they think the system continuously and proactively offers them options and suggestions, rather than requiring them to come up with something themselves.
- 2. Another reason is the diversity. Participants felt they could access a wider variety of items more efficiently compared to the traditional catalogue. Exposure to a broad range of options, unlike the usual limited curated selections, makes it easier and faster for users to develop an interest in specific topics after exploring. This was evident during testing when P5, after dragging several items, became intrigued by a World War I medical sledge and wanted to learn more about wartime transportation.

"This is quicker...and easier to acess to different things compared with browsing through categories..." -P4

"I start to get curious about the sledge... I might want to have a search later" -P5

3. Another reason participants found the experience supportive is that it not only encourages divergent exploration but also allows for deeper exploration. Users can view more detailed information and are provided with keyword search options to explore further.

"It's nice that if you find something interesting, you can click to see more information, while I can easily skip what doesn't interest me... they're not a barrier." – P3

5. Participants found the final exploration journey summary to be very supportive, as it helps them recognise their preferences and guides them in deciding what to explore next.

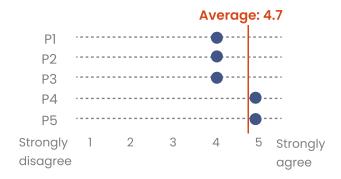
"this would help me know what is my interest, maybe I will try something different next time..." – P3

6. However, some participants pointed out that while it's a good and simple starting point, it still focuses on partial exploration, lacking an overview and offering a limited understanding of the website's entire collection.

"Well... it is a good start and you can have some level of understanding of the collections content... but you don't have the overview of what is available here " – P2

Playful

"I think this designed experience is a easy starting point, supporting me to begin my exploration on this website, especially when I am uncertain what to search."



1. The dragging function was the most playful element for all participants. They enjoyed the interaction itself, comparing it to an interactive mini game. More importantly, they found the discovery of surprising content through dragging particularly intriguing.

"It gives me a feeling like a game" -P1

- 2. Participants found it playful also because it provided an innovative experience, unlike anything they had encountered on other digital collection websites.
- "It is a completely new way to explore digital collections, I have never had a similar experience before" -P4
- 3. Another reason participants found the experience playful is that it wasn't just about having fun—they also felt they were learning something through the playing.

"The fact that I am also picking up some knowledge while playing makes me happier." -P2

b. Usability

The score of the System usability scale (SUS) that measured the usability of interface was caculated and displayed below. The SUS score was 82 (n=5).

According to Saruno (2011), the grade and the adjective ratings for different scores were shown in the Table 6, based on a research survey with 5000 participants.

SUS Score	>80.3	68-80.3	68	51-68	<51
Grade	А	В	С	D	E
Rating	Excellent	Good	Average	Poor	Awful

 Table 6. SUS evaluation

SUS score of my design concept: 82

Therefore, the usability of the final design can be considered excellent, although it's important to note that this assessment is based on the evaluation of only five participants. The result is consistent with users' qualitative feedback. Users emphasised that the design experience is simple, involving only clicking and dragging with minimal cognitive load and no complex interactions. Also, they think the tutorial animation guide is very clear and useful.

c. Desirability

The calculated result of AttrakDiff (Figure 109) showed that the final design is positioned at the "Desired" area.

When asked if participants desire to use my design if it were ideally integrated into the digital collections website, most participants expressed a positive interest. Some even mentioned that they would prefer this function over the traditional digital collections website for casual browsing. They also noted that the design is potential to help them find inspiration to some degree for their research work.

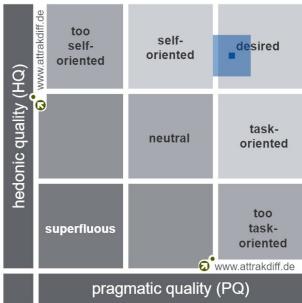
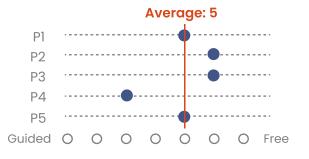


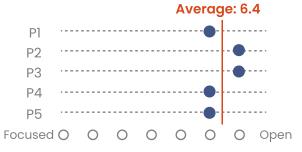
Figure 109. Evaluation results of AttrakDiff

However, participants also mentioned that this function cannot fully replace the search bar and catalogue search provided by current digital collection websites. It would be more useful as a supplementary function when integrated into Europeana.

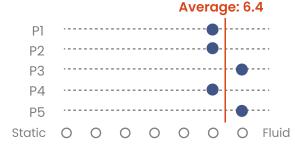
d. Design requirements



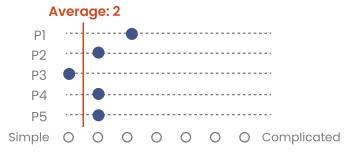
The average rating of whether users perceive the exploration as a free or guided experience is 5. This indicates that the design achieves a good balance between providing guidance and allowing for free exploration, with a slight inclination towards a more free exploration experience.



The average rating of whether users perceive the exploration as an open or focused experience is 6.4. This suggests that the design leans towards an openended exploration, allowing for diverse results.



The average rating of whether users perceive the exploration as an fluid or static is 6.4. This suggests that the design supports more for a fluid and continuous experience.



The average rating of whether users perceive the exploration as simple or complicated is 2. The usability score is 90. Also, from users qualitative feedback, they thought the interaction is easy and relaxing with low cognitive workload.

In this case, I can conclude that all the design requirements were met to some extent.

e. Practical improvements

- 1. Participants feel that sometimes the pace of the animation guide is a bit fast. They feel that the current animation guide is not very interactive and would like more control. They also want the option to stop the animation from playing automatically.
- 2. Participants want to be able to go back and review all their past exploration journeys and all explored artefacts after trying this feature for several times.
- 3. Some participants find the thumbnails a little bit small on a computer screen

f. Insightful suggestions

- 1. Users have suggested that it would be better if they are able to delve deeper into their explored items. For example, they want a filter on the exploration summary page that allows them to select keywords and display only the artefacts related to those keywords. Additionally, on the theme-based summary page, users want to move or play with the items they have explored within the theme map to compare connections between different items.
- 2. Some participants felt that the keywords are somewhat random and would like the option to choose the category of keywords, such as those related to the item's content, material, or theme, etc.
- 3. Some users have indicated that certain keywords, like "bestiary," can be quite specialised and difficult to understand. They would appreciate a feature that provides a brief, simple explanation for such terms.

8.3 Conclusions

To evaluate the final outcome of my project, I referred back to my design goal, which is to invite casual users to explore with an easy starting point and support their divergent exploration. Therefore, how does my final design achieve this goal?

According to participants, compared with the design of a traditional digital collections website, they thought Wander More is an user-friendly, simple and fun way of browsing different digital collections that open for more possibilities to get access to diverse collections.

First, participants felt that Wander More created an **exploratory** atmosphere that invites and encourages exploration through its visual focus, simple interactions, welcoming animation, motivating journey summary, and elements of chance. However, they noted that the randomness of the collection contents sometimes needs better balance, as excessive unpredictability could discourage further exploration for some participants.

Second, **serendipitous** discoveries did occur during testing with some participants. They experienced pleasant surprises through the dragging function, the connections between diverse collections, quirky item comparisons, audio interactions, and the potential of the exploration journey summary.

Thirdly, participants found that Wander More offers a **supportive** starting point for casual users to begin exploration. This is due to its system-driven approach of continuously providing options, the diverse environment, support for both divergent and convergent exploration, and the helpful exploration journey summary. However, they also noted that the supportive quality could be further enhanced, as casual users still do not get a complete sense of the entire database.

Lastly, participants all agreed that the exploration offers a **playful** and engaging experience with the digital collections. They found the entire experience innovative, likening it to a mini game, and appreciated the opportunity to learn something interesting while playing. From their perspective, the dragging function is the most playful element.

From the user research and testing, I found that designing for casual users' information exploration greatly depends on individual preferences, exploration strategies, and their level of open-mindedness. It's important to acknowledge that acceptance of the design varies among differnet casual users. However, based on the final evaluation findings, I can safely conclude that the concept received generally positive feedback from casual users. Participants appreciated the idea of bringing keywords out from behind the search box, making them directly accessible and interactive, especially having a comparison with the traditional digital collections website experience.

Chapter overview

- 9.1 Limitation
- 9.2 Recommendation

Chapter 9

Limitations & recommendations

In this chapter, the limitations and recommendations are discussed in detail.

9.1 Limitation

Design concept

Different definitions of 'distantly-related' and 'closely-related'

Different people might have varying definitions of what constitutes a closely or distantly related item. Some expect items that maintain a strong connection even in the distantly-related mode, while others enjoy seeing something completely different. One solution is to make the definitions of these relationships clearer and more transparent to users.

Insufficient content of Europeana's items

During user testing, I discovered that the quality and content of artefacts have a significant impact on user experience. Rich information about artefacts greatly enhances the overall experience. In developing the final model, I chose artefacts that were both more engaging and rich in content. However, the research revealed a notable issue with the current Europeana website-many artefacts lack metadat such as the keywords, tags, and even detailed descriptions and titles. This lack of content could affect the practicality of my concept, as incomplete or insufficiently detailed data might lead to inaccurate associations between artefacts, which would impact user experience.

Overload of randomness

The keyword display in the prototype is quite random and can sometimes appear inconsistent for different items. This randomness may discourage exploration.

Additionally, the number of items shown on one page should be managed to balance richness and diversity while avoiding choice overload. Too many random options is possible to overwhelm users and hinder their exploration experience.

Lack of consideration for long-term exploration

The design does not account for long-term exploration. It focuses primarily on the immediate experiencefor for this time, without considering what happens when users engage with the feature multiple times.

Project arrangement

Lack of a long-term testing

My design is an innovative exploration that most participants haven't encountered before. Since the novelty of the experience may contribute to relatively positive results, especially regarding the qualities of playful and serendipitous.

Therefore, whether the design will remain effective in the long term was not considered. A long-term test is needed to evaluate if users would continue to engage with the function once they are accustomed to it.

Number of participants

Although casual users exhibit some common patterns in their information exploration behaviour, individual preferences and strategies still vary, particularly regarding openness to different types of information. These differences can affect the experience of my design.

Due to these differences, including more participants in the testing would be valuable to minimise biases. The number of participants in the final round was somewhat limited. But expanding this was not feasible due to the project's time constraints. Additionally, finding casual users of digital collections websites is challenging, as they are not easily identifiable or accessible.

One assumption is that the positive results of my final evaluation may be partly due to the participants' greater openness to diverse information. However, this perspective is based solely on my observations and lacks concrete evidence.

Limited item selection in prototype

In my final prototype, the starting point page only features an Art theme with one selectable item. Participants couldn't choose based on their personal interests due to the impracticality of creating content for all 13 themes. This limitation overlooks the impact of user preferences on item content, which could influence the overall effectiveness of the prototype, especially regarding the quality of exploratory and supportive aspects. Participants are likely to be more encouraged to explore if the content aligns with their interests and may feel more supported if they start with an item that genuinely resonates with them.

9.2 Recommendation

Consider for a long-term exploration

One idea is to introduce a "My history discoveries" map in European's profile page where users can access and review their previous sessions. This would allow them to track their past exploration paths and rediscover items of interest.

Another idea is to add features that allow users to pick up where they left off in their exploration from last time, supporting a continuous and evolving experience.

Community elements

Another recommendation is to consider the addition of a community element, as this was frequently mentioned by users during research as part of their ideal artefact exploration experience. One feasible approach could be allowing users to upload and share their own exploration journeys. For instance, if a user discovers a meaningful or interesting path during exploration, they could recommend it to others. This feature would not only enhance the sense of achievement but also encourage further exploration by fostering a shared experience.

More testing with a prototype that is closer to the ideal situation

As mentioned in the limitation, testing with more participants is needed to minimise biases. Using a more advanced or refined prototype in the testing phase will provide a clearer picture of its effectiveness and ensure it better meets user needs and expectations.

Public implementation potential

Though this falls outside the scope of my current design, I believe my concept has potential for implementation in a museum or public area using a projector or interactive kiosk. This would allow a broader audience to engage with it by dragging and tapping the items in the concept. A larger screen could enhance the experience, offering additional interactions such as scratching the surface of items, and zooming in and out directly.

Leveraging AI for content enhancement

Although not within the current scope of my design, incorporating AI to generate engaging content for artefacts could be beneficial. During development, I observed that providing AI with artefact metadata enabled it to produce more creative and compelling previews. This capability could enhance user curiosity and interaction by offering richer and more intriguing content. Integrating AI for content generation may address some gaps in artefact descriptions and contribute to a more engaging user experience.

Chapter 10

Personal reflection

In this chapter, I reflect on the entire project and consider how I can become a better designer.

Chapter overview

10.1 Personal reflection

10.1 Personal reflection

My graduation project became more complex and challenging than I thought at the initial stage. When I look back to the entire journey of this project, I find that I learned a lot about how to become a better designer.

This project highlighted one of my weaknesses, which turned out to be a valuable lesson. I struggled with **project** management, particularly while designing independently in such an open-ended field. In previous design courses, I always had clear criteria and deadlines, but for this project, I had to decide when to continue or move forward myself. Often, I found myself stuck in perfectionism. However, I learned that a good project doesn't require every step to be perfect; it's more important to keep moving in the right direction. I also realised the value of seeking help from supervisors and other insightful people sooner, rather than waiting for everything to fall into place. Going forward, I need to plan more practically, stick to specific timelines, and push forward. If something goes wrong, as long as it's not a major issue, it's better to adjust in the next phase rather than dwelling on it.

Initially, I aimed to delve into AI technology and design something related, but this project didn't focus heavily on technology. While I find it pity, I also accept that I shouldn't design with technology for its own sake. However, throughout the process, I used ChatGPT frequently. For example, when curating cultural item information for the prototype, I fed metadata into ChatGPT to generate engaging, brief previews for each item. While the results weren't always perfect, it showed me the potential for AI to curating items in the cultural field.

I also learned a lot about decision-making. Early on, I had to choose between two project briefs: one aimed at encouraging Dutch reading at the Rotterdam Central Library, and the other-my final choicefocused on enhancing online exploration on the Europeana website. Another tough decision was selecting between two concepts. These decisions were challenging but valuable. What I learned most is the importance of having clear goals and communication with diverse people. Seeking advice from others is always helpful, but it's essential to balance different perspectives and stay focused on my own objectives. By gathering diverse input and aligning it with my goals, I could make more informed decisions. This really worked.

Reflecting on the final design outcome, I'm both delighted and surprised by the generally positive feedback from real casual users during the evaluation. Despite this, the design cannot meet everyone's preferences. For example, participants found the distantly-related items a bit random, while others welcomed this unpredictability. What I've learned is that people are diverse, even within the 'casual user' category. The key takeaway is to embrace this diversity. My design can't satisfy everyone, but that's fine. What matters is that I treated my users as real people rather than a fixed persona, basing the design on genuine feedback rather than rigid guidelines. This approach helps create a design that is responsible to actual user experiences.

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Appendix

The 14 elements that define users' ideal experience

14 elements that could define casual users' ideal experience with digital collections were listed below. This was the insights that come from the collage making activity of user research.

1) Get connection with others

Participants don't want to feel isolated when exploring the website. They expect a social media forum or a community dedicated to art and culture, where they can communicate, inspire each other, share different perspectives, and exchange experiences and knowledge.

2) Desire for surprise and new things

Participants express a desire for surprise during their exploration. They want the experience to keep them curious, offering opportunities to learn new and unexpected things. Rather than personalised content, they prefer to be introduced to unfamiliar topics that expand their knowledge, sparking their curiosity and providing moments of unexpected interest.

3) Have an on-going and in-depth discovery adventure

Participants hope their exploration experience feels like an adventure of discovery, where uncovering an unfamiliar term leads to the discovery of other unknown items, much like delving deeper into rabbit holes for a closer, more detailed, and complex look.

4) Fun and playful experience

Participants desire a playful exploration experience, valuing fun and engaging elements such as games, audio, interactive visuals, or quirky details that make their journey more enjoyable.

5) Aesthetically pleasing and fantastic

Participants desire a visually appealing experience that feels dreamlike and harmonious. They want to feel a sense of historical journey and timelessness, avoiding chaos and embracing elegance.

6) Need support & guidance

Participants appreciate a guided journey with a coherent story that helps them better understand the content. They value support and guidance, especially when they feel lost and unsure of what to do next.

7) Provoke self-reflection and personal exchange

Participants seek an exploration experience that promotes self-reflection and personal growth. They value experiences that resonate with them, prompt reflection, and help them discover new aspects of themselves. Additionally, they hope to engage with the platform in a way that allows for meaningful exchanges and enables them to leave personal contributions.

8) Provide a clear, efficient and easy-touse navigation

Participants need a clear, logical, and wellorganised structure for the content, making it easy to navigate and find items. They want to seamlessly move from one thing to the next, ensuring they can quickly locate exactly what they're looking for.

9) A relaxed and comfortable environment

Participants envision a relaxed and easygoing environment for exploring digital collections, similar to lounging on a sofa with a phone or tablet casually and informally.

10) Multi-sensory experience & different interactive medias

Participants want their exploration experience to go beyond visual elements and traditional reading. They prefer to engage with digital collections through various media, including listening, immersive experiences, animation, and other interactive methods.

11) Provoke new thoughts & inspirations

Participants seek a provocative experience when exploring digital collections, one that challenges their conventional thoughts, sparks new ideas, and inspires them.

12) Trusting and confident exploration

Participants hope to have a confident exploring experience that they are sure that they can find what they're looking for while having an overview of the collections.

13) Clear understanding & no confusion

Participants believe that everything encountered during exploration should make sense. They want to leave the website with a clear understanding of all the content and avoid any feelings of confusion or uncertainty.

14) Get a sense of achievement

Participants seek a sense of accomplishment and satisfaction. They hope that they can have a feeling of gaining something valuable after their exploration.

Analysis of Europeana's main page

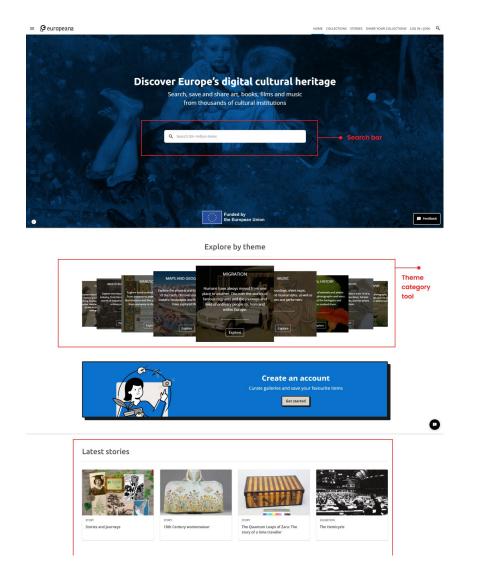
Europeana has a total of eight main pages. Each has different features designed to meet different user needs.

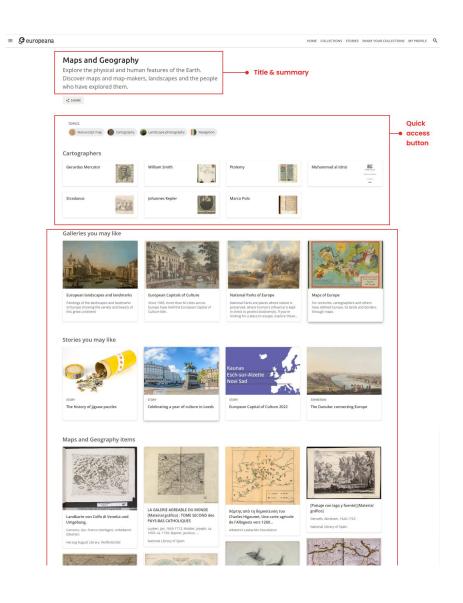
Home page

A large search bar dominates the landing page which is the first element to see when users enter into the website. Scrolling down, there is a theme category tool containing 13 themes in total. Users can select which theme to explore and navigate between them. It also shows some latest galleries and stories that enrich the landing page.

Theme page

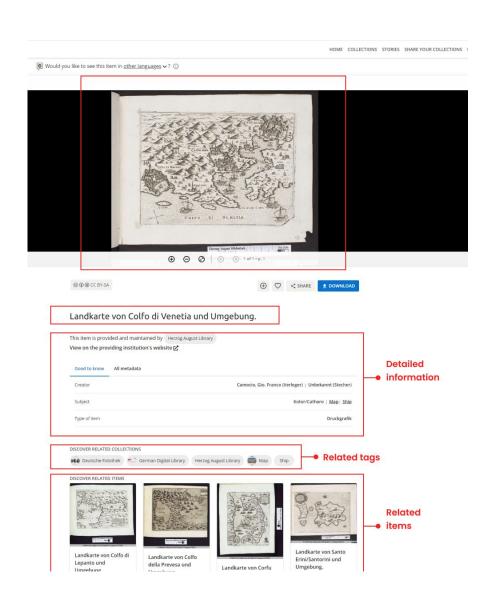
Each theme has its own dedicated page. At the top, the page features a title with a brief summary of the theme, along with quick access buttons for tags or notable individuals' names that direct users to the search page. Below, the page recommends stories, galleries, and items related to the theme.





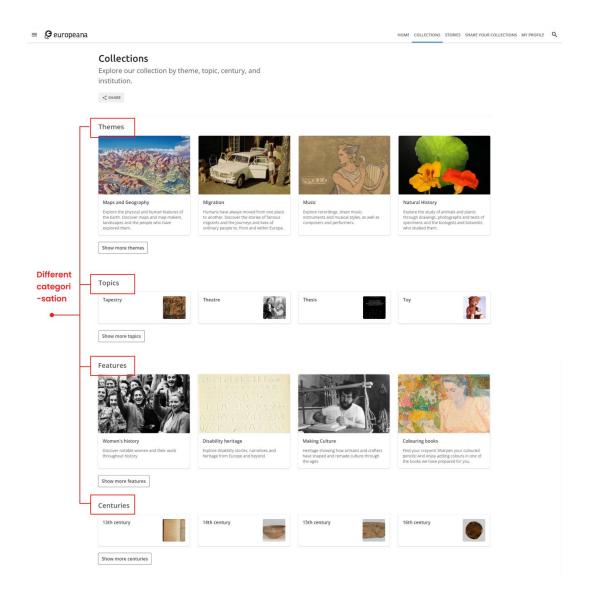
Information page

On the Information page, users can save images to a personal gallery, zoom in & out, download, like, and share on social media. Below the image, detailed information about the item is provided, including its title, description and metadata (creator, type, date, and more). Users can switch to view all the metadata. Additionally, tags related to the item are provided; clicking on a tag button will direct users to the Search page, displaying search results for that tag. At the bottom of the page, related items are presented randomly.



Collections page

The Collections page functions as an efficient catalogue, categorising cultural items by various dimensions such as theme, topic, feature, century, and organisation. Users can retrieve the items they are looking for through this page.

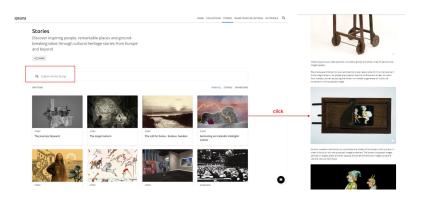


Story page

Story page features a grid of thumbnails representing various stories. Each story is related to a series of items available on Europeana. Users can search for stories by selecting tags. Clicking on a thumbnail opens the story, which is displayed in a blog-like format with text and images organised in a structured layout. This function focuses more on the educational purpose.

Gallery page

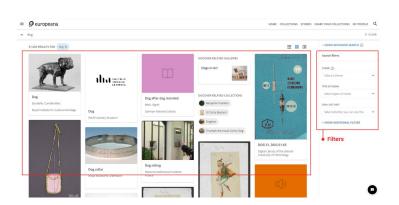
Gallery page, group various items together under a common theme. Users with accounts are able to create a gallery and publish on their own.



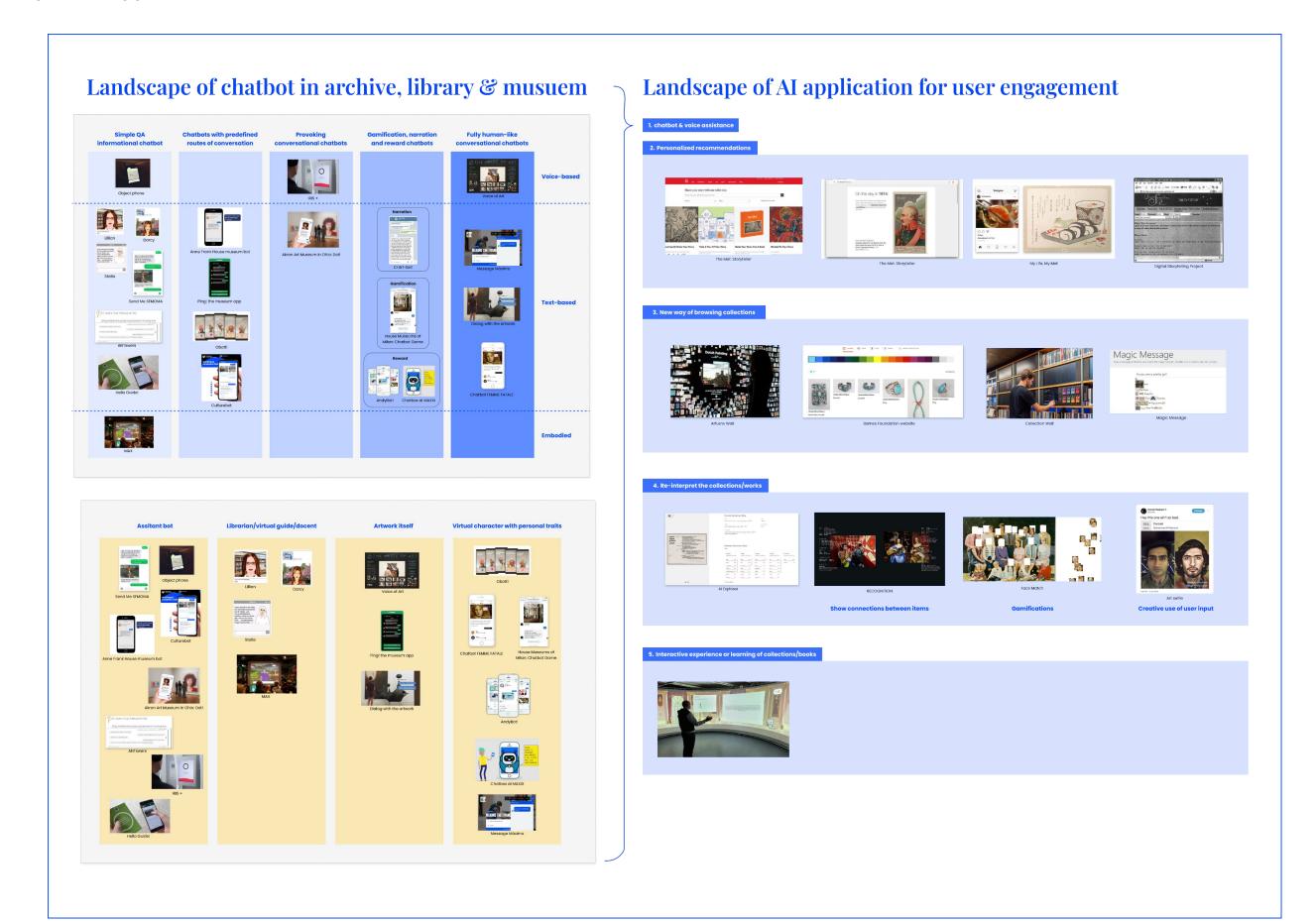


Search page

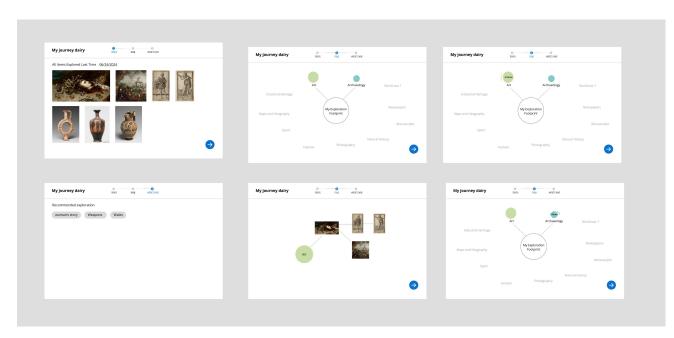
Users can search for specific items using keywords. The search results are displayed as a grid of thumbnails spread across multiple pages. Additionally, filters and advanced search functions are available to help users refine their search results.



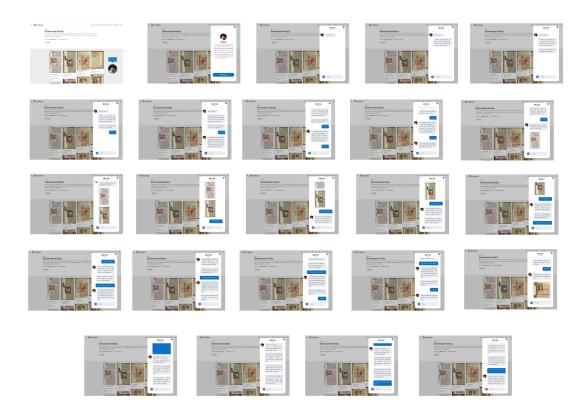
Landscape of AI application in cultural field



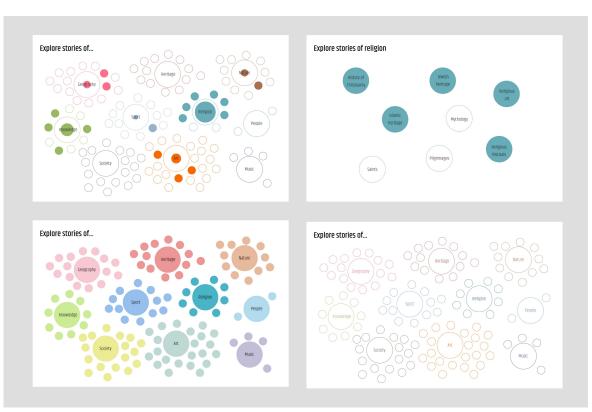
Main pages of some rapid mockups



Mockups 1



Mockups 2

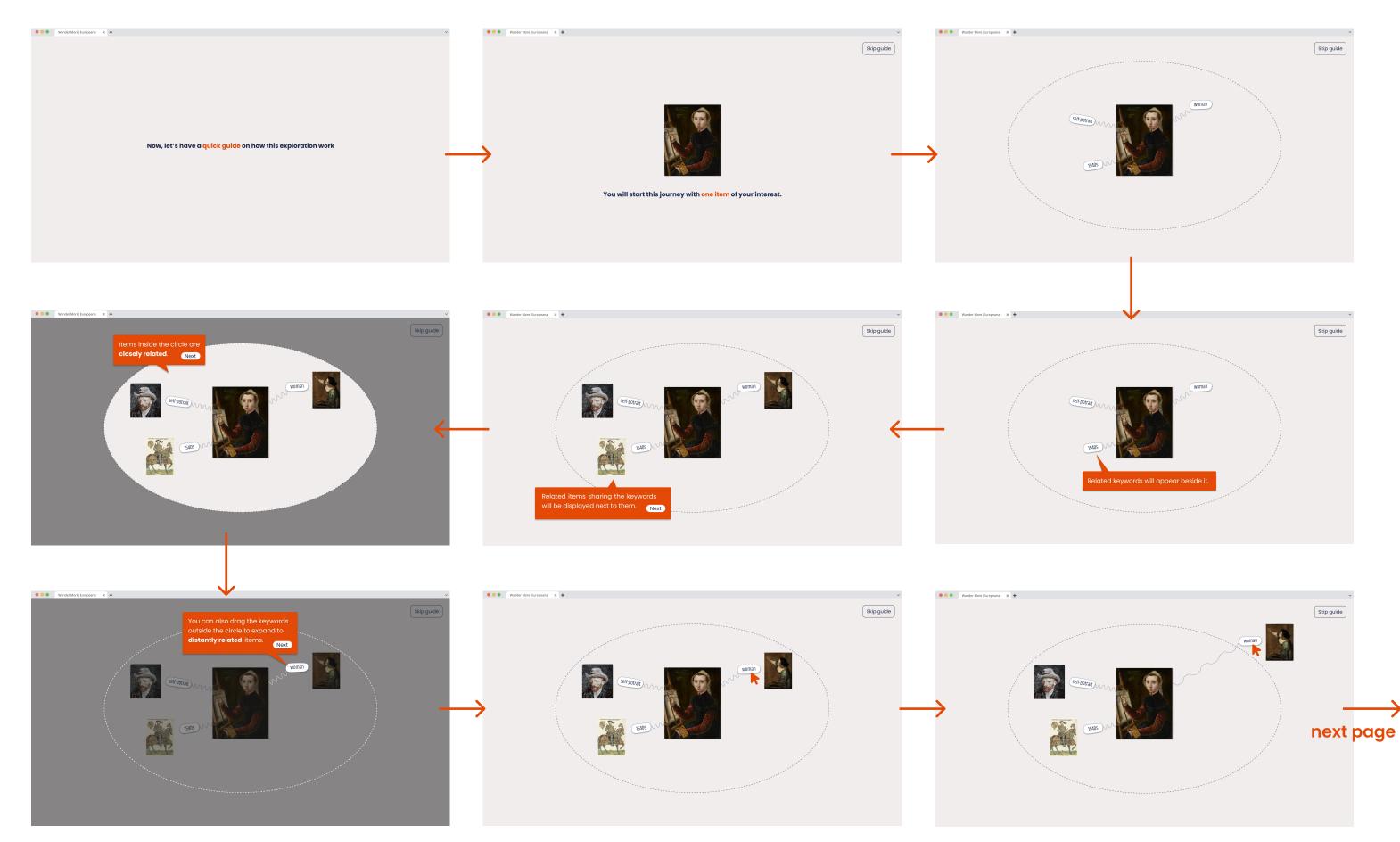


Mockups 3

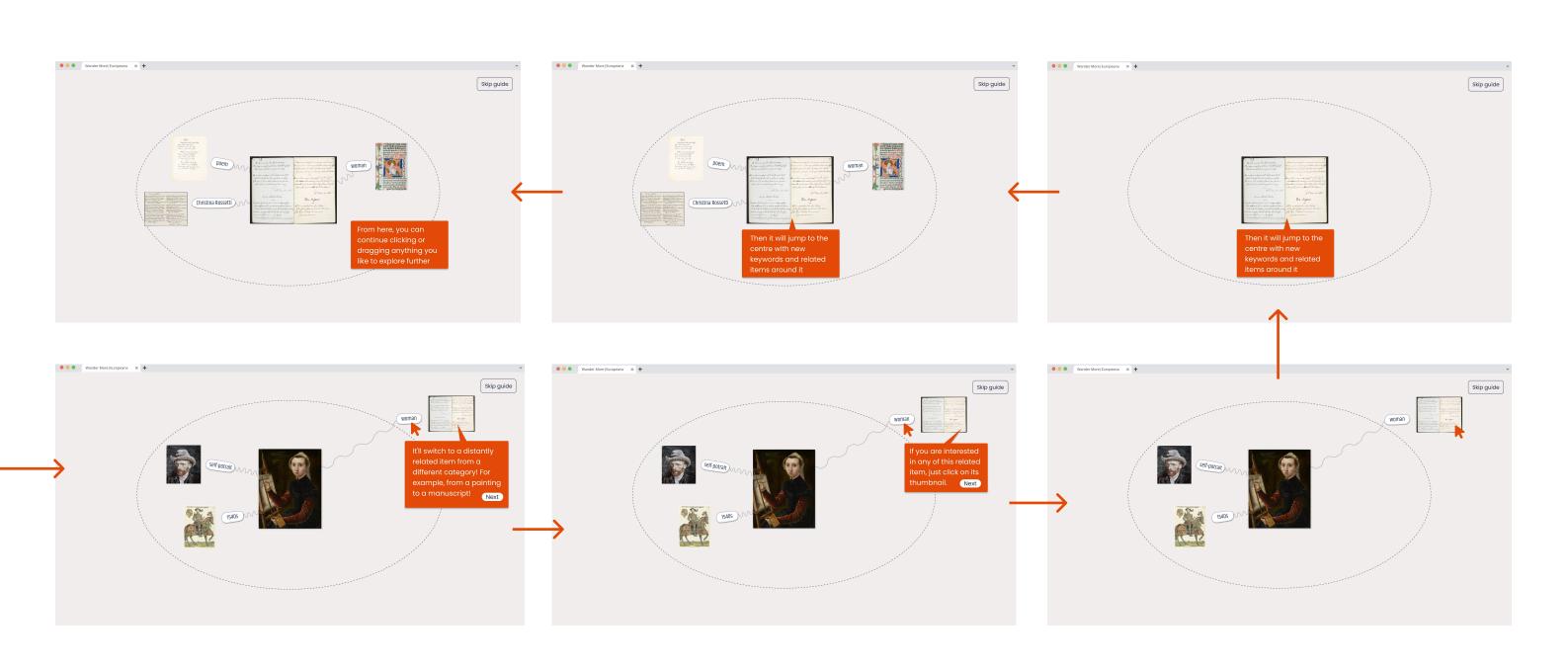


Mockups 4

The tutorial part of the animation guide's entire flow



An animation demonstration of dragging happens here







IDE Master Graduation Project

Project team, procedural checks and Personal Project Brief

In this document the agreements made between student and supervisory team about the student's IDE Master Graduation Project are set out. This document may also include involvement of an external client, however does not cover any legal matters student and client (might) agree upon. Next to that, this document facilitates the required procedural checks:

- Student defines the team, what the student is going to do/deliver and how that will come about
- Chair of the supervisory team signs, to formally approve the project's setup / Project brief
- SSC E&SA (Shared Service Centre, Education & Student Affairs) report on the student's registration and study progress
- IDE's Board of Examiners confirms the proposed supervisory team on their eligibility, and whether the student is allowed to start the Graduation Project

CTLIDE	IT DATA	& MASTER	DDOCD	ABABAE
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Complete all fields and indicate which master(s) you are in

Family name	Lei	7122	IDE master(s)	IPD	Dfl ✓	SPD
Initials	Y.L		2 nd non-IDE master			
Given name	Yuchen		Individual programme (date of approval)	Yes		
Student number	5768977		Medisign			
			НРМ			

SUPERVISORY TEAM

Fill in he required information of supervisory team members. If applicable, company mentor is added as 2nd mentor

Chair	Jeff Love	dept./section	Human-Centred Artificial Intelligenc	1	Ensure a heterogeneous team. In case you wish to
mentor	Peter Kraaijeveld	dept./section	Human-Centred Artificial Intelligenc		include team members from the same section, explain
2 nd mentor					why.
client:				1	Chair should request the IDE Board of Examiners for
city:	Delft	country:	Netherlands		approval when a non-IDE mentor is proposed. Include
optional comments	Jeff specializes in researching the intersection expert in interaction and intelligence design. interactions among AI, people, and collection	Together, they	can support and guide me to design	į	CV and motivation letter. 2 nd mentor only applies when a client is involved.

APPROVAL OF CHAIR on PROJECT PROPOSAL / PROJECT BRIEF -> to be filled in by the Chair of the supervisory team

Sign for approval (Chair)		Digitally signed by Jeff Love
IS Love	29 fab 2024	Date: 2024.03.28 15:30:45 +01'00'
Name J.S. Love	Date 28 feb 2024	Signature

CHECK ON STUDY PROGRESS

To be filled in **by SSC E&SA** (Shared Service Centre, Education & Student Affairs), after approval of the project brief by the chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total	EC	*	YES	all 1st year master courses passed
Of which, taking conditional requirements into account, can be part of the exam programme	EC EC		NO	missing 1 st year courses

Comments:

Sign fo	r approval (SSC E&SA)				Robin den Braber	Digitaal ondertekend door Robin den Braber Datum: 2024.04.11 09:52:22 +02'00'
Name	Robin den Braber	Date	11 apr 2024	Signature		

APPROVAL OF BOARD OF EXAMINERS IDE on SUPERVISORY TEAM -> to be checked and filled in by IDE's Board of Examiners

Does the composition of the Supervisory Team comply with regulations?

YES	*	Supervisory Team approved
NO		Supervisory Team not approved

omments.

Chair: Maarten Wijntjes, Mentor: Jeff Love Only one mentor is allowed, Peter Kraaijeveld can act as advisor.

Based on study progress, students is ...

ALLOWED to start the graduation project

NOT allowed to start the graduation project

Comments:

Sign for approval (BoEx)

Monique

Von Morgen

Digitally signed by
Monique von Morgen

Von Morgen

10:28:19 +02'00'

Name Monique von Morgen Date 11 Apr 2024 Signature





Personal Project Brief – IDE Master Graduation Project

Name student Yuchen Lei Student number 5,768,977

PROJECT TITLE, INTRODUCTION, PROBLEM DEFINITION and ASSIGNMENT

Complete all fields, keep information clear, specific and concise

Project title

Enhancing Multicultural Accessibility: Al-Driven Interactions in the Library

Please state the title of your graduation project (above). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

Introduction

Describe the context of your project here; What is the domain in which your project takes place? Who are the main stakeholders and what interests are at stake? Describe the opportunities (and limitations) in this domain to better serve the stakeholder interests. (max 250 words)

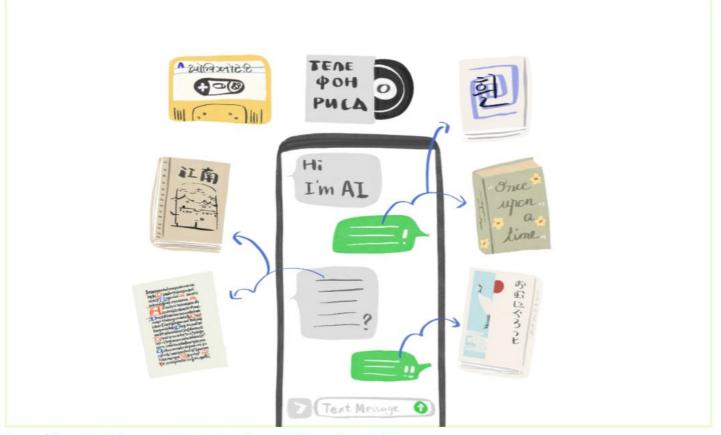
The context is TU Delft Library, and the main stakeholders are library visitors and librarians. The library is a space where collections of information resources are made accessible for reading or study. Interaction between humans and information occurs here. Characterised by digital-based information resources, the library has become a more dynamic space where people can meet and exchange knowledge. Now, with the advent of artificial intelligence, libraries can be presented with both new opportunities and challenges. Therefore, my project wants to explore how the use of AI could reshape the future library, bringing new interactions between human and information.

One of the possible opportunities is to cultivate a more culturally inclusive library environment using AI. Specifically, the project aims to improve the language accessibility and promote multicultural exchange within the library context. In light of the diverse visitor profiles at TU Delft Library, which includes international students with non-Dutch native languages, the substantial availability of literature and materials in Dutch may pose challenges related to cultural and linguistic barriers. Simultaneously, the TU Delft library also houses various collections from diverse other cultures, providing valuable insights for individuals from different backgrounds to explore deeper and share their perspectives. However, the interaction between visitors and these collections is rather limited.

Therefore, the project will delve into how AI-based interactions or collaboration can mitigate these cultural and linguistic barriers, deepen visitors' understanding of collections from diverse cultures, augment their engagement in reading, and thus enhance the culture accessibility for all languages within the library.

→ space available for images / figures on next page

introduction (continued): space for images



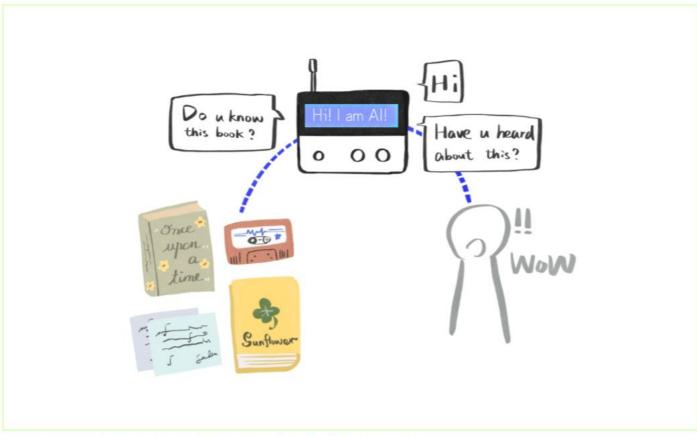


image / figure 2 Shape new form of interactions with collection through Al





Personal Project Brief – IDE Master Graduation Project

Problem Definition

What problem do you want to solve in the context described in the introduction, and within the available time frame of 100 working days? (= Master Graduation Project of 30 EC). What opportunities do you see to create added value for the described stakeholders? Substantiate your choice.

(max 200 words)

The TU Delft Library caters to a diverse audience, including international students for whom Dutch is not the primary language. On one hand, the library offers an extensive collection of literature in Dutch, posing potential challenges to accessibility due to linguistic and cultural barriers. This may involve difficulties in information retrieval and utilization, imprecise interpretation of materials, and a limited level of interaction with the library collection. On the other hand, TU Delft Library also holds many collections and materials from various other cultures, yet these materials have not received sufficient attention and in-depth understanding.

Therefore, it is crucial to explore the potential integration of AI as a collaborative partner within the library environment. This initiative aims to enhance users' cultural accessibility and amplify visitors' engagement with the library collections, fostering a deeper understanding of information from diverse cultural backgrounds. Moreover, exploring AI's role can open avenues for novel forms of interaction among visitors, facilitating the expression and exchange of knowledge within the library environment.

Assignment

This is the most important part of the project brief because it will give a clear direction of what you are heading for.

Formulate an assignment to yourself regarding what you expect to deliver as result at the end of your project. (1 sentence)

As you graduate as an industrial design engineer, your assignment will start with a verb (Design/Investigate/Validate/Create), and you may use the green text format:

Design an AI-related intervention to improve the cultural accessibility, boost the engagement with collections and facilitate multicultural exchange for visitors in future TU Delft library.

Then explain your project approach to carrying out your graduation project and what research and design methods you plan to use to generate your design solution (max 150 words)

For my research, I plan to use both qualitative and quantitative methodologies to understand visitor behaviour and the current context. The potential research methods for this study include sensitizing booklets, interviews or generative sessions and questionnaires.

For the design, I plan to use the principles of more-than-human design and the framework for designing human-agent collaboration that I acquired from the course of Product Understanding, Use and Experience. I will also explore other conceptual frameworks for designing human-AI interaction. I would like to try some AI prototyping tools for experimentation and prototyping.

Project planning and key moments

To make visible how you plan to spend your time, you must make a planning for the full project. You are advised to use a Gantt chart format to show the different phases of your project, deliverables you have in mind, meetings and in-between deadlines. Keep in mind that all activities should fit within the given run time of 100 working days. Your planning should include a kick-off meeting, mid-term evaluation meeting, green light meeting and graduation ceremony. Please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any (for instance because of holidays or parallel course activities).

Make sure to attach the full plan to this project brief. The four key moment dates must be filled in below

Mid-term evaluation 304月2024

Green light meeting 17月2024

Graduation ceremony 198月2024

Part of project scheduled part-time	
For how many project weeks	24
Number of project days per week	5,0

Motivation and personal ambitions

Explain why you wish to start this project, what competencies you want to prove or develop (e.g. competencies acquired in your MSc programme, electives, extra-curricular activities or other).

Optionally, describe whether you have some personal learning ambitions which you explicitly want to address in this project, on top of the learning objectives of the Graduation Project itself. You might think of e.g. acquiring in depth knowledge on a specific subject, broadening your competencies or experimenting with a specific tool or methodology. Personal learning ambitions are limited to a maximum number of five.

(200 words max)

The motivation for this project arises from a fascination with cultural topics. My undergraduate graduation project aimed to re-establish the connection between children and their experiences in art galleries. The project explored how tangible and haptic interactions could facilitate a deeper understanding of abstract works for children, fostering their creative expression. This exploration sparked my continued interest in cultural facilitation. Furthermore, during my master's studies, I encountered artificial intelligence and witnessed its transformative potential in shaping our lives. Motivated by these experiences, I aspire to explore the intersection between AI technology and cultural contexts. Looking ahead, I am also contemplating pursuing a Ph.D. study, specifically in the field of human-AI interaction or within the broader cultural domain.

I plan to prove my research skills through using both qualitative and quantitative methods. In the design stage, I intend to experiment with the principles of more-than-human design or the conceptual framework related to human-Al interaction. Furthermore, I would like to develop the coding skill to broaden my competencies in Al or other technologies. Overall, I would like to practice my UX design skills.