The Scattered Steps:  
A Living Catalogue of Web-Based Art Exhibitions

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Curating on the web is a site-specific approach that takes into consideration the technological context of the exhibition, which adds meaning to the artworks and affects how the web-based art exhibition is experienced and received. A curated exhibition on the digital interface emphasises the fact that our physical reality and online presence are closely connected and associated with political and technical infrastructures. However, the current discussion around web-based art exhibitions that highlight the site-specificity of internet culture is still limited. This is due to the scarcity of resources providing easy access to the wide selection of curated web-based exhibitions, and to the challenges in developing clear criteria for a web-based curatorial practice that can match digital technologies’ rapid advancements. In my practice-based research, I first explored the elements that distinguish a curated web-based art exhibition from an online exhibition; and developed a design proposal for The Scattered Steps: A Living Catalogue of Web-based Art Exhibitions, an archival project that collects and displays web-based exhibitions. The theoretical research of web-based art exhibitions focused on three topics: the duration, the interface, and the visitors’ participation. On the other hand, the development plan was accompanied by case studies of digital archives and interactive prototypes. The idea of a living, dynamic, and evolving catalogue were emphasised in the functionality, visual interface, materials collecting process, and data storage solution of The Scattered Steps: A Living Catalogue of Web-based Art Exhibitions. This thesis represents my personal journey across the fields of arts, design, and technology; and the archival project is a platform that will be continuously developing throughout time.

Keywords
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INTRODUCTION

1.1 PRACTICE-BASED RESEARCH
1.2 RESEARCH QUESTION & PROJECT OUTLINE
The thesis documents and reflects upon the design proposal of *The Scattered Steps: A Living Catalogue of Web-based Art Exhibitions*. The design was supported by research on web-based art exhibitions and current web technologies. This study explores and outlines the criteria that distinguish a curated web-based exhibition from an online exhibition, and investigates the current technical factors that contribute to the site-specificity and reception of web-based art exhibitions. Curatorial research is the foundation of my design proposal for *The Scattered Steps* website and is interwoven with the design and development progress of the website itself. This means that design decisions are supported by my research on web-based art exhibitions, and the structure of the research is driven by the development framework. The whole project represents the results of my exploration of the topic and actualizes my attempts to construct a platform for archiving web-based art exhibitions for future conversations.

The thesis focuses solely on web-based art exhibitions (WBAE), regardless of all the other online curatorial practices (i.e., virtual reality exhibitions). Besides, the WBAE discussed in this thesis are not digital replicas of physical exhibitions or only the photographic documentation of artworks and exhibition venues. In the following parts of the introduction, the definition of WBAE will be discussed. There are three main chapters in this practice-based research thesis. The first analyses seven case studies of archival projects on the Internet (chapter 2.) and also demonstrates the impacts that digital archives could have in the post-internet environment. The second is the research on WBAE (chapter 3.), examined in three aspects: duration, interface, and visitors’ participation. The third part is the design proposal for *The Scattered Steps: A Living Catalogue of Web-based Art Exhibitions* (*The Scattered Steps*) (chapter 4.). This includes the interview with a focus group of seven art professionals, the catalogue process design, a discussion on the visual interface and functionalities, and the participatory elements of the website. I regard this project as a personal exploration, unveiling my learning journey across art, design, and technology. Most importantly, while the field is rapidly developing, the project captured my interpretation of the current state of internet cultures and my aspirations for future-oriented web-based curatorial practice, as they stand in 2022.
Defining a Web-Based Curatorial Practice: A Site-Specific Approach

“We have now reached a point where we see not the art but the space first.”¹ When art critic Brian O’Doherty made this statement in 1975, he reflected on the audiences’ perceptions of the modern gallery space. This impression also applies to my experience in navigating exhibitions online. Regarding the sensorial aspect, the visual elements and the navigation system of the digital interface affect my desire to explore more content on a website. The layout and visual style of a website could determine the credibility and the perceived value of the content in the viewers’ eyes.² On the other hand, website design is often seen as the architecture that distributes access and atmospheric context to the content.³ Unlike physical buildings, which require much time and many human resources to turn raw materials into a solid space, each element of a website is highly flexible and the connections between different spaces can be made easily with hyperlinks. When we revisit O’Doherty’s words in 2022, a time when people are gradually sensing the monopolistic control of large platform companies and turning to Web3 in the hope of establishing a truly self-governing network⁴, the website as a platform for art is becoming a manifesto where art producers present their positions and opinions toward the digital realm and its infrastructure. For example, Low-tech Magazine⁵ utilises solar power to host their website.

Speaking of websites as architecture, there is a conservative tendency to rely on traditional gallery exhibitions as the sole point of reference when making online exhibitions⁶; for instance, creating a 3D space with white cement texture walls and putting up the images with proper spacing, in the same way that physical galleries hang artwork. On this point, new media curator Steve Dietz already suggested that “(n)o matter which way you slice it, of course, putting some version of an exhibition online is not the same as curating on the Web”⁷. Dietz did not precisely define the scope of curating on the web, and the elements included in the planning and production of curatorial practice are complex. Thus, in my research, I built my exploration of WBAE upon the researcher/curator Marialaura Ghidini’s definition of curating on the web:

Curating on the web is, to me, a subset of curating online, in that I understand the former as a site-specific approach to curating web-based exhibitions that enables new ways of producing and displaying digital art. While curating on the web is, at its core, responding to the characteristics of the web medium, its tools and interfaces, curating online is related to the practice that derives from displaying museum and gallery collections online.⁸

Curating on the web is a site-specific approach that assumes that the technological context of the exhibition adds meaning to the artwork and affects how it is experienced and understood.⁹ Thus, when we, as curators, try to discuss or evaluate a web-based exhibition, we must put at least the same level of attention on the interface as well as on the artworks it contains. Is each of the web design decisions made with a curatorial purpose behind it? How can the software environment of a web-based

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⁷ Dietz.
exhibition match the core spirit of the exhibition or the artists? In what ways does a web-based exhibition broaden our perception of viewing artworks through the browser? The technical apparatus of presenting and framing, as well as the mode in which the audience’s gaze is oriented and manipulated, are all included in the curatorial elements of a web-based exhibition. In this thesis, therefore, I explore and try to identify those curatorial features that are characteristics of WBAE and highlight the site-specific components of curating on the web.

You’ll Know It When You See It

After interviewing Ben Vickers, the Curator of Digital at the Serpentine Gallery, artist and researcher Gary Zhexi Zhang wrote “Vickers’s position seems indicative of where the Post-Internet is now: there are many Post-Internets. (...) The term’s many modulations relieve it of almost all meaning and yet, as Droitcour writes, you’ll know it when you see it.” He also concluded that “(t)he thing is, there is no alternative: we’re all Post-Internet artists now.” Post-Internet is the atmosphere in which a digital native like me lives and it is almost impossible to dissociate such air particle-like factors from my creative practice. As a result, the notion of You’ll know it when you see it echoed my experience when I attempted to showcase WBAE to people around me. I found it difficult to precisely focus on WBAE among all the other online exhibitions because the software, technology, and human interaction with the interfaces are iterative and rapidly changing. In addition, people’s daily activities and services rely heavily on the website medium and the users’ aesthetic perception of the interface is inevitably affected by the design guidelines from the software giants, such as Google and Microsoft. In this context, what would be the boundary between a web-based exhibition and a website with interactive media content or even an online publication of an art organisation?

Michael Connor, the artistic director of Rhizome, wrote during the Covid-19 global lockdown that curating WBAE can be described with the theatrical metaphor of mise-en-scène, which refers to the endless technological and human factors that come together to create the performative scene of WBAE. This would include, for example, how an artwork was turned into a format that is displayed inside the browser; how the navigation of a webpage can be used; how the links between pages can be created and placed; and how the digital content may be cross-device or even interact with the physical world. One of the mainstream browsers, Google Chrome, is speeding up its release cycle from every 6 weeks to every 4 weeks, which means the capability of browsers is evolving every month. In addition, people used to code their own website while nowadays more and more no-code platforms are helping end-users re-authorize the web. However, WBAE are not all about reflecting modern technologies. For instance, there is a reverse wave of promoting the handmade web as if
reviving the early net.art spirit. On the other hand, digital content is facing the issue of digital decay\textsuperscript{20} and domain hijacking\textsuperscript{21}. In terms of the former, Adobe Flash used to be a popular web software for net.art artists\textsuperscript{22}, but now, it is not supported by any browsers\textsuperscript{23}, causing the loss of a substantial amount of artworks unless they are migrated to newer software.

Web users are situated in this constantly changing river of technology, and most customer-facing interfaces cover these glitches and “errors” with a so-called user-friendly design\textsuperscript{24}. In contrast, art is here to intervene in the standardised global communication\textsuperscript{25} by unveiling the infrastructural systems and challenging the common solutions that aim to maximise efficiency or business profits. Echoing this sentiment, Boris Groys wrote in his article \textit{Art In The Age Of Digitalization} that “the contemporary, postdigital curatorial practice can do something that the traditional exhibition could do only metaphorically: exhibit the Invisible.”\textsuperscript{26} In the context of this thesis, the Invisible refers to the six layers that Benjamin Bratton identified in \textit{The Stack}\textsuperscript{27}: Earth, Cloud, City, Address, Interface, and User. In this regard, a curated exhibition on the digital interface may reveal the fact that our physical life and online presence are closely connected and associated with the political, technological, and social infrastructure. While we are living in a situation where everything we do online is bundled with Post-Internet, there remains the question of how a web-based exhibition could look or could be experienced. A curated web-based exhibition emerges somewhere in the search engine and reveals those invisible infrastructures and cultural conditions: you will know it when you see it. In the next section, I will dive deeper into this unclear border of WBAE, and more case studies will be provided in chapter 2.


\textsuperscript{22} Sabine Himmelsbach, Net-Based and Networked. Challenges for the Conservation of Digital Art (Edition Donau-Universit, 2019).


\textsuperscript{26} Boris Groys, ‘Art In The Age Of Digitalization’, Art Power, 2019.

What are the Criteria for a Curated Web-Based Exhibition?

After the outbreak of the Covid-19 pandemic in 2020, the contemporary art world began to operate more actively in the digital sphere than before. For example, more artists are aware of the potential of promoting their works via digital platforms to approach a wider audience. In addition, people who might not be familiar with contemporary art now have more motivation to access artworks due to the rising trend of non-fungible tokens (NFTs). Moreover, even if the artwork is not created in digital format, the curators still need to develop the strategy of exhibiting artworks on the Internet. However, despite this need, mainstream discussions on online exhibitions seemingly concentrate on just two activities: building a virtual gallery with certain software and creating a still website that is similar to a blog (online publication28). These two types of online exhibitions often fail to highlight the site-specificity of Internet culture and the correlation between contemporary art and web technologies.

My interest lies in exploring WBAE that demonstrate curatorial thinking in the technical context, rather than online exhibitions or publications that just present the .jpeg files in an interface that can be easily swapped or changed and does not affect the audience’s understanding of the exhibition concept. I experienced difficulty in discovering the aforementioned type of online exhibition. In addition, when conversing with other people in the art industry with an interest in but not necessarily a familiarity with the web technologies, I also found it hard to explain the curatorial potentials that WBAE embody.

During my research, I interviewed a series of curators and creative practitioners who hold different roles within the art industry. It is unsurprising that when I asked the interviewees to share the WBAE that they enjoyed or appreciated, none of the cases was initially found via a search engine. The current ranking factors of SEO29 (Search Engine Optimization) are designed for digital publication and e-commerce, and so they favour large organisations rather than independent groups. In addition, the way the algorithm inspects the site architecture of a webpage does not encourage out-of-the-box creativity when planning the content of online exhibitions. For instance, it is necessary for web programmers to use heading tags to help Google’s algorithm better understand each block...
of the content and thus search engines can recommend the webpage to the audience. However, not all dynamic and interactive WBAE can be structured within the traditional publishing framework. This means that the search results for “online art exhibition” and “web-based exhibition” are dominated by news articles (e.g., 10 of the best online exhibitions to visit from your sofa31) and archives of institutions (e.g., Art Canada Institute32). By contrast, the WBAE that really experiment with the possibilities and cultural meaning of exhibiting artworks on the Internet are not easy to discover using commercially focused search engines.

Nevertheless, there are several platforms that enable people to search for new WBAE in a more specific context. Here, examples include the publishing platform e-flux33 which posts current events and new exhibitions around the world and the not-for-profit arts organisation Rhizome,34 which established a platform for new media art and runs many archival projects to preserve digital artworks. There are also many digital bulletins for arts and cultural events in different countries and languages, such as Agenda des expositions par Point contemporain35 in French. In addition to these dedicated websites, social media is another major channel for people to explore new online exhibitions. Most of the WBAE I discovered are from social media and my connections. This was because even though digital bulletins and newsletters have existed for many years and have accumulated a large number of followers, they cover a rather wide range of activities, and most of the artistic content they promote comes from larger organisations. As for social media, what users receive in their feeds heavily depends on their personal connections and their digital trace data.36 Thus, discovering unique WBAE from the existing platforms is rather time-consuming and depends on chance.

I faced two major issues when researching WBAE:

1. Lack of a space that displays a wide selection of curated WBAE that I can take inspiration from or base my research upon.

2. The difficulty of discussing WBAE. Unclear criteria for what a curated web-based exhibition means. There have been several academic studies and definitions of web-based curatorial practice, but how can those concepts be applied to lively and dynamic everyday life on the Internet?

Therefore, the idea of creating a website dedicated to collecting online curatorial practices gradually emerged as a form of curatorial research. Completing the project provided me with insight into the practical criteria of web-based curatorial practice and how these aspects can be communicated to a wider audience via the platform I developed. As a result, the engagement with audiences and the invitation for people to participate in the exploration of WBAE are the core aspects that I wish to consider in my practice.

I further searched for similar projects and confirmed that few such websites currently exist and are still being updated37. Moreover, in “Curating on the
Web: The Evolution of Platforms as Spaces for Producing and Disseminating Web-Based Art’, Ghidini concluded that one of the challenges of triggering further interest and research on online exhibitions is “the lack of ad-hoc archival projects dedicated to web-based exhibitions”.\(^{38}\) This need will be addressed, in part, by The Broken Timeline, a project by CSNI (Centre for the Study of the Networked Image)\(^{39}\) at London South Bank University which will include a collection of over 250 online exhibitions from recent decades, accompanied by an overview of technical developments.\(^{40}\) At the time of writing, The Broken Timeline (TBT) website was recently launched.\(^{41}\) As its title suggests, TBT lists the web-based exhibitions in chronological order accompanied by several historical moments of Internet development. The types of the initiators and organisations are emphasised as well as the spaces and platforms where the exhibitions are constructed. While TBT focuses on presenting a historical-technical timeline and reflecting on the transformation of curatorial and art practices with technology,\(^{42}\) I see The Scattered Steps as a platform where the exchange and creation of experiences happen, with the project solely focusing on WBAE.

On Digital Archival Practice: Case Studies

Before diving into the design and development phase, I researched different digital archives around the topics of Internet culture and art, to explore how previous projects utilised the characteristics of web technology, and what would be the achievable scope for my project. I paid attention to the design and development details of those archival practices. For instance, the structure of datasets (How were the items and labels defined? How would the new data be generated and updated?), the visualisation of the information (How is the relationship between items visualised? How do the designed artefacts assist users’ exploration toward data?), the preservation of broken files and links (How do the expired items be managed? What was the thinking behind the decision?), and even the navigation and add-on tools provided in the projects (What kinds of web technology can be utilised in navigating databases? How were the tools designed to fit people’s mental model of acquiring information?). Among the twenty projects I visited online, I found seven projects particularly inspiring and innovative. In chapter 2, I will introduce the representative projects and highlight their key features.

Archive, catalogue, database, or collection, the word chosen to describe the aggregation of information can imply different meanings in the political and cultural context. Archives are seen as the sources of history and are products of decisions made by a range of stakeholders.\(^{43}\) Archives are highly involved in making history and the narrative that the institutions wish to construct. For instance, the American digital library Internet Archive\(^{44}\) and its Wayback Machine\(^{45}\) aim to preserve the artefacts of Internet culture and create a library for historians and scholars.

While archives put emphasis on the preservation of historical evidence, catalogues are described as “a collection of systematically arranged descriptions of materials” in A glossary of archival and records terminology\(^{46}\). Beyond the exhibition catalogues that list the artworks in the exhibition

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38 Ghidini, ‘Curating on the Web: The Evolution of Platforms as Spaces for Producing and Disseminating Web-Based Art’.
together with relevant essays, catalogues may also be seen as an activist approach to communicating with society, for instance, the *Whole Earth Catalogue* by Stewart Brand. *Whole Earth Catalogue* is often described as a grassroots revolution that created a nationwide network that shared knowledge of living, community, media, and many sorts of radical software. It greatly influenced the ecological movement and reflection regarding the economic system in the US in the 1970s. Digital catalogues may help create the cultural conditions under which the computer networks of contributors and readers could be imagined as tools of liberation.

As for databases, they are mainly connected to the computation context and the information that is organised and stored in the database can be manipulated or extracted for purposes. Thus, databases and their data structures are often designed to best facilitate the interchange of information. Yet, databases are not necessarily required to adapt programming techniques or automatic data collecting functions. *netart latino database*, for instance, is a low-tech and text-only website created and maintained by Uruguayan artist Brian Mackern in 2005.

Another commonly used term in archival projects is collections. Collections refer to a group of materials with some unifying characteristics. Unlike archives, in which the arrangement of the collected material and the corresponding timeline is crucial, collections are more versatile in terms of the integrity and uniformity among the collected materials. For example, *New Urgency* is a collection of links to various projects, films, PDFs, events, and people profiles. By using the form of collection, *New Urgency* aims to map out an emerging network of art and design practices.

After exploring the terminology of archival practices, I chose to use the term catalogue to define the nature of my project. As a catalogue, *The Scattered Steps* is open to public submission and could showcase the process of collectively defining the shapes and characteristics of WBAE, thus raising the public’s awareness and curiosity on web-based curatorial practice. In the next section, I will introduce the title and concept of *The Scattered Steps* in more detail.

The title of my project is *The Scattered Steps: Living Catalogue of Web-based Art Exhibitions*. “Scattered” and “Steps” are the literal translations of “散” and “步” in Mandarin, which together mean “take a walk; stroll”. I found that the experiences of visiting WBAE in the browser, clicking the links and images, opening a new tab, and navigating the interface, are similar to taking a walk or wandering in the physical world. Sometimes, I have a clear destination in mind but more often I just randomly walk (my cursor) from one place to another. As a catalogue that collects WBAE, people’s footprints and steps are everywhere, and the visitors come to the catalogue and see all the items loosely scattered on the interface. Thus, the title *The Scattered Steps* captures the poetic connotation attached to exploring WBAE.

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The ideas of living, dynamic changing, and evolving were emphasised, since the content (WBAE) of the catalogue is rapidly developing with new technologies and constantly presenting new perspectives to the audience. As a result, the landscape of the catalogue website is dynamic and reflects the current developments in the art and web technology industries. The Walker Art Center has launched the project Living Collections Catalogue as their online publishing platform. According to its website, “living catalogue” is the dynamic nature of an online volume about Walker’s collections and the information is updated as new research and presentations occur. Thus, The Scattered Steps will serve as a platform for gathering and presenting updates on the topic of WBAE.

The concept of a living catalogue is not only reflected in the content of the catalogue, but it is also present in the visual interface of the catalogue website. Instead of developing a static website, The Scattered Steps is an interactive website with several design artefacts that bring the organic elements to the interface. The prototypes for the visual interface can be seen in chapter 4.

The information collection and data storage processes of The Scattered Steps are built upon networked models such as peer-to-peer file sharing. Everyone can contribute to the catalogue, and the specially-designed browser extension will ensure that the submitted data is meaningful. The utilisation of a third-party web archiving service and a decentralised storage solution can prevent the catalogued content from disappearing or being dependent on a single service provider. As a result, The Scattered Steps lives and grows within the ecosystem of various web technologies.

Although the content of The Scattered Steps is written in English, cultural diversity and equal focus on different regions are taken into account when developing the catalogue. The map function in the website encourages visitors to explore the variety of WBAE from a global perspective and to enjoy the projects beyond the user’s geographical location while still appreciating the cultural context from which different exhibitions originated. In the future, more international contributors will be invited to submit the WBAE to the catalogue.
Chapter 2.

CASE STUDIES OF ARCHIVAL PROJECTS ON THE INTERNET

2.1 CO-EDITING DATABASE BUILT ON ONLINE SERVICE PLATFORMS
2.2 DESIGNED PLATFORMS FOCUSED ON VARIOUS TOPICS
The way that the digital tools were designed is highly focused on helping people to collect information, make connections among data, and contextualise information more easily. Before the birth of the World Wide Web, Apple released the software application HyperCard, which enabled users to navigate stacks of virtual cards that contain various information while users can also add new cards to the stacks to create a pile of hyperlinked media. Before the domination of Google’s search engine, webrings gathered many websites that shared the common themes into loops and helped Internet users to find the next cool website to visit. Nowadays, everyone can take screenshots at any time to serve their archival impulse. These tools and methods enable individuals to become the archivists of digital history, preserving and documenting the content that is mediated through the screens.

In 2008, Aaron Swarts wrote in the Guerilla Open Access Manifesto: “Opposing the privatisation of knowledge” thus triggered the movement for liberating the digital content from commercial academic databases. Saving and contextualising information on the Internet, in addition to just being a personal activity on people’s own devices, can also be a community collaboration with the aim of building collective knowledge. While the major software providers, like Google, now focus more on profitable future technology and no longer commit to creating universal access to useful information, the bottom-up approach to developing community archival projects could be a solution. The community in the digital sphere is not based on physical locations but the shared passion and curiosity about the topics. By participating in the development and promotion of digital databases, the individuals not only have the opportunity to affect the narration of the subjects that they care about but also can increase the visibility of high-quality content to other Internet users.
One of the lowest threshold ways to create a communal knowledge-sharing space is to utilise existing online service platforms that people are already familiar with, such as Google Sheets. Since those online service platforms are used globally and across cultures, people can participate in the co-editing process without difficulty. Besides, the initiators of those co-editing databases don’t have to do much technical and design work because the functions and utilities of the platforms are well-maintained by the corporations. In other words, everyone can kick-start a community knowledge base at any time, even without revealing their real identities. The spreadsheets will grow freely with diverse input from collaborators in various time zones. From the viewer’s perspective, this type of online database is easy to use and find information since the interface is familiar or designed by professionals for a broad range of users.

There are still several negative side-effects of collecting information on these kinds of open platforms. For instance, it is difficult to find the links via search engines by just typing the keywords even if the database has high browsing traffic. It is easy to visit the homepage of Google Docs but almost impossible to find a specific spreadsheet you have never visited before. On the other hand, the surveillance power of the online service platforms may affect the freedom of speech in the co-editing content. The uploaded content is all saved in the corporations’ infrastructure. Last but not least, since the collaborative databases mostly show new edits in real-time, the communities cannot always deter inappropriate content in advance. The quality of the databases heavily depends on collaborators’ self-regulation and their mutual review.

2.1 CO-EDITING DATABASE BUILT ON ONLINE SERVICE PLATFORMS

Screenshot 1. Case Studies of Hybrid Organisations. Captured by Ya-Yu Tseng, 2022, https://docs.google.com/spreadsheets/d/1awE_WDhBK7PH0pHGeCxhrhtH6gt0xMzt8rtjIP8LuJk/

Screenshot 2. Generative Art and Social Media Crowdsourced List. Captured by Ya-Yu Tseng, 2022, https://docs.google.com/spreadsheets/d/1bSq5QzNvRUIYUSQ4r6L25xqULzefGdFmuwCmMFC/edit?gid=0/
A Collective Booklet for Computational Women is a Google spreadsheet created by Dutch-based new media designer Soyun Park in 2020. According to Park, the project aims to protest against stereotypes and empower women to pursue careers in technology. Based on the version history provided in the platform, there are new edits each month.

Park created a template and a short set of instructions for the contributors to follow. The contributors worldwide post their photos and websites in each new sheet they add. After editing the sheets, the contributors can lock their sheet and keep the content unchanged. In addition to the self-introduction sheets, there is also one sheet about related articles about women in coding. By looking through this spreadsheet, viewers can meet many women who work with or love computational technologies. The spreadsheet works like an index of a human library and provides evidence to demonstrate contemporary women’s roles in the history of technology.

From my point of view, Park’s project created a safe space for cultivating a gradually emerging community and uniting the individuals to speak together to the broader society. There is no pre-selection on the collaborators of the spreadsheet; anyone who identifies herself as a woman in tech can post her words. In addition, the template created by Park encouraged the collaborators to freely “play” with the spreadsheet and achieve a fun and intimate visual language, which is opposite to the serious and stiff image of spreadsheets in most people’s impression. This, by
letting individuals showcase their self-narration in the co-editing database, truly echoes the project’s main concept, which is to protest against the stereotypes or any single definition of women in tech.

Case 2: Radical Google Docs on Are.na

Are.na is a web-based service established in 2011 that allows users to save content, create collections, and connect ideas. Unlike mainstream social media that contains many advertisements and algorithm recommendations, Are.na keeps the platform clean and simple, purely helping its users to structure the ideas better and build new forms of knowledge with the community. According to their roadmap, there are around 17,000 monthly active users on Are.na. An image, a link to a website, or a paragraph of text can be added to Are.na as a block, blocks can be sorted in multiple channels, and channels can be inside another channel. In other words, a channel is like a collection of information, and there will be images, websites, text, and other collections within a collection. The owner of a channel can decide the status of the channel, whether to allow other people to edit the content in the channel. Most of the channels on Are.na are open to everyone to edit since collaborative knowledge-making is the platform’s mission and what attracts its users the most.

Radical Google Docs is a channel created by user Corey Tegeler on Are.na. At the time of writing, there are 43 blocks and 2 channels inside this channel, 281 people following the channel, and the channel has appeared.


63 'Are.na Roadmap', n.d., https://www.are.na/about
in over 30 other channels. As the title describes, this channel collects all kinds of Google Docs that are used in a radical and creative way. The themes of the projects inside the channel mainly focus on social issues in the US, such as #BLM, defunding the police, and decentering whiteness in industries. The amount of information aggregated in these Google Docs is huge; each of the documents directs readers to a giant list of self-help or self-educate resources. Without this channel, those Google Docs are scattered in different communities and have no relation to each other. Now, this channel can be linked to other relevant channels, or discovered via the connection footprint of each block it contains.

The themes of the radical Google Docs in the channel address are the urgent issues happening in the US and Europe in recent years. In my opinion, Radical Google Docs reflects the current state of Western society and a particular set of values and activities. Moreover, the user group of Are.na—mainly people who work or study in arts, design, and technology—is a small fraction of the Internet users. Thus, the channel preserves the history that creative people utilise ordinary digital tools to intervene in social issues, contribute to making useful information more accessible, and create a safe and equal space, allowing more people to join the collaboration. Although the participants and viewers of the channel are limited in comparison to other commercial platforms, Are.na and its channels have still built an entrance to a more diverse exploration of digital tools.
In the following case studies, I explore how individual as well as organisational perspectives have contributed to the development of different approaches to archiving, web design, and public collaboration. These frameworks impacted *The Scattered Steps* which I explain in detail in chapter 4.

**Case 3: Cyberfeminism Index**

Cyberfeminism Index is a growing database launched in 2020, facilitated and gathered by American designer and researcher Mindy Seu. As its title suggests, the database offers hundreds of texts, images, and projects that are associated with all kinds of digital feminism, cyborg, and post-binary studies from 1985 to 2020. Together, those works map the radical techno-critical activism that shapes a cyberfeminist counter-public.  

Seu described the website as a billboard for submissions, and the Index is never complete and always in progress. By naming the individual activists and their productions, and gathering them under the umbrella of cyberfeminism, the Index aims to perform a social and political act.

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66 ‘Cyberfeminism Catalog 1990–2020’.
reclaiming the meaning of feminism in technology history.

The implementation of the Index was significantly inspired by many female thinkers and activists, for example, Donna Haraway, Judy Malloy, Anna Tsing, Wendy Chun, etc. The design and development of the Index were done with Angeline Meitzler, and the Index employs a pared-down aesthetic, using default web elements and system fonts to ensure that it continues to function even as its appearance changes as a result of software updates and other technological shifts. In addition to the list of objects in a static and DIY spirit webpage, the Index included several collections curated by female voices to guide the readers to navigate and get inspiration from the database. Another designed function is the side panel, where users’ clicking history is visualised and can be downloaded. The thinking behind the side panel is to visualise citations or associative pathways, and the download function points to ideas of agency, ownership, and dispersal.

From my personal experience scrolling through the Cyberfeminism Index, I am very impressed with the sidebar that shows my reading history simultaneously, and I can even download those “citations” as a PDF to read later. On the one hand, the reading history captures my interaction with the Index and my personal learning journey. On the other hand, the responsive and automatic PDF generating function is clear proof of why we need digital archives, bringing in a new reading experience and working methods.

Case 4: 2021 Ladybug Online Desktop


69. Hoejlund, ‘Sharing as Survival: Mindy Seu on the Cyberfeminism Index’.

Created by Taiwanese visual designer Jyunc-Cih Li, 2021 Ladybug Online Desktop is a website that visually imitates the “files overload” situation of designers’ working desktops. Each folder on the website belongs to one female visual designer in Taiwan. The designer can create a folder with her name and upload the portfolio, website, and contact information into the folder. When users first visit the website, they would discover a huge number of folders displayed on the “desktop” and realise that many female professionals are working in the visual design field in Taiwan. Furthermore, when users click through the folders and see the thumbnails of designers’ works, they are able to discover their diverse styles and talents. As the website described, this project hopes to bring more public attention to the underrepresented female visual designers, and the reality of Taiwan’s design industry and education, in which female design students are twice as many as male students but the key names perceived by the society are mostly male designers.

In the context of this thesis, the 2021 Ladybug Online Desktop may not be precisely recognized as an archival project but it plays with the idea of folders and files saving important information in the digital environment. The links and different formats of files were transformed into folders that visually occupied and covered the whole desktop, where the landscape may indicate one’s style of managing information. In Ladybug’s case, the overloaded desktop creates a vivid impression of the female designers’ existence: they are there, with their names but not their looks. Thus, I think Ladybug successfully delivered the message by bridging people’s perceptions of digital interfaces and technical components. Moreover, on the one hand, this type of personal project brings the public’s attention to the theme it promotes and on the other hand, manifests the social value and political provocation that digital archives can ignite.
Case 5: Your Uncertain Archive

Your Uncertain Archive is a web-based artistic work that offers a structure that connects the artworks, projects, publications, texts, sketches, and interests of Olafur Eliasson and his studio. Upon entering the website, viewers may drift in the cosmos-like layers of objects, accidentally click on a tag and see the objects reveal their connections with each other, and encounter unknown objects. It is an archive that sorts information related to Eliasson’s works and texts, but it also puts users in a prominent position where interaction is constantly being created.

Three key aspects make this project stand beyond a regular artist homepage. Firstly, it reconsiders archive and knowledge collection from spatial and psychological perspectives. Secondly, it respects and invites viewers to become co-producers of the space. Last but not least, it incorporates uncertainty into the process of associating items. Considering the evolution of critical media and how the Internet works, Eliasson’s studio turned the retroactive and passive type of archive into a proactive approach that can nurture future dialogues. The project gives website viewers a set of tools, “yet rather than organise the material into predictable patterns or groups, these tools lead users to unorthodox topographies.”

The viewers no longer passively accept all the information provided; instead, they face freedom and uncertainty in the archive. Eliasson wanted to reclaim the value of being uncertain; he believed that the appreciation of uncertainty means the society is able to trust other people and believe in their capability. In the archive, the idea of uncertainty is visualised in the endlessly rearranging sea of floating objects and the slowly moving...


71 Agerman Ross.

72 Agerman Ross.
layers of colours. In addition, the classification system of the archive—the tags—is developed in a way that unpredictable connections could arise, and new meanings could be produced. From my perspective, Your Uncertain Archive does not build a fortress that guards all the knowledge and experience; rather, it is sending invitations to the broader audience to join the play.

In addition to the individual creations, I also looked into larger projects that are managed by organisations. Such projects are often more conscious of their social responsibilities like promoting equal access to information and highlighting the minorities’ voice in the art industry. The organisations may put the goal of building a community early in their projects and reach out to various people and collectives to contribute together. In addition, these organisation-founded projects tend to have a cohesive roadmap and consider how their decisions can foster future dialogues in the digital environment. When I was studying these projects, I focused on their mechanism of gathering and showcasing information, such as the preservation of the dead links and past content as well as the frameworks and philosophies behind structuring the content and designing the visual interfaces.

Case 6: Rhizome ArtBase

The ArtBase archive was established by the non-profit arts organisation Rhizome in 1999 and has collected over 2200 born-digital art, including online works, artists’ software, video games, poetry, electronic literature, and moving images. Since the nature of born-digital arts does not fit
into the traditional software infrastructure of archiving content, Rhizome has invested time and resources in developing new approaches that can truly reflect the relational and dynamic qualities of born-digital cultural expressions.\(^\text{74}\)

In 2016, researcher Lozana Rossenova started a four-year, practice-based research PhD project of redesigning the ArtBase.\(^\text{75}\) By addressing the question of how archived web-based works can be made accessible to the public in the online context, the research looked into the development history of the ArtBase, conducted research activities with different user communities, reviewed 46 different interfaces ranging from institutional to experimental projects to identify the key features and interaction of the future ArtBase, and developed three versions of the prototype with users’ evaluation.

The ArtBase was relaunched in mid-2021. The main implementations are the flexible data structure based on Linked Open Data (LOD) and the preservation methods: the Emulation-as-a-Service approach and Conifer. LOD is a set of standards for structured, machine-readable, and interoperable data on the web facilitated by the open-source platform Wikibase.\(^\text{76}\) LOD enables users of the ArtBase to query the database beyond keyword search, which was often considered to be simplifying the complex performativity of digital artworks.\(^\text{77}\) As for preservation tools, ArtBase partnered with external collaborators such as Google Cultural Institute to explore solutions that can capture both the operating system and content of digital works.\(^\text{78}\) Conifer,\(^\text{79}\) an online service based on Webrecorder\(^\text{80}\) hosted by Rhizome, allows users to create an interactive copy of any web page, including the multimedia content revealed by the interactions. Thus, the digital artworks that run on past software or expired hosting domains can still be documented and showcased in the ArtBase. Currently, the ArtBase is running periodic open calls to receive new submissions.\(^\text{81}\)

The Rhizome ArtBase shows the importance of preserving web-based content as they are part of cultural heritage. Their practice also points out a crucial issue; the classic database systems are very limited for cataloguing digital artworks.\(^\text{82}\) Moreover, preserving the contextual elements and the interaction of artworks that were hosted in the internet environment is another challenge for the archivists. Rossenova’s research project also highlights the importance of incorporating users’ voices and opinions throughout the design process of such public archives. As a result, cataloguing digital content requires rapidly iterating on the strategies and close collaboration across the arts and technology sectors.


The Creative Independent (TCI) describes itself as a growing resource of emotional and practical guidance for creative people. It is published ad-free by the public-benefit corporation Kickstarter. Aside from interviews, essays, and zines published by TCI, the website also has a library section displaying the recommended books, TCI staff picks, and PDF lending library.

In an essay written in 2018, Willa Köerner, the former creative content director of TCI, reflected on the difficulties of creating shared knowledge in the field of creativity, where the system is more likely to reward ego-driven practices. However, she also considered the benefits of networked technologies, which enabled more experiments on knowledge-building in the public space. As a result, rather than functioning as traditional online publishing or editorial that feeds readers with headlines and features, TCI’s role is more close to a digital archive of creative people’s experiences of living in the current society. There are essays about budget basics for artist fundraising, making a living as a musician, etc. When users visit the TCI website, they will see an endless wall of blocks of information that visually do not look different from each other, so users can focus on the pure text. The users filter the information based on their current needs, for example, looking for tips or questions.

TCI quoted Julia Cameron’s words that artists will circle through some of the issues over and over, each time at a different level. According to Köerner, knowledge is hardly manageable or fully captured, to capture is to kill, keep the energy flowing. Those ideas are demonstrated in the spiral.

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89 Köerner, ‘A Personal Philosophy of Shared Knowledge’.
logo of TCI, and also in a page called “snails” that simply shows several moving snail images on the website.

For *The Scattered Steps*, TCI rethinks the purpose and benefits of gathering resources on the Internet. It preserves useful information while considering the users’ emotional experience of learning together. It builds an archive that people not just come and take a piece of information and leave, but would feel themselves being inside a community where friends show their traces of learning, and they can keep coming back.
Chapter 3.

RESEARCH ON WEB-BASED ART EXHIBITIONS

3.1 THE LIFE AND DEATH OF WEB-BASED ART EXHIBITIONS
3.2 FROM SPACE TO INTERFACE
3.3 VISITORS’ INVOLVEMENT IN WEB-BASED ART EXHIBITIONS
It is common to think that exhibitions come with a schedule of opening and closing, since the exhibited objects need to move somewhere else and the long exhibiting time would not constantly attract new visitors from the local area. However, when it comes to WBAE, the files of exhibited works can be infinitely duplicated and do not occupy the same amount of space; the digital content can reach new visitors on the Internet if the marketing effort continues. Thus, there is a necessity to reconsider the meaning and strategy of curating a fixed-time web-based exhibition. If a web-based exhibition would end at a certain point, what is the reason behind it? Does it just follow the convention of physical exhibitions? In contrast, if a web-based exhibition would last forever, what could be the variables of the exhibition content? How does the continued web-based exhibition incorporate into the iterations of web technologies? To address these questions, I discuss in the following section the temporality of WBAE in two categories: those which coexist with physical exhibitions yet are not an online replica or documentation of physical venues and those which stand alone.

Web-Based Exhibitions that Coexist with Physical Exhibitions

When building a web-based exhibition that is parallel to its physical version, it is crucial to consider the curatorial strategy of transitioning the tangible art objects into an interactive and dynamic web environment. Curator Daniel S. Palmer considered the images of artworks that people see online to be digital translations: curators should learn to display art objects in ways that reflect the changes in perception brought on by digital technologies and to leverage the advantages of digital media to express aspects of a work that cannot be conveyed in a museum space. Building on Palmer’s words, the duration of WBAE is an element to be translated as well, and it should be considered together with other advantages of digital media.

The exhibition To Martian Anthropologists, curated by Taiwanese curator Chun-Yi Chang in 2020, consisted of a one-month physical exhibition and a web-based exhibition that is still running to date. The physical and digital contents of this exhibition were not the same: rather, they complemented each other and operated different functions to finalise the comprehensive exhibition experience. Take one of the exhibited artworks—for example, Pharmakos by New York artist Dorian Gaudin, nine ceramic pieces...
displayed along the shelf in the physical gallery. In the exhibition website, the audience voted to select the ugliest one, and each week, the one ceramic that received the highest number of votes would be smashed into pieces. The debris remained on the floor and accumulated as time went by. At the end, only one ceramic would remain standing on the shelf, and the website shows the remaining ceramic with the text “Kimberly is the most beautiful piece. Visitors broke all other works.” In this case, the web-based exhibition worked as an indivisible part of the exhibition during the opening time, and it remains and is still representing the artworks, not just as documentation or a catalogue for the physical exhibition.

Projected.Capital is a project by Silvio Lorusso and Sebastian Schmieg, exhibited online and at Roehrs & Boetsch in Zurich, Switzerland. The main page of the website is the livestream showcasing the 900cm² exhibition surface in Zurich. In the project, anyone can rent a portion of that exhibition surface for $0.25/day during a two-week show period. The artist then uploads the image that they want to exhibit and pays the rent with PayPal. The concept of this project is ironic as its title suggests “capital”. According to the project website, the founders tried to turn the hiatus between shows into opportunities for many other artists to gain direct access to the prestige of the art world. In Projected.Capital, the opening and closing times of the web-based exhibition correspond to the physical ones. Monetising space and time is questioned in Projected.Capital and the use of the web made such critique more ironic.

Web-Based Exhibitions that Stand Alone
Physical exhibitions deal with logistics and staging of the artworks; the opening of an exhibition means the entrance and paths to the exhibition are unblocked, and the ending of an exhibition means the artworks are moved away and transported to another place. In the case of WBAE, the opening starts from the second that a user can access the website and see the content, and the ending of an exhibition may be the point at which the users can no longer connect to the website or see the original content. In other words, a web-based exhibition is on show only when the users can properly perceive and interact with all the website content. Thus, the
curators should consider the limitations and natures of the technologies that the WBAE are built on and should develop a strategy that ensures the sustainability and accessibility of the exhibitions.

The WBAE that exist solely as such have high flexibility in terms of duration. Nevertheless, their maintenance and continuity are still affected by several factors, including technical maintenance, content management, budget, and the job structure. First of all, technical maintenance is the most fundamental part of keeping a website alive and functional on the Internet; this includes the registering and renewing of the website domain as well as updating the source code to meet the newest standards. Secondly, content management refers to whether the artworks in the web-based exhibition will be changed or adjusted and if there were licence or contract issues with those artworks. Thirdly, budget greatly affects the duration of WBAE since all the maintenance work requires human resources and payments to many other Internet services. Unlike physical exhibitions that often charge audience tickets, WBAE are mainly free, thus relying on internal funding and grants even more. Last but not least, the personnel structure of art organisations may have an impact on the maintenance of WBAE. For example, the traditional training of curators and administrative roles does not always include digital literacy and human-computer interaction knowledge. Besides this, there is not always a role assigned specifically for conducting the planning and quality control of WBAE within the art organisations. In other words, the rising trend of WBAE may create new job opportunities to attract talents with art, design, and technology backgrounds, so that the WBAE can be operated in the long term. To conclude, even though managing a web-based exhibition seems like making a few clicks on a laptop, the allocation of human and financial resources and the ambition toward the future are the key points to determine the duration of the exhibition.
Since the early stages of the World Wide Web, people have been passionate about applying the physical space metaphor onto the digital space—for example, GeoCities, in which people could have neighbourhoods with their personal website. In addition, the terminology of searching for content on the Internet is also surrounded with spatial-oriented concepts, such as visiting a website, sharing the address, and naming the browser Safari.\(^9\) Now, there are notions of building a digital garden to manage personal knowledge\(^9\) and products like GatherTown that aim to provide a more interactive communication experience where people can walk their avatars into different rooms on the webpage.\(^9\)

When it comes to exhibiting artworks in the digital space, there is a tendency of hanging pictures next to each other horizontally on the website (see Illustration), just like walking along the gallery white wall; the sections are divided into different webpages, just like the visitor who stands in one room cannot see the artworks in another room. However, in my opinion, the metaphors of our spatial experience in the offline world should not necessarily be set as a default way to interpret the website navigation; it is crucial to re-examine the interface that situates itself between artworks and people.

Interfaces exist on many levels between hardware, software, and humans.\(^9\) Understanding people’s perception toward interfaces may help with map-
ping out the cultural reality of our current time; artists following and exploring the continually developing interface, just as artists have explored the canvas, could help us understand it as a medium for exhibiting artworks. Based on Pold’s definition of interface, interfaces exist between hardware, software, and humans. I would like to argue that the web-based exhibition is the interface between artworks and humans. Whether or not the digitally exhibited artworks were made to be tangible, they were all digitised, and the viewers perceive them throughout the website interface. In other words, the artworks are placed in the interface and viewers see the artworks by interacting with the interface. From the artists’ viewpoint, Artie Vierkant wrote that “the architecture of the Internet—an arrangement of language, sound, and images in which imagery is the most dominant, immediate factor—helps facilitate an environment where artists are able to rely more and more on purely visual representations to convey their ideas and support an explanation of their art independent of language.” On the other hand, the way in which the interface of a WBAE was constructed reflects the current art world’s opinions toward exhibiting artworks on the Internet. For example, a 3D virtual gallery may represent a belief in the legitimacy of white-cube aesthetics. On the other hand, the design of the interface affects the viewers’ perception of exhibited artworks (for example, the monetary value of the artworks) and educates viewers on the possible actions that they can take toward the artworks (such as reading the additional information or taking screenshots). Thus, the exploration and decision making on the appearances and functionalities of the interface are parts of the curatorial process. In the following section, I would analyse case studies of WBAE that demonstrate unique perspectives on the interface level.

### Navigation

Navigation is about finding directions in a place, and its meaning within a web-based exhibition refers to design artefacts that enable users to locate themselves in the exhibition, move through it, and understand the scale of the exhibition. From the interface design perspective, the navigation within a website includes elements such as buttons, menu bars, tabs, logos, headings, and even the visual design elements like colour-coding. To interact with the navigation of a website, the most common method is through cursor clicking while there are some more diverse ways of input being developed, such as gesture and voice inputs.

To curate a web-based exhibition is to create a new interface for the visitors to build relationships with artworks. From the human-computer interaction design perspective, providing affordance in the interface would ensure the desired and relevant actions are readily perceivable by the users. Affordance refers to the actionable properties between the world and an actor; affordance can include different characteristics, such as physical, sensory, cognitive. Thus, a web-based exhibition is an interface where viewers and artworks interact, and the relationships between viewers and artworks are supported by the affordances given on the interface. However, from the artist’s perspective, those user experience guidelines may kill the opportunity for users to create their own experience in the interface. Net artist Olia Lialina critiqued that “UX (user experience) fills awkward moments when
AI fails. It brings “user illusion” to a level where users have to believe that there is no computer, no algorithms, no input.” In other words, users’ experiences are already scripted by the designers, and users are guided by the elements on the interface to walk on the standard route to access information. In that sense, the poetry of digital tools and interactions becomes undetectable when users are visiting a web-based exhibition.

The key opportunity in navigation design for WBAE is finding the balance between creativity and usability, in other words, to enjoy the freedom of artistic expression and to build a functional platform with the knowledge from scientific research on human-computer interaction. One such exhibition, Real Live Online, curated by Lucas G. Pinheiro and Devin Kenny, in which the navigation is simple and straightforward, shows a list of artist names and short-cut links to their works. Visitors to the exhibition may go to the desired section of the exhibition directly without being lost in the interface; however, they also receive less excitement and emotional triggers from the interface. On the other hand, there are exhibitions that design their navigations according to the exhibition themes. For example, Lost In A Garden Of Clouds, curated by Davide Bevilacqua, keeps the colour contrast of the navigation button and text very low so that the text is more readable only when the clouds in the background layer are floating behind the button. Similarly, Open Secret by the KW Institute for Contemporary Art makes its navigation buttons blurry and waits for visitors to hover the cursor over them to reveal the actual information. These examples demonstrate how the navigation of a web-based exhibition can correspond to the curatorial concepts without losing the usability and affordability to visitors.
Connor used the term arrangement to replace the term order—which, in a physical exhibition, involves imposition of order on objects—to describe the open-ended and dynamic process of making relationships among the objects in a web-based exhibition. Building on Connor’s definition, I will now focus on the arrangement of information within the interface of WBAE. The discussion comes from two perspectives: one is the visual level, which is about layout and styles, and the other is the internal level, which includes links and connections between objects.

The visual layout and styles of a web-based exhibition create the script, or define a framework, for users to understand the current mode of the website and see the possible actions they could take on the interface. In practice, many web development frameworks promote the use of design systems that ensure the visual consistency among websites; the major platforms that people are using daily, such as Google, FaceBook, and AirBnB, all employ a number of professional designers to create their own design systems that define the visual components of their interface. Thus, people have become accustomed to the visual language of many digital services and have established the mental model to interpret the meanings of various visual components, such as distinguishing the styles of single selection and multiple selection. On the other hand, there are several cognitive factors that could affect the users’ perception of the visual interface, such as memory, attention, and learning.

In addition, one study has pointed out that the webpage reading behaviour among East Asians and Westerners can be classified into holistically minded and analytically minded due to the media culture and the linguistic differences in these two areas. To conclude, our perception toward and interaction with the visual design of websites are strongly influenced by the common digital products that we use daily and the cultural context in which we live.

Bearing the above factors in mind, we can identify two types of layouts for WBAE. One is the functional approach in which the layout is similar to the digital gallery or photo album interface in many other websites. The visitors of this type of WBAE have a concrete feeling of viewing a series of artworks by the guidance from the structured visual hints. For example, *We=Link: Sideways*, curated by Zhang Ga, used a functional approach to locate the artworks in different folders. Its visual style adopted the Windows 2000 user interface, which is an iconic and universal design language, so that visitors had a clear understanding of the current state of the interface and knew that each pop-up window represented one artwork. Aside from this functional approach, there are WBAE presenting more chaotic but creative layouts, proposing new angles for visitors to experience their interaction with the information on the website. One representation is *Post-gallery, online*, run by two Estonian artists. They collaborated with many artists and produced web-based solo exhibitions where the layout and visual styles of the interface were designed according to the artworks. For instance, *Hocus Pocus Zero Focus*, wrote “touch me” instead of “next page”, and each page showcased different formats of text, animation, and even interactive painting elements. Similarly, *Demiurgic meltdown* did not provide...
any call-to-action (CTA) button on the interface but let the visitors explore the animated paintings with their instinct and interact with the artworks. In these WBAE, the web technologies indeed helped the curators and artists achieve their experiments on alternative layouts. This outside-the-box design approach may create unique viewing experiences and even bring the viewers closer to the artworks.

On the web-based exhibition interface, the hyperlinks enable visitors to open a new section of information on their own initiative. In many WBAE, hyperlinks act as mono-directional pointers that visitors follow in a linear sequence. The visitors click on the link and see a new page or reveal a new field of information; when the visitors want to retrieve the previous information, they have to click on the “back” button to return. Thus, within this linear structure, WBAE are likely to keep their interface similar to bound pages. However, there have been various web technologies that allow curators to propose a more interactive and dynamic approach of displaying the connections between exhibited materials. For example, in the early age of the web, Project Xanadu visualised the connections between objects in a vast bi-directionally linked network. In my opinion, showing the related information in a responsive way makes web-based exhibition visitors’ viewing experience dramatically different from being in the physical exhibition.


114 Medina Lopez Pamela, ‘The Document/Book as a Form of Curatorial Creativity’ (Finland, Aalto University, 2020).

Although the audience of WBAE is invisible on the surface, their involvement and behaviour are not necessarily immeasurable or impossible to capture. Instead, the website is a medium that welcomes users’ input; users are also very accustomed to adding content to websites, such as replying to a post or leaving a rating for a place. In addition to that, incorporating a message board function or a live chat to a website is relatively easy to achieve with current web technologies. Thus, creating the opportunity for visitors to leave their trace on the WBAE is a curatorial choice, and the key points would be the kind of information that the curator wants to receive from visitors and the way in which that process can echo the theme and concepts of the exhibition. Therefore, in the following sections, I explore the topic of visitors’ involvement in WBAE from three aspects with selected cases.

### Content Co-Creation

Visitors can be transformed into content contributors of the exhibitions whether through intentional information submission, such as inputting their data with a device keyboard, or agreeing to share the infrastructural data, such as sharing their IP address.

The content provided and generated from the visitors’ end often becomes an inseparable part of the web-based exhibition. For example, in the exhibition *Magical Reflections* by the Nationalgalerie, there is a gallery consisting of “pictures from the community” which are the screenshots that other visitors took within the web-based exhibition. Visitors are invited to virtually wander through the yard of the museum and capture photos just as they would do in the physical space. When browsing through other people’s photographs, visitors can hover over a photo and be redirected to the scene where the photo was taken within the web-based exhibition. This photo-taking feature is an important part of the exhibition since it combines the habit from physical life (ie., taking Instagrammable photos in the museum) and the common practice of web design (i.e., redirection) to create a new experience that conveys the ambition toward the digital realm of traditional art institutes. Thus, participation is a tool for curators to invite the audience to explore WBAE which are new channels to interact with arts and museums.
As for the process of collaboration, Christiane Paul described collaboration in networked environments as something that requires more awareness of its own process, and its results are not necessarily predictable since the content is created by multiple users throughout time.\footnote{Christiane Paul, ‘Flexible Contexts, Democratic Filtering and Computer-Aided Curating: Models for Online Curatorial Practice’, in Curating Immateriality. Reino Unido: Autonoma, 2006, 85–105.} For instance, \textit{What are you waiting for?} by Merel Smitt is part of the artist’s research project, and it aims to raise awareness of people’s time spent waiting. Aside from watching the video clips by the artist, the visitors are invited to submit their personal waiting experiences and stories. The submissions are placed on top of the videos so that the artist’s work and the visitors’ work are merged on the same surface. In this case, the artist and the curator’s roles are setting the rules and building a platform which embodies research outputs, design, collaboration processes, and the project theme, at once.

### Personalised Experience

Aside from adding personal contributions to the exhibition content, the data and inputs from the visitors’ ends may also affect their experience within the web-based exhibition. For instance, providing customisation and social interaction functions could extend visitors’ unique experiences.\footnote{Soyeon Kim, ‘Virtual Exhibitions and Communication Factors’, Museum Management and Curatorship 33, no. 3 (4 May 2018): 243–60, https://doi.org/10.1080/09647775.2018.1466190.} For example, \textit{The Collaboratory}, described as Lenbachhaus’s new fifth venue, experimented on the communication among visitors within its web-based platform. The visitors have to select a colour as their digital representation and name it before landing onto the “Open Stage”. Similar to online games, the visitors need to control their avatar and move to the entrances of different art projects. In addition, the number of visitors that are currently online is shown, and visitors can chat and interact with each other. These tools make the visitors no longer feel isolated from others while experiencing the art works and the interface. Moreover, the navigability aspect may allow visitors to perceive themselves as “being there” in the exhibition.\footnote{S. Shyam Sundar et al., ‘Communicating Art, Virtually! Psychological Effects of Technological Affordances in a Virtual Museum’, International Journal of Human-Computer Interaction 31, no. 6 (3 June 2015): 385–401, https://doi.org/10.1080/10447318.2015.1033912.} Here, providing autonomy to visitors can help them create a more personalised experience and unique interaction within the WBAE.

There are WBAE automatically modifying the contents based on each visitor’s device setting and other background data to create personalised experiences. For example, \textit{The Great Conspiracy} by The Spanish Royal Academy utilises the visitor’s geographical location and the time of entering the website as variables for individualising the layout and animation of
the exhibition interface. The sparkling trail moving around the visitor’s screen shows the route that the prior visitor’s cursor has traced. Thus, the navigation and visual elements differ every time, depending on the time and the place from which the visitor accesses the site and on the people who have entered earlier. This mechanism is aligned with the theme of the exhibition, which is to play with the logic of Internet communication and the conditions of online contacts. As Dekker and Tedone described, “networked co-curation’ shifts the attention from what is produced to how it is performed under the socio-technical conditions and relations that characterise the current state of the Web”. The co-curation process in The Great Conspiracy did not lead to a collective outcome that accumulated in a linear direction, but enabled each individual visitor to experience their own standpoint within the networked environment.


Feedback

Curators can collect feedback from visitors and the data related to the visitors’ behaviour within WBAE to review their curatorial works. By developing web applications that host real-time conversations, such as live chat and video calls, curators and artists can proactively approach the audience on the web. For example, common.garden is a platform where people can curate a garden (i.e., this could be exhibitions or events) and meet other people just as in an online meeting. Visitors to the garden can open their device camera and connect to the people who are around them on the web page. Thus, people might run into each other and start a conversation. The interaction on the web environment is not restricted by the opening hours of physical spaces, and the hierarchical or even the exclusive atmosphere is eased in the digital interface. Thus, the curators can randomly talk to the visitors and build connections without formal settings.

Other than proactively interacting with visitors, curators can also choose to implement specific data tracking tools inside WBAE to help them evaluate the visitors’ engagement and the performance of different contents. For example, Google Analytics enables website owners to grasp the demographics of website visitors, the average staying time on different pages, visitors’ footprints (i.e., from where they discover the website), and the clicking percentage of a specific button. Moreover, there is research
and tools focusing on tracking mouse cursor movements on the website, which is associated with users’ cognition of the website content.¹²¹,¹²² The benefit of adapting the background tracking technologies is that curators can understand the audience from a scientific perspective and to evaluate the usability of the interface and navigation of WBAE.¹²³ For instance, the curators may discover a specific page of a WBAE has a low click-through rate while containing important materials for the exhibition; the team can then adjust the design and development accordingly in a short period of time. Since web-based curatorial practice involves the creative works of experimenting with the technologies and the strategic planning of delivering exhibition concepts, the behavioural data collected from the visitors plays an important role to ensure that the functionality of a WBAE is well-maintained.

Chapter 4.

DESIGN PROPOSAL OF THE SCATTERED STEPS

4.1 INTERVIEW FINDINGS
4.2 CATALOGUING THE WEB-BASED ART EXHIBITIONS
4.3 DESIGNING THE INTERFACE EXPERIENCE
4.4 THE PARTICIPATORY ASPECT
I invited a focus group of six people who work in the art industry: two artists, one curator, one researcher, and two gallery/museum co-founders and directors, based in Finland, Estonia, France, and Taiwan. The scope of the interview was to discuss their experience of web-based curated exhibitions and further my own understanding of the subject. The interviews were conducted remotely, and the duration of each interview was approximately half an hour. The main goals of the interviews were:

- Gathering opinions from curators, artists, and researchers with experience of or interest in web-based art exhibitions.
- Understanding the interviewees’ workflow and methods for creating or researching web-based art exhibitions.
- Knowing more about the pain points and needs of the possible users of my project.

I asked all the interviewees the following set of questions:

1. What role(s) or title(s) do you use to describe yourself, regarding the art and culture industry? This will be the only personal information revealed when quoting your thoughts from the interview.
2. Do you have one or two online art exhibitions in mind that you really like or feel to be impressive?
3. How did you find or know about those online exhibitions? From where did you access them? (link on a specific website/social media/email/search engine/etc.)
4. Can you share how you gather information about new online exhibitions? From what channels or networks do you discover and follow current productions of online exhibitions?
5. If there were a database of online art exhibitions, what would you expect from it? Could be certain functionalities, its position or theme, the layout and navigation, etc.

In addition, I also wrote role-specific questions for each interviewee. The questions were related to their own experiences and past work. In the following paragraphs, I summarise the interview findings in three main categories: accessing WBAE, the value The Scattered Steps can bring to the interviewees’ works, and their expectations toward it.
Accessing Web-Based Art Exhibitions

There are many platforms, from paper-based brochures to digital publishing and social media, that promote exhibitions in physical spaces as events and activities that people can visit. However, when it comes to discovering WBAE, the interviewees all noticed that following social media and checking each organisation's own webpage are the only methods. Thus, they felt it necessary to subscribe to many artist and organisation newsletters or pages. For example, according to the cofounders of post-gallery.online, utilising Instagram is the best way to keep up with the community and also to promote their own works. Therefore, if people want to know more about future WBAE, they must actively maintain their social media presence and make sure they follow the galleries and artists’ communication channels. However, although the Internet eliminates the geographical barrier to exploring foreign content, the above-mentioned method is still very limited. For instance, a fine art student in Taiwan mentioned that she knew what local galleries and artists to follow on social media, but she was totally unaware of where to start if she wanted to discover WBAE in another country, especially when searching for a specific genre of works. The challenge of finding non-domestic content may exist in many different fields; however, surely it should be less of an issue for WBAE, as they are built for international audiences, and the curators may hope to reach people in different countries. Moreover, it would be a loss if physical museums receive foreign visitors while online exhibitions are only exposed to local users.

Furthermore, the confusion of the terminology “online”, “web-based”, and “digital” exhibitions further increases the barrier for people to search for the right information. For example, many of the interviewees mentioned they would not try to search for a web-based exhibition specifically since it was difficult to find the right keywords to type in the search bar unless the title was known. Moreover, the director of a medium-sized art museum stated that she could not think of many WBAE that were inspiring enough, because many that claimed to be “online exhibitions” were just virtual galleries, and she regarded them simply as the documentation of exhibitions. Apparently, the interviewees adhered to their own definition of WBAE, but current Internet algorithms fail to yield the proper results. To conclude, the interviewees all agreed that if there were a website that focused on WBAE in the context of contemporary art, they would be able to access more WBAE more easily.

The Value that My Project Can Bring to Their Works

From the artists and independent curators’ viewpoint, The Scattered Steps could help them connect to more diverse and independent art workers. As one of the artists emphasised, it was difficult to visit an online exhibition created by someone he did not know. Similarly, an artist mentioned that she could imagine that more people would be interested in WBAE once there was a database like my project, just as people began to watch more videos produced by people in other countries once YouTube emerged. Another curator who mostly worked in photography and self-publishing...
mentioned that digital curation was a world itself and consisted of many
great designers and web-based curators. Thus, if The Scattered Steps
could create a gathering space for people with similar interests, it would increase
the visibility of many great talents and works for a wider audience. It would
also have the potential to function as a space for networking for such
interested practitioners.

The researcher and gallery owner I interviewed valued the potential impact
that The Scattered Steps could have on the industry. For example, such
a free and open-to-everyone database could help further their research and provide resources for future explorations; especially the topic of
digital curating could be more popular in the near future. The director of a
museum agreed that WBAE would be more prominent over time since they provide a flexible and relatively low-risk solution in the current unstable
world situation, when it comes to logistics and time limits. In addition,
the director also shared that developing WBAE also helped the museum to attract younger audiences. As a result, if The Scattered Steps could
successfully promote the rich layers of curated WBAE, this topic could gain higher attention and receive more involvement from both inside and outside the art industry. After considering all of the interviewees’ opinions and critical takes on future developments, I developed several functions to
the catalogue and explained in more detail in this chapter.

**Expectations Toward The Scattered Steps**

Most of the interviewees shared their opinions about the navigation and search functions of the website. Based on their previous experience of
using other databases or similar websites, they thought that it is important
to find the results without needing to type in very precise keywords. One
of the interviewees mentioned that the users might not always have a clear search destination in mind, they might just want to explore through
the hyperlinks and get surprised. In addition, the lecturer shared that she would like to be able to search across themes, approaches, timelines,
and locations where these exhibitions originated. Thus, an explorative
navigation system and a categorising logic that allow intersectional search
are crucial, as I will outline in chapter 4.3.

The preservation of expired WBAE is another issue worth solving. “Expired WBAE” refers to the websites that are inaccessible due to unrenewed
domains, unsupported software, and deleted files. Both the artist and
curator mentioned that they have had the experience of looking for closed
WBAE but could not access the work or find any materials to imagine what past exhibitions looked like. They all felt that cataloguing the past WBAE is a difficult problem that also exists in the domain of physical curating.
Still, they were looking forward to seeing how The Scattered Steps would
address this issue, which I will consider in chapter 4.2.

Lastly, the interviewees shared their thoughts on the visual appearance of
the catalogue website. Many of the interviewees suggested the visual style of the catalogue could be image based and the interface could show the visual aesthetics of each web-based exhibition directly. For many of the
interviewees, the screenshots or visual identities of the exhibitions were more important than the artists or curators’ names when they were viewing the database. The director of the museum mentioned that I should consider the direction of The Scattered Steps, whether it is built for everyone or it is just to demonstrate my personal creativity. The former approach should implement a simpler and easy-to-learn navigation system, while the latter approach could take an experiment of the uncommon interface designs. Similarly, an artist shared that she often entered some artistic websites that could not run smoothly on her laptop or mobile device; those situations were frustrating and could ruin the visitor experience. Thus, accessibility and quality of design and development are key aspects of the catalogue website and will be explored in this chapter.
Since the content of WBAE may change and evolve from time to time, it became a challenge to identify what would be the collectable and documentable elements of a web-based exhibition in my project. To better clarify the different elements of WBAE, I analysed across web-based exhibition case studies I initially collected and created an illustration that showed the grouping of elements and their relations (figure 1). In the following paragraphs, I would explain the characteristics of those elements and correspondent cataloguing strategies in The Scattered Steps.

Figure 1. Elements of a Web-Based Art Exhibition
Illustrated by Ya-Yu Tseng, 2022.
When I was collecting web-based exhibition case studies for The Scattered Steps, I wanted not just to record the title of the exhibition and the curators and artists’ names, but also thought about how I can identify more data fields and embed this information into a larger and interoperable web that maximises the discoverability of the catalogued cases outside the project website. In other words, only when the items in the catalogue can be indexed by the other systems will they be able to connect to more information and be more accessible. In this regard, the idea of Semantic Web coined by Tim Berners-Lee in 1998 inspired me to look into the structured data of websites.

A web-based exhibition is hosted on a website, which may be only one webpage or a collection of webpages. The whole website is represented by a domain name and is published on at least one web server. People access the website via two methods: one is to directly type in the URL of the website in the web browser’s address bar, and the other is through hyperlinks. Hyperlinks are either created by humans (i.e., all the buttons in a website’s menu) or suggested by the algorithms (i.e., search engine results and the advertisement recommendations). For the latter, Schema.org was founded to promote structured data on the Internet so that the machine can categorise and index the websites’ content in the sea of information. Schema.org provides particular sets of agreed-upon definitions for microdata tags, which is one form of structured data. The major Internet service providers all adapt the vocabularies of Schema.org and over 10 million websites use them to mark up the contents. The schema of a website is like an index tag or a sticky note that is added inside the source code of the website and allows other people/algorithms to quickly grasp the main information of the website. If a website could not be properly indexed in the search engine, it is probably due to the lack of schema.

When I look into the types of schema, there are two that are possible to utilise on the web-based exhibition websites: ExhibitionEvent and CreativeWork. In The Scattered Steps, there is a profile page dedicated to each web-based exhibition. The schema is generated and applied to each profile page, labelling the various attributes of the web-based exhibition. With the profile pages with proper schema, the WBAE that have been catalogued in The Scattered Steps will have higher visibility within the search engine and can be indexed correctly as exhibition events or creative works within the Internet ecosystem. However, it is also possible to suggest a new type of schema to Schema.org. Thus, if the implementation of The Scattered Steps proves that WBAE have unique characteristics and criteria, a new schema dedicated to WBAE can be proposed.

Materials Layers

The materials of a web-based exhibition can be separated into five layers: text, links, multimedia (image, audio, and video), styles (layouts, colours, and other design artefacts), and services (i.e., embedded content, real-time content, APIs). These layers represent all the possible materials that can be
exhibited in a web-based exhibition. The formats, amounts, placing areas, and the display timing of these materials are pre-determined and clearly written in the source code of the web-based exhibition. The curators of the WBAE have to strategise the arrangement of these materials and ensure the display of the materials corresponds to the curatorial concepts (examples can be seen in chapter 3). However, the materials might be vanished from the WBAE due to human factors, missing files, expired domain and storage, or unsupported technologies. Thus, no one could promise the content of a website can remain throughout the years if the website is built with the common web 2.0 technologies.

If I only put the link to the web-based exhibition in its profile page, it is likely that after a while, the link will no longer be readable; the visitors will only open an empty link and will not be able to experience the exhibition on their devices. To avoid such problems, I incorporated a second link to each exhibition profile (figure 2). The link will be generated by a third-party archiving service, for example, the Wayback Machine\footnote{Wayback Machine by Internet Archive.} by the Internet Archive and Perma.cc\footnote{Perma.Cc, accessed 30 April 2022, https://perma.cc.} by Harvard’s Library Innovation Lab. The web archiving service can capture the content, which is the materials of WBAE, throughout time and can create multiple timestamps that users can select a time to “go back”. Wikipedia also uses Wayback Machine to save the reference websites. With the second link directed to the web archives, the visitors are able to grasp the concept of the WBAE and view the artworks even if the original website stops functioning (figure 3).

However, the existing web archiving solutions are not necessarily capable of capturing the whole website content exactly as it was. There might be some displacement of the visual elements and the failed-to-load multimedia contents in the snapshots captured by web archiving services. The ultimate solution to fully preserve a web-based exhibition is through acquiring the original code files of it, so that the website can run on the tailored device and software environment in the future, just like playing the 1900s cine strips nowadays. Preserving the source code will heavily involve legal, money, and time resources. Thus, providing a link to a third-party web archiving service is the most efficient way in the scope of The Scattered Steps. Every public website has a public address that can be linked from anywhere; moreover, everyone can submit a link to the web archiving service to preserve the content. However, it is still possible that the owner of the website can ask the web archiving service to remove their records or to avoid being archived by adding specific codes to the website. From the perspective of The Scattered Steps, people can also refuse to catalogue their web-based exhibition.
Figure 2. Profile Page in The Scattered Steps.
Designed by Ya-Yu Tseng, 2022.

In the INFO panel, a link to the third-party archival service is provided.

The example exhibition in this screen credited to Offsite Project: https://www.offsiteproject.org

Figure 3. Example of Offside Project in Wayback Machine.
Interaction and Experience

Unlike materials layers that are pre-defined contents, the interaction and experience provided on a web-based exhibition is dynamic and unique for each visitor. The curators cannot fully predict the experience that the visitors would have on the web-based exhibition, since each visitor’s clicking order, mouse trace, device settings and software version, and personal preferences when scrolling through a web page can be very different. These personal experiences are also one part of the web-based exhibition. In other words, visitors’ interaction with the interface and the content cannot be excluded when evaluating and researching on the web-based exhibition. As a result, a link and a few lines of description are not enough to capture the whole creation of a web-based exhibition.

To preserve and document the visitors’ interaction and experience within a web-based exhibition, I came up with the idea of creating a web browser extension tool. The extension allows the submitters of a web-based exhibition to record their screen activity on the selected web-based exhibition and save the documentation/material to a decentralised storage solution. After submitting, the screen recordings will be fetched and displayed on the website. Even though there are many methods and extensions that allow people to record their screen activities, developing an extension dedicated to The Scattered Steps can ensure the website being recorded is the actual web-based exhibition itself, instead of capturing other content from unrelated windows. In addition, there is a bug report function in each exhibition’s profile page, and people can also submit newer or additional recordings after the exhibition is catalogued.

On this page, I demonstrate the design of the browser extension (figure 4). Users may open this extension in the website they want to record, and have a maximum of one minute for the duration of each recording. More prototypes related to the submission can be seen in page 59.
In addition to the prototypes, the process and mechanism of saving the interaction and experience of a web-based exhibition are demonstrated in the following two diagrams:

**Submitting An Exhibition To The Catalogue**

**USER ACTIONS**
- Visit a WBAE
- Open the extension
- Record the WBAE
- Submit to the catalogue

**TOUCHPOINTS**
- Extension bar
- Start recording button
- Metadata input fields

**BACK-END**
- Recording the screen
- Save the recording
- Get storage key
- Save the storage key
- Save metadata record

**SUPPORT PROCESS**
- Storage
- Database

Figure 5. Submitting An Exhibition To The Catalogue.
Illustrated by Ya-Yu Tseng, 2022

**Fetching An Exhibition In The Catalogue**

**USER ACTIONS**
- Visit the catalogue website
- Look for a WBAE
- Read the information

**TOUCHPOINTS**
- Catalogue website
- Filters
- T Ngo's
- Map

**BACK-END**
- Fetch the exhibition profiles by filters
- Show recordings and other information

**SUPPORT PROCESS**
- Storage
- Database

Figure 6. Fetching An Exhibition In The Catalogue.
Illustrated by Ya-Yu Tseng, 2022
The decentralised storage solution plays an important role in the process. The documentation of WBAE should be saved in a public and non-private service. In addition, the saved documentation should be available for a long period of time, instead of disappearing after a while. There are two possible solutions that my project could utilise. The first is the InterPlanetary File System (IPFS), a peer-to-peer hypermedia protocol released in 2015 designed to preserve the data persistently. IPFS uses content-addressing to identify each file; when adding a documentation of the web-based exhibition to IPFS, the file will be cryptographically hashed and generated a content identifier that acts as a permanent record. Any user in the network can serve a file by its content address, and other peers in the network can find and request that content. In addition, the files stored on IPFS are resistant to tampering and censorship and the originals keep the same.

The other solution is the Arweave, a data replication system that ensures availability via a decentralised and sustainable endowment. The Arweave network builds on content distribution mechanisms utilised in BitTorrent and other peer-to-peer file-sharing networks. Many NFT collectors store their assets in the Arweave system since the fee calculation model of Arweave is more sustainable than other solutions.

To conclude, whether I decide to implement IPFS or Arweave in The Scattered Steps, the documentation of visitors’ experiences in the WBAE will be stored in a permanent and decentralised network so that people can access those materials at any time. As the initiator of the catalogue, I do not have to manage the data in my privately owned local server or depend on any other infrastructure corporations such as Amazon web services. This ensures independence, information security, and the flexibility of future development of The Scattered Steps.
Based on the interview findings and the research into WBAE, I proposed two major functionalities to The Scattered Steps. One is the tags and filter system, and the other is the map and explore function. By incorporating these two aspects, I wanted to create a responsive and exploratory interface experience for the catalogue users. In the following, I introduced the design concepts and prototypes of each functionality.

**The Filter**

The biggest area of the catalogue, which is the main section of the website, displays WBAE in an infinite scroll mode (in contrast would be the pagination mode). There are two options to order WBAE, either according to the adding time or by random arrangement.
Based on the interview findings, I noticed that users from different roles, such as artists, researchers, or curators, have different emphasis on the content they would want to see in the catalogue index. To fulfil users’ needs in various scenarios, I designed the filter that allows users to freely select the fields of information they want the website to display when browsing the catalogue. The fields of information include thumbnails of the web-based exhibition, title, curator, institution, tags, and region. In practice, if the user selects “thumbnails”, “title”, and “region”, the main section of the website will show a grid of WBAE with their thumbnails and two lines of text (figure 8). There is no minimum or maximum limit for users to select the fields of information. If the user only selects “thumbnails” then the website will show images without any text information.

Figure 8. The Filter Result with Different Selections.
Designed by Ya-Yu Tseng, 2022.
The Tags Panel

Based on the interview findings and benchmarking on the other art databases, a well-designed tag system will be significantly helpful for users to find the desired information; otherwise, users may feel frustrated and lost, and will perhaps question the results they get. To solve the usability issue, I got inspiration from the user experience design perspective. For instance, the first principle of Jakob Nielson’s Ten Usability Heuristics is visibility of system status, which refers that systems should always keep users informed about what is going on, through appropriate feedback within reasonable time. Thus, in the tags panel of the catalogue website, users are able to select multiple tags and then click on the search button, instead of accidentally clicking on one tag and then being redirected to another page. The visual interface of the tags also shows the different state of the system; for example, the square-bordered tags are for categories, the round-bordered tags are for topics, and the selected tags will show in a colour different from the unselected ones (figure 9, 10).

The multiple selection functionality does not only exist in the main page, it also can be used in the profile page of any web-based exhibition. In practice, when the user opens a profile page of an exhibition, the tags panel on the right will remain and its content will be changed from all the selectable tags into only the tags that belong to the specific exhibition. From there, the user can check the tags of that exhibition and even begin another round of multiple selection among the currently displayed tags. This function allows users to link to other related contents more easily and intuitively, without having to narrow down the search scope or experiencing the fear of excluding the information that might actually be helpful (figure 11, 12, 13).

As mentioned above, there are two types of tags in the catalogue: category and topic. The category tag indicates the medium and format of the art works in the web-based exhibition. The category tags are predefined by me at the beginning of the project; I did not define the categories with very narrow divisions since the purpose of having category tags is to help users look for a certain format of art pieces in the web environment. Category tags accept new suggestions from the submitters of WBAE but new tags will only be available in the catalogue once I confirm them. As for topic tags, they work as the keywords of the WBAE. The submitters can add various tags to the exhibition and create new tags without my reviewing. To passively prevent over-creating topic tags, there is the instruction text that suggests submitters check through the existing tags and only apply one tag to one concept (which can avoid the inefficiency of the Instagram hashtag system), (figure 14, 15).
Figure 9. Tags Panel: Default. Designed by Ya-Yu Tseng, 2022.

When the user selects tags, the number of the filtered items will be updated right after.

Figure 10. Tags Panel: Multiple Selected. Designed by Ya-Yu Tseng, 2022.
The initial state of the TAGS panel in the profile page shows the tags related to the exhibition. When the user click on the TAGS panel, those tags will be inherent to the default selection.

The user may modify the selection within the TAGS panel and see the number of filtered items.

When the user click "open result in a new tab", the search result will be displayed in a new tab within the website. This design helps the user to have multiple working stages at the same time.
When the user fills in the submission form, they have to apply tags according to the categories and the topics of the exhibition.

The user can freely add a new topic to the catalogue. The system will show the suggestions while the user is typing.
Although *The Scattered Steps* is focused on WBAE, which are totally constructed in the virtual networks of the Internet, I still see there is a necessity to bring the geo-locational aspects and the cultural context among different languages into the catalogue. Christiane Paul argued in her essay that the Internet itself is a mirror of the actual world and while some countries have been subject to government-imposed access restrictions, the networked environments still enhance the potential of democratisation.\(^{139}\) Being Taiwanese, I totally relate my own experience with Paul’s viewpoint. In my younger age, I browsed through many Taiwanese and Japanese websites, due to the colonial background and cultural exchange among these two countries. Then I grew up and became able to read in English; it was like opening a new world for me to browse US- or European-designed websites since their visual interfaces and website structures are different from Asian practices. In recent years, I realised that any website operating in China has to obtain an ICP licence so that the website content is approved by the government.\(^{140}\) Realising that the Internet cultures vary between different countries and language speakers, I am curious to see how WBAE designs differ based on exhibition provenance inside the catalogue. On the other hand, by transforming contents around the world into an easy navigation, *The Scattered Steps* can act as a platform for bridging the people in different cultures since it would be difficult to search for a foreign web-based exhibition when you do not speak the other languages.

For *The Scattered Steps*, the map function was inspired by the history of navigation, especially the ancient maritime trade routes, when I designed the map function of the catalogue website. The history of navigation is the process of exploring the unknown through the art of technology, such as building stronger vessels and designing better navigators. Nowadays, navigation in web context refers to the process of perceiving the information resources in a networked environment and the interfaces that guide the users. The navigation experience in the past was a slow and team-dependent process, while navigation on the Internet happens repeatedly in seconds on each individual’s device. On the other hand, the trade routes, such as the maritime silk road, the Mediterranean trades, and the spice road, represent the series of pathways and stoppages where the exchange of materials and information happened. In contrast, the trails of web navigation, which can be found in the browsing history of the browser, is a notion that does not receive much attention nowadays.\(^{141}\)

I created a map panel where users can filter the search results of exhibitions by dragging and zooming in and out. The dynamic and interactive map panel is constructed with Mapbox GL JS, a client-side JavaScript library for building web maps and web applications.\(^{142, 143}\) When a user opens the catalogue website for the first time, they will see a map in the default view that shows the whole world map and several bubbles with the numbers of exhibitions in different areas. The user may drag the map to a specific area and zoom in to see the landscape of exhibitions there. Whenever the user makes changes to the map, the search results on the left side of the website

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will refresh and display the corresponding exhibitions that are included in the current map view (figure 7, 8). By adapting the map interface in the catalogue website, I aim to achieve a freer and more flexible navigation experience so that users do not have to set a clear destination in mind beforehand (i.e., type in a specific country or city). Together with the map panel, I also designed a trail panel, which is explained in more detail in chapter 4.4.

Figure 7. Homepage of The Scattered Steps.

Figure 16. Dynamic Search Result Linked to the Location Panel
Designed by Ya-Yu Tseng, 2022.

In this screen, the map in the LOCATION panel is navigated to a more focused view. There is only one bubble on the map with number 3, indicates that there are three exhibitions in this area.
Submission

The Scattered Steps is open to the public for submitting WBAE. To submit a new web-based exhibition to the catalogue, the submitter has to install the extension on their Google Chrome browser. The extension, as described in the previous chapter, allows the submitter to record the interaction and content on the web-based exhibition (figure 17). Before the submitter clicks the start button of the recording extension, they have to type in the title of the exhibition and the system will check if there are cases with similar titles already catalogued in the database. If a recording of that exhibition exists, the new recording will be submitted as supplemental material. If the exhibition is a new case, the submitter will fill in more information in the catalogue website.

In the submission page of the catalogue, the submitter is asked to fill in the basic information of the web-based exhibition, including the name of the curator(s) and institution. In addition, the submitter can select the tags that are relevant to the exhibition and also input its geographical location (figure 18). There are technologies that enable machines to read the content of a website and automatically generate tags for it, but I did not apply such technologies into The Scattered Steps. WBAE are produced in a complex context and do not necessarily follow certain formats of organisation, thus, their core themes and types of arts can only be determined and identified by human visitors. As a result, I invite submitters to manually apply tags for WBAE. More information about the tag system can be found in chapter 4.2.
Figure 17. Use Extension to Record the Exhibition. Designed by Ya-Yu Tseng, 2022.

The extension can be operated in Google Chrome and has two different interface before and during the recording session.

Figure 18. The Submission Page of The Scattered Steps. Designed by Ya-Yu Tseng, 2022.

After finishing the recording, the user will be redirected to the submission page of The Scattered Steps. The user may choose to discard the recording, or to fill in the submission form. The user can also edit the recording and select one frame of the recording as the thumbnail of the exhibition.
Sharing the Trails

The visitors of *The Scattered Steps* can generate outputs and share these with other people. The outputs are the trails that each visitor went through when they were exploring the numerous exhibitions in the catalogue. In other words, when the visitor clicks on one exhibition, the clicking history is recorded in the trail panel by order (figure 19). The more exhibitions the visitor opens, the longer the trail will be. At the end, the visitor can reflect on their exploring journey within the same browser session. Visitors may also remove undesired exhibitions (i.e., accidentally clicking on one) in their trail before sharing it with others (figure 20, 21).

When a person receives a link to someone’s trail, they will visit the WBAE along the trail and experience the same exhibition-visiting journey with the creator of that trail (figure 22). The trail functions like a music playlist but it can also just be documentation or a tool that indicates one’s unique pathway.

![Figure 19. Trail Panel of *The Scattered Steps*. Designed by Ya-Yu Tseng, 2022.](image1)

On the left screen, the user has only visited one exhibition in the current working session of their browser. On the right screen, the user opened the second exhibition. Thus, there are two records in the TRAIL Panel.

![Figure 20. Preview Pop-Up of the Shared Trail. Designed by Ya-Yu Tseng, 2022.](image2)

When the user click the share button, a preview pop-up will show up. The user can edit the name of the trail and copy the link.
The user may return to the TRAIL panel and delete the undesired records of their trail. The trail will only be saved within the same working session of the browser.

Figure 21. Preview the Shared Trail. Designed by Ya-Yu Tseng, 2022.

The user open the link of the trail, they will see this trail page that focuses on the order of the exhibitions.

Figure 22. The Trail Page of The Scattered Steps. Designed by Ya-Yu Tseng, 2022.
Chapter 5.

CONCLUSION
My research for *The Scattered Steps* began with exploring the criteria that distinguish a curated web-based art exhibition from online exhibitions and websites with art content, from the perspective of life cycles and infrastructural context, interface and navigation, and the visitors’ participation. This thesis documents the research and the development of curatorial and web design processes that are at the heart of *The Scattered Steps*, whose focus and scope were defined and refined throughout the research process. This includes the exploration of various WBAE, case studies on digital archives, and interviews with potential users of the catalogue.

The duration of a web-based exhibition is affected by several factors, including the position and independence of the project, maintenance strategies and budget, and human resources and personnel structure. If a web-based exhibition coexists with a physical version, then the curators can utilise the interactive and real-time dynamic functions to create a bridged experience where the elements complement each other. In cases where the web-based exhibition stands alone, the maintenance support system of the exhibition should be considered, and the exhibition could evolve and be transformed over time. A web-based exhibition acts as the interface between artwork and viewers. To curate a web-based exhibition is to create a new interface for the visitors to build a relationship with the art. From the visitors’ perspective, an enjoyable navigation system of the web-based exhibition may provide the delight of freely exploring the artistic and creative productions and also achieve usability such that visitors can perform desired actions regardless of their own conditions (i.e., model of device, age, language). On the other hand, the viewer's perception toward the arrangement of information within the interface, including the visual layouts and the linkages between materials, is strongly influenced by the common digital products that they use daily and the cultural context in which they live. Thus, two approaches to designing the interface of WBAE emerge: the functional and the chaotic-creative. Each can be chosen or combined according to the curatorial framework.

WBAE can incorporate visitors’ participation in content co-creation, personalised experiences, and feedback collection, and these participatory processes are enabled by web technologies from user input or background data tracking. The collaboration between artists and visitors within the web-based exhibition is not limited by location and timezone. In addition, the interface and the content of these exhibitions can be customised and adjusted according to the variables provided from the visitors’ end. Moreover, curators can monitor the visitors’ activities within the web-based exhibition to better evaluate the works and modify the content appropriately. The above-mentioned technologies provide curators with tools to create meaningful interaction and understanding of the visitors, which are important in the curatorial process. From visitors’ perspectives, this functionality deepens their personal connection with WBAE as well as artworks.

The aspects and examples I raised in this thesis may not cover the entire gamut of WBAE, since the topic is situated at the intersection of
contemporary art curation, web technologies, digital design, and human-computer interaction. However, the life cycle, interface, and visitors' participation reveal the issues that curators of WBAE have to plan for and communicate with other stakeholders. Joasia Krysa reflected on Marina Vishmidt’s suggestion that the role of the curator in the age of network systems should be repositioned from administrator to a manipulator of information and systems.\textsuperscript{144} The curator as the manipulator of information and systems is prominent in the case of WBAE; the information can be displayed and arranged in various ways in a single surface, involving systems ranging from browser specs to the entire Internet ecosystem. Thus, the key driving force that clearly separates WBAE with site-specificity from other online exhibitions is the curator’s awareness of the complexity of works contained in a website and the actual realisation of cross-disciplinary collaborations that can be experienced by the audience.

The exploration of several case studies on several digital archival projects was fundamental in the development of \textit{The Scattered Steps}. Through these, I realised that collecting information, making connections within data sets, and contextualising information on the Internet are all practical approaches that affect the narration of WBAE. At the same time, these practices offer me an opportunity to enhance the visibility of high-quality content against the profit-dominant algorithms. Digital archives can be built on existing web services, providing a low threshold to kickstart and reach more participants easily, or they can be thoroughly designed and developed platforms which manifest individual or group beliefs.

In addition to the case studies, I interviewed six people who work in the art industry to understand their needs for digital archives of WBAE. According to the interviews, accessing WBAE beyond one’s social circle and language is challenging. However, the interviewees agreed that WBAE will raise more interest in the future, so it is important to let the public explore these practices. To ensure the usability and visibility of \textit{The Scattered Steps}, the interviewees suggested that the visual navigation of the catalogue website should be attractive, the search function should be flexible and handy, and the whole platform should work smoothly regardless of device settings or other software requirements. The findings from interviews supported my design process and made my ideas not solely based on assumptions or speculations.

The initial goal of the project was to create a catalogue that gathered WBAE that emphasise site-specificity, so that people can easily access these references when talking about the digital curatorial practice. However, as I looked deeper into the techniques of digital archives and other communal knowledge bases, I saw more possibilities within the functionalities that a platform can provide and the necessity of considering current and future technologies when planning solutions. Thus, I incorporated a third-party archiving service, decentralised storage technologies, and a browser extension to preserve both the content and experiences of the WBAE. I further designed several navigation tools (filter, tags, and maps) to fulfil different scenarios. Most importantly, I proposed the trail function which
records the users’ viewing history and allows them to invite friends to embark on their personal trails of exploring the WBAE.

Together with the above elements, *The Scattered Steps* is not simply a gallery of numerous websites, nor an authoritative guide that aims to define the standards of WBAE. Instead, I expect it to be a platform where people enjoy the process of exploring content, creating their own knowledge base, and sharing their experiences with others.

In the design proposal, I focused on prototyping the following aspects and functionalities: schemas for indexing the catalogued exhibitions (p. 43-44), content archiving for preventing dead links (p. 44-47), screen recording enabled by browser extensions for capturing the viewing experience (p. 47-49), filters for personalising the interface (p. 50-51), multiple tags searching to increase usability (p. 51-55), map navigation for adding alternative lenses (p. 56-57), submission method for inviting the public to contribute (p. 58-60), and trail sharing for triggering dialogues (p. 60-61). The prototypes mapped out the core functionalities of the catalogue and visualised the experiences of users in the website. In addition, the prototypes demonstrated that the integration of different technologies can be actualised in the proposed designs of interface and interaction. Nevertheless, the prototypes were the starting point of future implementations and the details can still be modified when the project develops towards latter stages. Thus, there will be more discussion on various topics and issues with different experts and users once *The Scattered Steps* is further implemented. These include, for instance, determining the most suitable third-party web archiving service for the catalogue, connecting the file storage to a decentralised network, and improving the visual aesthetics of the interface.

The planning and building of *The Scattered Steps* is a continuous process of connecting myself with the current trends of digital curatorial practice and the development of new technologies. Such a mindset may also apply to curators working on the web environment, since a web-based exhibition is the contact point of artistic production, interaction design, and the critical use of technologies. Many aspects of the decision-making process within this project, as well as the curation of a web-based exhibition, are based on collective contributions and cross-disciplinary collaborations. For example, the way the artworks and materials are gathered to and sustained on the digital interface, the interaction and participation that visitors can have with the visible and invisible, and the takeaways that visitors receive from their viewing experience. Even though this thesis represents my personal journey, the development plan of *The Scattered Steps* is already built on the output of many talented people and will involve more voices and perspectives in the future. This important collaboration sits at the heart of *The Scattered Steps*, a project which hopes to bring critical awareness to the curatorial potential of curating web-based art exhibitions.
REFERENCES


Ghidini, Marialaura. ‘Curating on the Web: The Evolution of Platforms as Spaces for Producing and Disseminating Web-Based Art’. Arts 8, no. 3 (1 July 2019): 78. https://doi.org/10.3390/arts8030078.


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