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Master Thesis

User Experience in Cultural Heritage

Interactive technologies for Interpersonalisation in museums

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Abstract

This thesis critically observes the application of interactive technology within Cultural Heritage (CH) and assesses its impact on the User Experience, within a broader social and cultural context. So far, interactive technology has been applied within CH as a tool, rather than a lens to better understand the reasons behind user behavior and relationships with the museum object and space.

By analyzing user experience theories and reviewing case studies, this thesis provides some understanding of how the possibilities and risks of using interactive technology will shape future museum practices and future user experience design. To provide more meaningful experiences for the user, their design should happen contextually, and ethically and involve the community as it holds the power to shape its very practices and question the role and responsibility of the museum as a CH institution.

Keywords

Human-computer interaction, museology, interactive technology, user experience, cultural heritage, Interpersonalisation

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1. Introduction

User experience in Cultural Heritage is fundamentally changed as a result of the increasing technological advancements in interactive technology. Interactive technology applications in the museum context are mostly aimed at diversifying and customizing visitors' encounters and creating informal learning opportunities, to ultimately increase attendance and interest in their cultural agenda (Chelini, 2012). Examples of these applications include virtual tours through museum websites and accessible digitized archives where the users can contribute to creating new knowledge and posting questions and sharing answers on a chosen artwork. Multi-touch screens afford to be used by many people at once and can integrate themselves into the museum narratives. Interactive walls such as the one installed at Gallery One at the Cleveland Museum of Art display over 4100 objects from worldwide museums, that many users can browse and 'touch' at the same time to display more content while personalizing and sharing their tours (Bernstein, 2013). More and more projects are developed to provide immersive experiences in museum exhibitions, challenging formal learning, and augmenting reality and sensory feelings. In the case of the Immersion Room, many users can experience the wall covering patterns in full-scale projections and they can sketch their designs (Cooper Hewitt, 2016).

These interactive technologies are very diverse, but all of them seek to support and enhance the user's experience in museums and contribute to the social practice of creating engagement with the museum object and the exhibition space. On these grounds, I decided to focus on the process of Interpersonalisation which relates to the user's experience itself and provides insights into relationships happening between the user, groups, objects, and the museum space. As per Calvo and Peters (2014), technology and design processes, focused so far on technical aspects, benefit from cross-departmental knowledge to consider new methodologies to support users' basic psychological needs such as engagement, positive emotions, flow, and the possibility to make choices. These basic needs are supported by interactive technology and are at the core of participatory design practices to create the user experience. The use of this kind of application within CH has been tested in the last decade, however, little research has been made on the phenomenon of interactive technology from a socio-technical perspective. As a result, interactive technology within the museum was applied as a tool and while highly experimental and scalable, it led to a fragmented user experience and a silent acceptance of changing roles and responsibilities of the cultural heritage institution and its engagement with society.

The objectives of the thesis are to observe how during the user's experience, 3 main dimensions (objects, agency, and spatial awareness) gain new meanings and to analyze some of the emerging concerns that come with the interactive technology application within Cultural Heritage Institutions (CHI) on a broader level. This is done by surveying and synthesizing theories of user experience in museums within 3 case studies that convey the implementations of interactive technology in the 3 dimensions considered.



While new technologies described in this study foster the potential to enhance the user's experience and contribute to new museological practices, a critical look at ethical concerns in the specific use of interactive technology is provided to understand the implications on our shared culture. This study, therefore, attempts to contribute to the field of Human-Computer Interaction and its applications within Cultural Heritage, in that it reflects on the many possibilities and risks associated with technology from a phenomenological perspective.

This thesis follows this structure: Chapter 2 presents a comparison of Personalisation and Interpersonalisation to provide a background on the two often misinterpreted terms and situate the latter in the context of a museum and its evolving practices of museology. In Chapter 3, the contribution to new knowledge is connected to previous studies and key concepts on the topics.

In Chapter 4, the theoretical framework of this study is explained, together with the theoretical models and tools for interpretation that lay the foundations for the analysis and structure of this work. Chapter 5 deals with the methodology and its subsections: purpose and aims and method. The research purpose and questions are outlined and so is the research strategy. The coverage of the study, its limitations, and ethical concerns are presented.

Chapter 6 presents the Analysis and reports on the data collected, thematically linked to the chosen theoretical framework. Chapters 7 and 8 are comprised of the discussion around the formulated research questions, the findings and achievements, and the conclusion, which includes the key takeaways from this study and suggestions for future research.



2. Background

This section seeks to present a background of the argument that follows in the next chapters. The reader is reminded of how the thesis aims to discover how users make sense of different dimensions at the museum mediated by the most recent technologies that are shaking the grounds of the museum field.

Concerning interactive technology, a brief overview and uses are provided. As interactive technology is a very versatile and powerful tool and its application is very broad, we focus on the process of Interpersonalisation, which goes beyond its precursor, Personalisation. Their main difference lies in that the former allows users to actively create their own experience and meaning, while the latter, feeds users an experience and meaning based on the elicited preferences as captured by interactive technology. Following the introduction of interactive technologies, we go over some examples of both Personalisation and Interpersonalisation in Cultural Heritage, a field that has been evolving through major changes alongside the political and social events of post-WWII and the radical movements of the 1970s. Cultural Heritage and the museum as an institution have seen a significant shift in its social responsibility, especially when incorporating new technologies and its role as custodian and holder of a single source of truth of the object it houses (McCall & Gray, 2013).

To give the reader an understanding of this important paradigm shift and its rippling effect on the user's experience in museums, we will further provide a brief introduction to the museum space, museology in traditional museums, and how it transitioned to the more contemporary new museology. These views will help the reader to better contextualize the approach of museums toward their end-users or visitors, and to define the museum space as a fundamental actor in the user-object relationship.

The two evolving stories of interactive technology and the role of the museum reach a turning point when we analyze Interpersonalisation within the museum or CH, while the technological affordances overlap, challenge, and ground the museological philosophy as will be revealed by the end of this chapter.

2.1. Interactive technologies for Cultural Heritage

Interactive technologies date back to the diffusion of Information and Communication Technologies (ICTs) in all the contexts of human activities (Buonincontri and Marasco, 2017). Their adoption in the CH sector is due to the changes in cultural consumption patterns and the emphasis on innovation and value creation in recent years.

Interactive technologies provide countless ways to enhance the experience of visitors at heritage sites, for example, today they span from wearable devices (Leue, Jung, and Dieck, 2015), Virtual Reality (Huang, Backman, Backman and Moore, 2013) and Augmented Reality (Han, Jung, and Gibson, 2013) and are seeing a surge in their development. These technologies that either create a virtual environment in



which the user's immersed or blends real artifacts or spaces with simulated ones, belong to the umbrella term Extended Reality (XR).

One of the VR installations classified by Carrozzino and Bergamasco (2010) is the Museum of Pure Forms, a 3-year funded project by the IST program of the EU, exhibited at the Museo dell'Opera del Duomo in Pisa, among the four partner museums. In this project, 3d scanned models of objects can be experienced via digital haptics built on an exoskeleton that mimics the feeling of touching the original artifacts in a highly immersive experience, as the visitors explore the virtually enhanced rooms of the museum. Digitized artifacts, processed models, and the overall design of the virtual museum, plus the system architecture made of the haptic interface system, a database of 3d models, the stereoscopic visualization system, and the API libraries for haptics and graphics rendering made for a very complex ecosystem. Despite this, after conducting usability testings and evaluations via surveys, the visitors found the experience interesting but the overall sense of touch and realism somewhat lacking, because it was mediated by the touching points of the exoskeletons that received the pressure or force that simulated the artifact's texture and shape (Loscos, Céline & Tecchia, Franco & Frisoli, Antonio & Carrozzino, Marcello & Widenfeld, Hila & Swapp, David & Bergamasco, Massimo. (2004).

This preliminary information already hints at a lack of consensus regarding how interactive technologies can be used to enhance the user experience at museums and what exactly is intended by the "experience" of CH, what changes are brought by these technologies, and how the museum as an institution is shaped by it.

In the case of VR installations, in particular, the focus lies on the support of shareable and multidimensional experiences within simulated environments, however, in this thesis I will consider IoT devices (Internet of Things) accessed by mobile Apps, which allow the creation of interactive, dynamic, personalized, and interpersonalised experiences at museums.

IoTs are embedded in the physical environment of the museums through QR codes, RFID tags, sensors, and NFC tags that interact with the museum visitors via downloadable APPs or other IoTs located within the museums.

Beyond the increasing ease of access to IoTs, one of the main reasons why the scientific and museum community is interested in adopting IoT is to understand what happens to the user during a museum visit (Yoshimura et al., 2014), how users interact with the objects, the physical exhibition space, and other users.

To solve this challenge, Pierdicca et al., (2019) explain how IoT devices can be used to gather and analyze visitor-generated data to create strategic insights that will be used to design the personalized content of their visit. Further, the findings will shape the user experience by introducing personalized elements and allowing users to create new meanings when they interact with the museum space and objects, in a continuous feedback loop. As a consequence, the use of interactive technologies transforms the museum into a social space for ever-changing and tailored experiences.

Many interactive technology fruitful applications support Personalisation and while this study is concerned with Interpersonalisation, we'll provide some general information about both below.



2.1.1. Personalisation

Since its beginning in the 1990s, the World Wide Web has called for an improved ability to find content. Adaptive systems, ie. processes that adapt their behavior to users' input like the GPS, used user models to show the right content for the right user with increased precision and speed of access (Brusilovsky & Maybury, 2002), resulting in successful searches and tailored experiences. Personalization is ubiquitous in several applications from e-commerce websites to health system dashboards. In the case of the web or mobile queries consented to through the acceptance of "cookies", the content is said to be "personalized", that is, enriched with related search suggestions and marketing offers. The experience for the user becomes personal and it enters a lifecycle where its heartbeat is tracked and targeted periodically (Caudill & Murphy, 2000).

Cultural institutions such as museums realized the chance of using Personalisation, not only for collection management and dissemination but also to engage with their visitors through profiling and customization. Tracking and forecasting the captured user's cultural and spending habits aided museums in creating Cultural Heritage collections around the user's personal preferences (Kontiza et al., 2018). Nowadays museums around the world provide their users with personalized access and filtering of collections, notifications, and tours. Through personalized web experiences, they connect to their visitors, learn about their ever-changing needs and provide feedback, becoming more than a static interface, but rather mirroring and predicting users' actions (Bowen et al., 2004).

An example of interactive technology for user profiling is found in DMA Friends (Stein & Vyman, 2014) in which the visitor of the Tate Museum becomes a 'friend' and their basic demographics are willingly disclosed. That way the algorithm learns about the visitor's preferences and suggests related exhibitions. In addition to the content-based approach where the user isn't in charge of their collected data from previously visited items, in this case, the user can create a personal profile and can access, with some level of control, their securely stored data. The visitor can swap credits for the visited exhibits in exchange for museum discounts. This approach not only generates more museum visits, sharing, and ratings but also creates an ongoing relationship between the visitor and the museum.

2.1.2. Interpersonalisation

Building on the aforementioned approach in that it opens us to the user as part of the museum's experience, Interpersonalisation in the context of CH seeks to redefine the relationships between visitors, space, and objects based on newly created meanings and shared experiences. Unlike Personalisation, where users' habits and interactions are observed via their digital footprint to make decisions around the collections, the way Interpersonalisation is applied is via the users' direct participation and control over some predefined variables of a scenario (enabled by the museum's technological infrastructure), that allow interrelation via sound, spatial, haptic and visual cues. Content is transformed by the user through contextual action and the traces of data left to analyze (on the museum side) form "behavioral networks" (Meiss et al., 2008), which reflect the level of technological



interaction that happens between two users when they share the museum experience in the same physical space or outside via social media.

To find out if user's experience dimensions are appropriate to study any exhibition's type, this work analyses 3 case studies that are set in more traditional art museums and might see a combined use of both Personalisation and Interpersonalisation, although the main focus will be on the latter.

The first case, "The Gift Project" by the Blast Theory artist group is based on the concept of gift giving and via a browser app, lets two users exchange a cultural object gift, as scanned or photographed in a museum, and intervened to create an intermedia digital object via adding vocal, text, music features.

The data of up to 500,000 visitors per year captured from the exchange of gifts produce a digital network via Gift Viz (<http://www.mixedrealitystorytelling.net/gift-viz/>) information visualization workflow and is available in yearly deployment plans for the museum to analyze. Data recorded can provide insights for museum personnel and curators on which exhibition and piece are most or least popular in gift-sharing. The Gift Viz is in the ongoing development and is "intentionally software-agnostic" so it can be adapted to any host without particular tech requirements.

In terms of privacy, the links to the experience allow anyone in their possession to open the gifted museum objects, and the data itself is owned but never shared by the artist collective. The anonymized data contributions such as photos or videos made by users can be used by the artists to document their projects and research. Users with hearing and vision impairments are taken into account and museum Staff can provide help with text transcripts of the instructions and text cues to locate the objects.

The experience for the giver is made meaningful as they have to look for an object that has a special connection to the receiver, who might repeat the same action, creating a moment of reflection and bonding and re-signifying the museum object.

The second case, "One minute experience" is a project that allows users to read and edit their brief content via image recognition of scannable museum objects. The React Native project can be customized for any museum and consists of the free Mobile app (supporting iOS and Android), and the account-based One-minute Experience Story Editor.

From the museum side, it also includes a web server running a CMS system and its extension (Directus Headless) and a Microsoft Azure CustomVision Account with an active Multi-Class Classification project and API keys for training and prediction (see <https://github.com/twray/One-Minute-Experience-Mobile-App>).

The experience for the users is significant as it allows them to create their curatorial style, engaging with the object in different and more direct ways, to encourage repeated visits for newly motivated users.

The third case, "Never let me go" designed by Riding Karin and licensed by MIT is an experimental prototype in which two users, one Controller, and one Avatar,



experience each other's behaviors in the museum space. The aim for the users is to co-create a more playful guided tour via an interface visible to the Controller, that shows some direct (action-based) and more abstract (imagination-based) commands to enable different interactions between the space and object.

Per the Data Management Plan of "GIFT: Meaningful Personalization of Hybrid Virtual Museum Experiences Through Gifting and Appropriation" (Lovlie, Bedwell, Ojala 2018) and applicable to all individual projects: all data is considered useful for research and academia, CHI, Creative industries, and other users and is subject to FAIR principles to make data "findable through metadata, accessible, interoperable, reusable". Project coordinators are responsible for all data shared with the partners, which is secured and encrypted freely via Cloud storage. GitHub access to store source codes is free of charge and due to its high trustworthiness, no data is backed-up on a project-wide scope but data can be backed up and recovered where applicable by each researcher.

2.2. The museum as social space

The museum as a physical space for social dynamics is considered according to this work's hypothesis a space for interaction rather than one of introspection (Ryding, 2020) therefore we consider it as a stage for relationships of different kinds: the one between the user and the object, the user and the space itself, and the user and its control over the interaction.

According to Eklund et al. (2020), museums are inherently social spaces, and similarly, according to McManus (1989), the visitors' interaction with the exhibition is only part of the experience. In their view, museums are the pretext or backdrop of social interactions as visitors often attend exhibitions in small or big groups, more or less close to them and their connection with the museum objects or space continues even after their visit. By the same authors, more traditional museums employing digital technologies, have forcibly shaped the user's experience as something individual, based on the assumption that one of the most important aims of a museum's visit is to induce 'self-reflection' and 'meaning-making', states of mind that can't be elicited from social interactions.

One example of individual user's experience is led by the groundbreaking "self-guided in-app tours" (Petrie et al., 2017) that displaced the role of the traditional museum guide, the predefined path within the museum space and the language-dependent access to canned information, in exchange of an individually paced and personalized experience, however, quite an alienating one.

Following the technological advancement in the digital realm and taking into account the changes in the museum's role and practices, however, the user experience is designed in social and participatory practices (López Sintas et al., 2014) and aims at supporting the user's psychological needs within their interrelation, as will be framed within the activity theory described in the following chapter.



As mentioned, to illustrate these changes in the museum's role and practices, we will start by introducing museology and its phases, continuing with the type of object of interaction in the new user experience.

2.3. The beginning of museology

The blurry beginnings of museology, as per Grässe (1883) can be dated back to the evolution of the museum as Cabinet of Curiosities (15th - 18th century), characterized by practices of exhibiting rooms full of collected objects of natural, ethnographical, and religious interest.

From establishing social status and colonial power to educating the masses through subsequent world fairs, professional memberships, organisms, and thematic magazines started to appear. It was clear that a need for creating relationships amongst valuable objects would soon emerge and with it, the need of establishing a fully-fledged discipline to govern them. In these regards, catalogs of museum objects started as merely descriptive lists and evolved into very detailed prints, that included illustrations and critique (ca. 1500). Operational museology and in particular collection management and exhibitions were hastened by the creation of the International Council of Museums (ICOM, 1946).

2.3.1. From traditional to new museology

Museums have historically promoted their institutional perspective to civilize the public (Louvre, Paris), educate them (Uffizi, Firenze), and nationalize their heritage, ie. establishing their power over other nation's through a display of political virtues (Simmons, 2010). However, according to the father of scientific museology Zbyněk Stránský (1926-2016), there is more to the institution perspective, as museological practices are also based on the didactic, communicative, sociological, philosophical, and technological ones. The didactic one focuses on learning and communicating with young people, while the communication one is concerned with the strategic proposal within the museum world. The sociological perspective is the one that focuses on social outreach and impact, and the impact on CH policy. The philosophical and technological ones tackle the issues of the museum as a phenomenon and the most recent needs of research into digital museology (Brulon Soares, 2016).

The role of the museum, and thus museology, changed from being an entity that preserves and presents the past to educate on national heritage, to that of a "center for the service, entertainment and education of society about the material evidence of mankind"(Isa, Siti, 2012). Classical museology practices such as collection management and curation gradually embraced the user-centric view that demanded a more collaborative and representative approach in their design, giving the user the chance to aggregate, customize and negotiate knowledge (ICOMFOM, 2019). Such was the manifesto of the New Museology (1971), that reacting against the traditional museum role of educator, the object as holder of truth at the center of collections and exhibitions, constituted a change of paradigm and critically looked at museum's practices aimed at dictating authority, meaning, control (Stam, 1993).

In his seminal book "The New Museology" (1989), Peter Vergo proposed academic discussions around critical approaches to traditional museology. "The "old"



museum, he asserted, was too focused on methods, and too little interested in its purpose. The “old” museum would teach how to conserve, administrate and educate but would not explore more conceptual ideas of these founding matters”. These strong claims later resulted in a series of wrong interpretations regarding two divergent concepts: the old traditional museums oriented exclusively towards the object vs the new modern museums oriented exclusively towards the visitor (Hanley & Maidment, 2013).

This thesis takes into consideration that the historical context of traditional museums is what imprints importance to the object in the collections, over time. Therefore, this thesis does not advocate against traditional museums collections vs modern ones, but rather reflects on the changes brought by interactive technologies regardless of their opposite approaches.

The aim of new participatory processes supported by interactive technology bears similarities to what the “New museology” ontology (Mairesse & Desvallées, 2010), described when decentralizing the role of the object and the curator to prime that of the audience (formerly seen as “passive receiver”, rather than “active participants”). In these new processes, the definition: “[collections] must be built as it were from inside to outside, shaping the container according to the content” (Réau, 1908) that ushered in the primacy of the object collected, was no longer acquiesced, and thus replaced by a newfound interest in the object’s symbolic value as “carrier-meaning” (Pomian, 1987).

Over the course of history, objects housed in museums are seen by the users and museum staff in a different light according to the historical moment they belong and the evolution of museum practices that organize them. For this reason, it was important to remind the reader about the main phases of museology as science related to the museum as a whole, to understand the different perspectives maintained by traditional vs. contemporary museums, and how user experience was therein facilitated.

2.3.2. The object in Cultural Heritage

In the case studies that we briefly introduced, technology has changed the way the user experiences the museum object that can be “touched, seen, preserved” (Watkins & Beaver, 2008), ie. those that belong to Tangible Cultural Heritage. These objects are produced by diverse cultures, however, some of them are considered representatives of universal humanistic ideals, and are thus part of the “cultural patrimony” that belongs to society as a whole.

In this thesis, we consider this class of tangible objects, rather than the intangible or immovable objects, to describe the shift in focus from more traditional object-centric museology to the new and more user-centric museology. Considering Intangible or Immovable objects would otherwise require adding further variations in regards to oral history, digitally born artifacts, and architectural emplacement which aren’t currently in scope for this work but could inspire future analysis.

The tangible object, which acquired importance from the beginning of civilization, even before being part of a structured collection, was believed to carry some



intrinsic power. Objects that were exotic and unusual, such as the snake stone or ammonite retrieved from distant lands or received as a token by noblemen, were used for centuries in alchemic and early medicinal practices and every museum ought to own at least one specimen to be considered reputable. Over time, objects were used to glorify important family history such as that of De Medici, referring to which the words “gallery” and “museum” made their first appearance in Europe (Simmons, 2010).

It is then that the history of the object and that of its container (the collection and the museum space) started to converge and became inseparable concepts that defined the role and scope of the cultural heritage institution until they were sidelined by the New Museology and its new focus on the museum visitor.

2.3.4. The user experience in the new museology

The new relationship between the user and museum (and its objects) together with the possibilities fostered by interactive technologies contributed to the creation of new design practices aimed at creating a new, interactive user experience.

User’s experience as defined by the International Organization for Standardisation (ISO)’s first edition of ISO 9241-210, “includes all the users’ emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviors and accomplishments that occur before, during and after use” (ISO, 1998). Since ca. 1980s to the present, User experience is arguably based on several post-cognitive theories, such as the ‘activity theory’, and is framed by the multidisciplinary research field of HCI, Human-Computer interaction (third wave). A brief account of both the activity theory and HCI will lay the basis of the theory behind this study.

As mentioned, changes in the user experience brought by Interpersonalisation will be contextualized to the museum’s space in the analysis section. Per Fishwick (2016), Interpersonalisation in the museum’s experience involves some qualities such as self-directed visitor learning, multidisciplinary object interpretation, and community knowledge, amongst others. The case studies were chosen for this study, “One minute experience”, “The Gift app”, and “Never let me go” are representative of these qualities, and each of them is investigated through the lens of changing dimensions of the user experience, such as the relationships between user and object, user and space, user and agency. These case studies all feature and pioneer the latest advancements in supporting the Interpersonalisation process as a consequence of interactive technology and posits the critical discourse of interactive technology. Although it might seem like a big progress towards user inclusiveness and self-determination, the full impact of interactive technology on the user’s experience is yet to be discovered: as technology and needs change, user experience design, known as human-centered design, must adapt its methods and tools to respond to digital borne concerns. These are mostly connected to privacy, security, acknowledgment of the users’ digital footprint, dissemination of unmanaged information, technological dependency, infrastructure malfunctioning, new interface design, and ubiquitous computing (Brock, 2016). In the context of museums in particular, some of the ethical concerns are brought by changes in public behavior, the creation of new forms of engagement, user agency, and technology’s accountability which will be analyzed in this theory relevant section.



As new museology practices and interactive technology continues to evolve and overlap, creating interesting ethical questions around the role and control of the museum and the user, the reader will be guided through the previous research and theoretical framework to make use of the conceptual tools and to critically acknowledge the changes in how users interact in a museum space intervened with such controversial technology.



3. Research gap and previous research

3.1. Research gap

User experience in Cultural heritage spaces such as museums is undergoing major changes as new interactive technologies are incorporated into their design (Gillier & Piat, 2008). One of the newest implementations, Interpersonalisation is on the rise because it gives the users a powerful tool to self-curate and interpret the exhibition, and interact with the objects and the other users in meaningful ways, according to their contextual needs.

As discussed in the previous chapter, much has already been researched about Personalisation (Darzentas et al, 2022), which revolves around practices led by the CH management such as user profiling and targeting for diverse purposes, however, to date a few studies have focused on explaining the origins, theory, and risks of the most recent socio-technological phenomenon of Interpersonalisation in CH.

As a result, no unified view and consensus exist on how this new technology application influences the user's experience across its three main dimensions of the object, agency, and spatial awareness. There is uncertainty on the ethical questions brought by its implications and how it ultimately impacts the perception of the role and scope of the museum as well as the participation of the user within it. The issue with this lack of underlying knowledge in the field of CH leads to the creation of a fragmented user experience design, in which the main importance is given to using technology as a toolset that can be applied to any context without a deeper analysis of the components of the user experience.

3.2. Previous research

As mentioned, the lack of founding knowledge in Interpersonalisation applied in the context of museums is at the core of this thesis and what it attempts to discover and establish for future research. The difficulty of analyzing previous works on the exact phenomenon emerges from the relatively recent perspective that researchers have, as they are faced with such contemporary and fast-changing applications.

Despite this conundrum, we can take a look at two broader topics in Interpersonalisation and user experience that stand the test of time: symbolic interactionism and the community role in a specific type of museum (the eco-museum). Following that, we go over why we consider the user experience in 3 dimensions, providing previous research on it.

3.2.1. Symbolic Interactionism

Symbolic Interactionism is a theoretical perspective of sociology from the 1960s in America (Mardon, Tang & Patel, 2021) that identifies all the processes in which “people build meanings, identities, and acts in their everyday life”. Just as with Interpersonalisation, importance was placed on the agency, the meaning-making, and the interpretation, which processes defined the discipline. Another aspect that characterized interactionism and that we can find in Interpersonalisation is that



people use actions to interact with objects and other people to form meanings, based on their already conceived meanings. Meanings are changing in nature and help people to form interpretations of the objects they experience socially (Snow, 2001).

As a consequence, interactionism claims that society as a whole is based on single interpersonal relationships, suggesting a bottom-down approach in contrast to other sociological theories. As mentioned, the concept of interaction with the other and the object are cornerstones of this theory, and just as important is the concept of user agency (also correlated to Interpersonalisation). The individual user can control social forces and is “autonomous and integral in creating their social work” (Carter & Fuller, 2015).

The symbol that this theory refers to can be any event, condition, space, or people that elicit feelings and actions (Snow, 2001) therefore, to draw a parallel to this thesis, we can identify the single components of the user experience in museums: visitor, groups, museum objects, exhibition space, interactive technologies, etc. that can be researched and predicted via new technologies.

It’s interesting to note how the research method that aligns with this very pragmatic theory is direct observation. As with user experience research, direct observation of behavioral cues, transcription of verbatim, computer logs, interactions with technologies, and interviews are quantitative in nature and carried out and scrutinized contextually in search of patterns (Carter & Montes Alvarado, 2019). This methodology and its results on such micro-level of interactions are therefore considered less conceptual and more experimental by the critics (Pill, 2014) but are mostly supported by ethnographers, who similarly use an inside-out perspective to understand the overall culture by analyzing individual interactions, beliefs, and behaviors (Carter & Montes Alvarado, 2019).

If interactionists as ethnographers are concerned with individual interactions that shape the culture in their terms, then the applications of this approach can impact big societal questions such as that of the identity of race and gender amongst others, which are mere identifiers but are recognized as the main categories involved in some form of oppression (Denzin, 2001). In these regards, the biased application of technology in the user experience design in cultural heritage institutions (museums collections, exhibitions) can lead to a similar impact as we saw in the previous chapter.

Lastly, as symbolic interactionism does not aim at explaining the working mechanisms of institutions and society through its strata, because that’s rather a consequence of individual actions and interpersonal interactions, this theory takes another interesting posture: interactions create a fluidity of case scenarios, actors and meanings (Dennis & Martin, 2007), which as we report by the end of this chapter, anticipates the compositional nature of the experience.

3.2.2. Community-led museums: the eco-museum

The topic of the involvement of the community in the museum’s resources and the creation of participatory practices has gained importance since the 1980s. Per



Rivière (1980) the public addressed as the “local population” is part of the “eco-museum” integrated instrument, operated by museum experts, facilities, and resources whose aim is serving society’s needs. The new museum system was the result of two almost opposite movements: the concern for ethnology and ecology and the increasing need for self-management. The new museum actors (the public/users, the museum administrators, and the experts) contributed to the creation of an integral experience incorporating workshops, documentation centers, shops, and community pathways, redesigning the museum space and the community involvement, and defining a new “humanism”.

To define the museum's role in society, theorists of the eco-museum zoom into many of its unresolved issues: according to Veillard (1974), the rise of eco-museums brought by the question of the museum object and the collection: traditional museums collect the object through donations and research to elevate the value and prestige of the collection, however what about those objects that are typical of a certain tradition, region, folklore or even individuals? These objects might not add a monetary value or prestige to the collection, but relate to the community all the same and reframe the role of the museum as a means to understand society.

3.2.3. Considerations on object, agency, and space in the experience

As we have an understanding of how previous studies tried to establish quantitative studies on micro-interactions on an interpersonal level, and we have seen at least part of this ethnography reflected on CH via the eco-museums, we conclude by providing a breakdown of the dimensions of UX in analysis referred to some previous practical case studies.

Why are we considering these 3 dimensions of object, agency, and space? According to McCarthy and Wright (2004), the experience the users have with technology consists of different parts that compose themselves continuously in the unfolding of activities and events. This compositional nature of the experience is affected by space and time, and users are aware of the space-time factors in different ways according to their level of connection and engagement. The object component of the technology experience refers to the physical feel for the artifact and the feelings it conveys through its materiality and affordances of use. In the author's view, the user’s agency is a recursive part of the construction of meanings, in that the users collectively interact with objects and space in an ongoing process, re-compositing the initial instances of the experience. Given this overview, we can go deeper into the considerations of these 3 dimensions, highlighting some prominent previous cases in museums.

As for the object, it is seen as a thing of use within the user’s context; the exhibition space is made sense of according to the user's interpretation and the agency and meaning-making of shared culture are enabled by social interaction. According to Weil (1990), objects are bearers of ideas and mediators of multiple meanings created or interpreted within the user’s context. Under-represented social groups claim their seat at the table when discussing the representativeness, access, and inclusiveness of the collected objects (Harrison, 2013). Researchers Geismar and Mohns (2011) documented the Vanuatu Museum’s experiment where the native



population had the chance to tag their cultural heritage artifacts according to their beliefs, co-curating new and inclusive themes, in a shared community effort.

Concerning the physical space, new ecologies and proxemics extend the boundaries of the museums to the real world, thanks to invisible yet pervasive technologies. The public as a whole participates in real-time to the creation and interpretation of new knowledge in specific contexts of use, and thus, further research in human-centered design and design processes is enabled to create new user experiences. In the case of the “Panopticon” project (Darzentas et al., 2022), the combined use of technologies such as machine vision and Interpersonalisation was applied in the context of refurbished arcade exhibitions. The consenting users’ facial expressions and haptics were captured in real time via a camera pointed at them during the interaction with the exhibition. Via an NFC tag printed on a physical token, the users could access their onboarding station, begin the recording, and create a 3D avatar that would mimic the same emotional response. While the aggregated data collected served mostly for museums purposes, the hybrid approach also included Interpersonalisation in that the users would be shown a collection of their emotional journey to provoke reflection and form new memories, and they would be given the chance to keep their avatar “alive” over time for the next visits.

Lastly, on the change to the user’s agency dimension, users can take control and tailor their own and others’ experiences and most of the tools and systems within it, making it interpersonal. The museum and its professionals are no longer expected to be in charge of directing the focus and the intention of the user according to the curator’s intention and the exhibition’s aim. In the case of VRtefacts (Spence et al., 2020-2021), a combination of mixed reality and Interpersonalisation was applied to the user’s experience of 6 3D-scanned and 3d-printed objects props or controllers linked to an HTC Vive Virtual Reality ecosystem. These props were presented to users inside VR vitrines, and they could be fully manipulated the researcher leading the session, would only coach the users in the use of tech equipment and led them to visualize the physical objects in front of them but did not interfere in judging the process or the stories shared by the users during the sensory experience.

If the user-centric view explored in these cases has led to a paradigm shift in museum practices and design processes, on the other hand, it also ignited the debate around the more commercial, marketing tactics of the CHI to attract more visitors, the loss of credibility in curatorship and the risks of algorithmic biases. These topics are discussed as part of the Additional Ethical Concerns section.

To summarise, we have seen how despite the lack of previous knowledge on the applications of Interpersonalisation technology in the context of museums and its design, it is possible to connect it in dialogue with symbolic interactionism as a sociological movement, the eco-museum as a center for participatory practices and the compositional nature of the experience. Together with Interactionism and Interpersonalisation, the compositional threads of the experience share the concept of individual interactions at a micro-scale that form changing meanings, to understand society (although, without any aim at explaining it from the top-down) via research methods based on ethnographies that are also applied in user experience research. The resulting categorization of users and their behaviors often



leads to the formulation of important questions of identity, which are also often brought up in the context of technology and ethics. The rise of eco-museums as symbolic spaces of interaction that are self-managed by individuals serves as a nexus to understanding today's impact of Interpersonalisation on the user's experience in the context of museums.



4. Theoretical basis

In this section, we present an overview of the founding theories for user experience, and the specific dimensions changed within it by interactive technologies. The reasons why we choose to work with philosophical theories such as post-cognitivist action theory and its principles are two-fold: on the one hand, the post-cognitive approach at large gives importance to the action of the subjects in creating relationships and deriving meanings; on the other hand, because the action theory's key principles provide us with the understanding of said relationships and meanings. Moreover, according to research on the ontological and epistemological origins of HCI, the chosen theories have been widely accepted as adequate. The Underlying Action theory based on the philosophical ground that will be soon explained aligns plausibly with the contemporary user experience and human-centered design in that attests to the iterative process of forming new meanings via a deliberate yet intuitive interaction. Lastly, these sets of theories, especially the critique of cognitivism by Dreyfus can be connected to ethical considerations on interactive technology in that it shuns its capacity of predicting user behavior based on logical calculations.

These considerations will be the underlying basis for the Research Questions in the next section.

4.1. HCI: User vs experience

Human-Computer Interaction (HCI) is a broad field of research from the 1980s that is based on several disciplines such as computer science, human factors engineering, and cognitive science. The primary goal was to design a seamless and enjoyable interaction between the popularised computers and the user as if it were to happen amongst humans and is a precursor of what today is known as User Experience Design.

The main focus of HCI research since its beginnings has been the study of user behavior and the methodology used was that of fieldwork. This approach often included the use of behavioral observations, contextual interviews, and diary studies as a medium to understand motives and patterns in user behavior and devise ways to design experiences or interactions taking into account their findings. This pragmatic approach is nowadays believed to be based on post-cognitive theories.

It is necessary to mention the precursors of such theories to provide a brief context on how post-cognitivist theories became significant in HCI. In fact, before the 1950s, dominant cognitive theories (Pylyshyn, 1984) emphasized how problem-solving and learning, (two of the output sought by contemporary human-centered design), were representations of the mind that could be structured, broken down into



smaller parts, and studied in a controlled environment such as a lab by experts, without including other contextual data about or interaction by the user.

The user context was therefore removed from the experience, and because of this process of “purification” (Latour, 2011), the cognitive way saw its supporters in the so-called First Wave of Human-Computer Interaction, cc. In the 1960s (Susanne Bødker, 2015), where the focus was similarly on understanding computing and developing software and the interaction between humans and computers was relegated to physical connectors and commands. The user experience was reduced to following rigid and structured tasks and the user’s agency, context, and needs were not factored in. Centered on this conception, computer models capable of human-like reasoning, task analysis models, and Programmable User Models (Young, Green, & Simon, 1989) acquired great importance. These cognitive models were attempts to predict early user behavior in some exploratory or routine scenario while constrained by a strong cognitive structure or architecture, assuming that user behavior was rational and predictable (Blandford & Good, 1999). The analysis of large and complex systems, however, raised questions about new design methods and the establishment of software engineering as a profession. At the same time, programming and engineering were recognized as an area of psychology or software psychology (Shneiderman, 1980) and this brought up more changes in HCI leading up to a new wave.

The Second Wave of Human-Computer Interaction (1992 to 2006) explored group dynamics in applications and information flows. According to Latour (2011), said groups or societies were translated into a single element, eliminating nuances and contexts of use. This is somewhat similar to what studies by Thomas & Kellogg (1989) identified as some of the main gaps between the user and the tool. They describe ecological gaps as those gaps in understanding user behavior when the laboratory environment does not take into account the user’s context which is replaced by an artificial one. The laboratory is a sterile, ideal environment, detached from the user’s reality, therefore the user’s motivation and individual differences in group experiments aren’t addressed (user’s gap). Other examples of gaps include those in which the user experience is based on predefined tasks set up by researchers which cannot be generalized, with tools unknown to the user, who employs them for the controlled time of the experiment only.

Along the same lines, Dreyfus (1929-2017) claims that human problem-solving depends on the context, rather than on the knowledge of precise, logical steps. He explains this with two concepts: knowing what and knowing how (Dreyfus, 1987). Knowing-what is a conscious activity that allows people to analyze a complex problem and search among many possibilities, for the most successful way to solve it. By contrast, knowing-how is the way people deal with problems intuitively, almost forgetting the rules, as they come naturally based on people’s goals and expectations.

In opposition to this HCI application that sees the group and the context as negligible elements of the user experience, Spivak’s (2010) post-colonial idea of “subaltern” introduces a new disruptive characteristic: the user is not neutral, as isn’t the information flow. The user can and will use the technology given to them to



fulfill their needs, beyond the original and intended use, even though they are unable to “speak”, and they can do so by acting collectively.

With this understanding and the popularisation of personal computing accessible to the common user, the Third Wave of Human-Computer Interaction (2006 to present) replaces the information flow with a more collaborative, action-driven approach. As a consequence of this behavioral approach, cognitivism is outrun by post-cognitivism in the “most canonical theory-base, the socio-cultural, Activity Theory” (Carroll, 2011). Activity theory stems from the sociocultural tradition in Russian psychology and Marxist philosophy, and sees the activity as transformative, between the actors (users) and the world (objects) (Leontiev, 1978). The reasons why Carroll believes that this Activity theory underpins contemporary HCI and creates the user’s experience as we know it these days can be found in two main contributions: Vygotsky’s law of development and Rubinshtein’s unity of consciousness and activity. According to the former, human mental functions happen “inter-psychologically”, that is when distributed between one user and another or a group, rather than “intra-psychologically” (individually). According to the latter, human conscious experience and human acting in the world are inseparable and determine one another. Shifting the focus from purely cognitive aspects, the pragmatic Activity Theory tries to situate participatory design at the cross of social forces and contextual factors. The participation of the user in the design can be concretely explained from attempts to structure Leontiev’s theory into principles. Per Kaptelinin and Nardi (2006) these principles are often regarded as the major contributions to the HCI research field. For this study, we will present some of these principles from Ghaoui (2005) which will be linked to the user’s dimensions: “object-orientedness”, “internalization and externalization”, and “hierarchy” which will be explained in the following section.

4.2. Three-dimensional User Experience

Throughout its waves, the research field of HCI becomes a broad conceptual framework that takes into account the user’s relative contexts and needs, to create a multidimensional user experience. The dimensions considered in this study are those of object, agency, and spatial awareness which will be related to the Activity Theory's main principles by the end of this chapter.

4.2.1. The principle of object-orientedness

The object in the principle of “object-orientedness” exists independently in the world and yet it transforms the activity of the subject (from now on, we intend the subject as the user during the experience). The object also reflects the psychology of the subject, and its alignment is dynamic, as the activity and the interaction change continuously. The object is either tangible or intangible, and its properties are defined by the subject and the culture as a whole. Human activity is therefore triggered by the object’s existence and vice-versa.

An example related to this thesis might be that of a museum visitor that is faced with an object of use that is de-contextualized for the collection, for example, a bench that serves other purposes than sitting. According to logical processes and mental models, as we will see in the following sections, the visitor might experience



cognitive dissonance, as both the object properties and the cultural context dictate that a bench is for sitting. However, when the visitor internalizes the context that the object is both a common piece of urban design, but also a modern art piece, and when they interact with the object in a different way than originally intended, the visitor builds a new instance of that object, transforming its meaning and activities around it.

4.2.2. The principle of internalisation-externalisation

It follows that the process of object-orientedness exists due to the principle of internalization and externalization, which in HCI can be related to the concept of Agency. During internalization, objects external components are internalized by the subject: for example, the visitor could be talking aloud to remind themselves of certain steps to perform externally when interacting with a museum's 3D object. Contrary to internalization, externalization transforms internal components into external ones: for example, when the user receives some cues from the art object and produces their media with some kind of intervention and interaction.

These intertwined principles can be extended to the individual-collective activity as both the subject and the group take part in activities that can either be individually carried out or socially shared. When activities are shared socially, a collective or social praxis is formed (Ilyenkov, 1977). In this regard, one notable exploration of Leontiev's activity theory is Engestrom's activity model (1987) which concerns itself with the social aspect of the activity. According to this model, the interaction not only involves the nodes of the subject and object but also, the community. The community interaction aims to produce a shared use and meaning of the new object.

To provide another example of how this principle applies to this study, it can be assumed that the visitor interacts with both the object (collection) and the community (other visitors at the museum or somehow engaging with the shared content). The output of this three-fold relationship is the creation of new media, a new collection's object, and a new interaction.

4.2.3. The principle of activity-hierarchy

Lastly, the principle of activity hierarchy can be related to the user's awareness. In this thesis, we consider in particular spatial awareness as we chose the museum as the main physical and figurative space of interaction. Nevertheless, the concept of the hierarchy of activity can be extended to any aspect of human interactions.

To explain it further, we remind the reader that per Leontiev, human activity is made of 3 layers: the first is the activity itself which is oriented towards an object (a need), the second is an action which is a conscious process to obtain a goal towards that need, and the last are the operations which are unconscious routine processes that prompt the user towards a goal. Unconscious operations can be the result of the automatization of previously conscious actions, or they can be the result of improvisation. Human activity is therefore the result of the alignment between conscious and unconscious processes, between needs and goals.

In this thesis example, spatial awareness in museums is at first originated by the collection's configuration, the physical space constraints and design elements, the



guided tour, and the interactivity of the installation, but it can be later on modified by new proxemics with the group of visitors and possibilities of interactive technologies in that the visitor can discover new walking patterns, in concert with their needs and intuition.

4.3. Mediation

Following the Activity Theory's main principles, Leontiev's theory places the concept of mediation as one of the most fundamental triggers for human activity. He states that mediation is the single most important feature of humans because through it many complex structures are possible: language, culture, use of advanced tools, etc. Per its etymology, mediation (Merriam-Webster, n.d.) refers to the transmission by an intermediate mechanism or agency, ie. something that's in the middle of two subjects and acts as an intermediary. The museum can be seen as the mediator between culture and society because individuals make sense of their shared culture through the communication and transmission of cultural objects. Cultural objects in museums are often intermedia, that is, they establish a relationship with different forms of their production. For this study, the museum object as a "product" won't be considered, as the main interest is the relationship between visitors, space, and objects.

In HCI and human-centered design, objects are mediators of actions, because their design, their structural and material properties, and their "affordance" (Norman, 1988) have embedded the way the object can or can't be used. The most typical example of an object that triggers a specific action is a door handle, which shape affordance enables the action of closing-opening and acts as a mediator between the user and the space. As per the previous section, through internalization-externalization processes, the mediating objects can modify the user's mental model of the object itself, the action triggered by it, and its outcome. A user's mental model (Craik, 1943) is "a small-scale model of reality that the mind uses to reason, anticipate and explain". It helps create long-lasting perceptions and beliefs about the world and it bridges the divide between the user and the understanding and experiencing of the object (or system, or technology). When the user cannot immediately recognize the object and its purpose, they can experience "cognitive dissonance", a mismatch between what the user believes and how they behave about the object (Cooper & Carlsmith, 2015).

4.3.1. Bringing it all together

At the beginning of this chapter, we took the reader through a journey on the different waves of HCI, a multidisciplinary framework that enables contemporary user experience design. It was highlighted how during different phases, the study of the user and its interaction with the system, tools, other users, and society changed as a reflection of the transition between cognitivism and post-cognitivism. These were described and exemplified as two founding philosophies of science that aim at explaining the nature of human meaning-making and learning accordingly as independent or dependent on the mental processes or context. At a micro-level, we identified the Action Theory which 3 main principles of object-orientedness, internalization-externalization, and activity-hierarchy helped us frame the 3-dimensional user experience we can analyze in today's human-centered design



which processes are interconnected and change according to the personal mental models, social context and the mediation of cultural objects and interactive technologies. Users' efforts and activities in museums can produce several outcomes, that in turn modify the initial setup. For example, the users can use interactive technologies to modify the meta-text of an artwork and share it with other museum visitors and the new text or social interactions become part of the experience potentially as part of a new object, art performance, etc.

As we will explain in the next chapter, we will identify the ways and mechanisms in which interactive technologies can affect the user experience at museums, suggest future participatory design practices, and have an impact on the social context of CH.



5. Methodology

5.1 Aims and purposes

The effects of Interpersonalisation on the user experience of CH are still under investigation as this recent technology is being gradually adopted by museums worldwide. This thesis aims at identifying new ways in which Interpersonalisation alters the user experience (UX) in CH within its dimensions: object, agency, and spatial awareness and the effects that the new user experience has on users within this social context. The application of Interpersonalisation within the museum as a social space was investigated using 3 case studies to prove its effects on the user experience and shared social practices.

The purposes of this thesis are:

- To observe the changes in UX dimensions throughout the user experience in museums.
- To assess the impact of interactive technology and Interpersonalisation in the museum context and suggest future design practices.
- To identify the effects of the new user experience in the social context.

5.1.2. Research questions

To do so, the following question will be addressed:

- RQ1: How are these dimensions of the UX of Cultural Heritage changed?

To further support this question and provide a specific frame for the analysis, two sub-questions will be addressed:

- a) How do interactive technology and Interpersonalisation alter the user experience across these dimensions and what could this change suggest for future design practices?
- b) Which effects do the new user experience have on the user within their social context?

The first sub-question will introduce Interpersonalisation to explore how new technologies change and enhance the user's experience across these dimensions, suggesting new ways to further design the user experience in CH.

The second sub-question will help determine the effects of the new user experience on the user within society as throughout this thesis, we considered the museum a social space, in which the experience is shared collectively and creates new meanings and practices for society.



5.2 Method

Due to the very specific data selected for this thesis, to the epistemology that founds our Theoretical Framework (ie. the bottom-up approach to creating meanings, the socio-technological feedback loop, the importance of contextual knowledge), we chose an interpretative research philosophy as opposed to a positivist one, with an inductive research approach as opposed to a deductive one. We chose an interpretative research philosophy because the thesis studies the effects on human experience and the main focus of the research is looking at interactive technology as a lens to watch their behavior and interaction at museums. We chose the inductive approach as this reasoning starts with a specific observation, a recognition of patterns, in this case, within case studies, to try and formulate a preliminary conclusion (ReviseSociology, 2015).

As per the Research gap chapter, there is not a unified theory that might generally be applied to Interpersonalisation, museums, or the design of user experience around them. Therefore, the inductive one is the most appropriate approach for our proof of concept. As the study is exploratory in nature, that is, it investigates topics that weren't previously covered, the preferred approach is the qualitative one. The strategy used non-randomized case studies (Ochoa, 2017) based on the criteria of availability of information of the real-world case studies and the fact that each case study represents more clearly one analyzed UX dimension over another (although, some reflections of the three dimensions are in all three cases). A sampling of these case studies is applied to understanding the phenomenon of Interpersonalisation and its effects on UX in museums although, contrary to randomized case studies, results might not be applied to other museum contexts, exhibitions, or technological applications (Sage research methods, ed.).

5.2.1. Case studies

As mentioned, the research strategy of this thesis used three case studies to yield multiple results: shed new light on the specifics of UX experience dimensions and helped visualize Interpersonalisation as a phenomenon with its effects on real-world scenarios. We chose, in particular, the case set up at Brighton Museum (<https://brightonmuseums.org.uk>) a museum known for its collections on colonialism, LGBTQ, and feminism history, that is a museum that is linked to some topics and sets of practices that aren't considered strictly traditional. Moreover, the cases (the live case The Gift, and the two experiments One Minute and Never let me go) offer valuable material related to Interpersonalisation. In this regard, we noted how Digital Manager Kevin Bacon developed the collection's management efforts testing while critically looking at both Interpersonalisation (as in "AI as a provocation rather than the solution" here: <https://gifting.digital/brighton-museum/>) and the question of curatorial power (as in "A short grumble about Curating" blog post here <https://fauxtoegrafik.wordpress.com/2013/11/21/a-short-grumble-about-curating/>) which corresponded at large to some of the preliminary findings.

5.2.2. Data collection

For the data collection, we chose to synthesize the changes that Interpersonalisation brings within 3 case studies in a longitudinal time horizon. The choice of cases developed at multiple points in time was due to the testing of the Gift project carried



out for 3 years, out of the overall Horizon 2020 which lasted 7 years. The cases were selected consulting the Europeana Pro web page <https://pro.europeana.eu/project/the-gift-project> as well as the official landing page <https://gifting.digital> which also features several types of academic publications including conferences and presentations and reports from the project.

This data collection method was chosen over other methods, to explore the phenomenon behind the real-world application. The emphasis on the theoretical basis is the backbone of this study, as it channels the understanding of *what* has been done so far to design and enhance the user experience within CH while showing *how* it has been done and how it can be further developed.

5.2.3. Data analysis

For the data analysis, we used exploratory analysis (Tegan, 2021-2022). Exploratory analysis is preferred when delving into relationships among variables that might not be very evident. In this study, the main variables are those agency, object, and space, which constitute the focus of UX theories in CH. This type of analysis is helpful to discover causal links and inform future design decisions. In this case, by exploring these real-world applications, it is possible to establish their effects within the user experience and their broader social context.

To extract useful information about the exhibits, their underlying UX theories, and Interpersonalisation, we researched peer-reviewed literature, author's publications, and articles by field experts using search keywords. We mapped out the data at first using sketches and concept maps for personal analysis. An informative table made using Word and a concept map will briefly describe the scenarios and will present the answer to the questions schematically and visually.

5.2.4. Research Limitations and Ethical Considerations

The study is limited in that it does not aim at creating a general theory of the user's experience as changed by new implementations of Interpersonalisation, as it takes off from a small sample of data. This might pose a validity issue since there is a risk of misrepresenting the aspects of the user's experience considered and thus, generating conclusions that are only partially valid (Middleton, 2019-2022). Similarly, when it comes to implicit UX theories and museum practices, it is necessary to simplify and narrow down the possible ramifications of both and keep only those that could be the most interesting and relevant to this research's main questions. Hence the difficulty of working with a very detailed scenario might reduce the comprehension of the user's constraints during the experience. Despite the user's experience being embedded into a certain use and user's context, it is not possible to take into account and derive guidelines regarding a general use case. This is because each implementation within CH is too specific to be reported in its wealth of details and implications beyond the requirements of this research. This suggests that the preliminary conclusions might become unreliable in time, in different museum contexts, and using different technology applications than those analyzed here.

Data extraction and presentation choices are mostly qualitative in nature, therefore the research does not provide a condensed numeric dataset and does not intend to



support quantitative studies at the moment (McLeod, Ed. 2019). The data presented does not inform about real users, therefore it cannot be used to draw conclusions or make speculations on any demographic aspect of the users. Participant museums, partners, and stakeholders involved in the projects are available for the researchers on the official websites and linked academic resources in the References section.

6. Analysis

6.1 How does Interpersonalisation alter the user experience across these dimensions and what could this change suggest for future design practices?

We analyzed the three dimensions of UX as referenced in the theoretical framework: objects, space, and agency and their shifts in meaning and social praxis within CH. We considered 3 representative case studies however, we did not provide a descriptive analysis of the case studies as those were presented in chapter 2., nor the user's evaluation findings, since the focus of this thesis was not to gather diaries, verbatim or surveys, but rather provide a case study research on the phenomenon of Interpersonalisation within the specific context. The point of presenting these cases was to highlight specific aspects of their design and ultimately acknowledge them as the basis for future design exhibitions.

6.2 Object: One Minute Experience

As per the theoretical basis and previous research sections of this study, the analysis of what constitutes the museum object has been changing over time: from the uniqueness and primacy of the physical artifact available for the few to their digital representations available to the many, we analyzed how the interaction, context, and use intertwine to make today's museum objects. The cultural context (Foucault, 1970) gives the objects their meaning and the user can accept and understand them only if they have this knowledge. Besides the necessary aspects of preservation (security, climate, and access controls), museum objects can be often used either by their original owners or the visitors who interact with them during the exhibition. The Tangible Cultural Heritage objects considered are intended as objects that emanate their stories, embody their unique materiality, and are ephemeral props for sensory experiences within the user's knowledge and cultural context. To demonstrate how interactive technologies changed the way the object is curated and enshrined to how it is freely interpreted and accessed, we analyzed the first use case, the minute experience. One Minute experience was part of the Gift Project (Horizon 2020). The app was developed by the IT University of Copenhagen in partnership with Royal Pavilion & Museums and tested in 2019 at Brighton Museum amongst others.

6.2.1 Aim

The aim of this project lay in the innovative possibility of each user to engage with the objects as they wrote and shared their texts, opening up to more direct access to



the artwork and its informative material, and a more interpretative effort that transcended or rather supplemented the curators.

6.2.2 Design

Unlike other apps which work with QR codes or links to caption the displayed artwork acting as a barrier between the user and the museum object, users were invited to simply photograph the objects and read their content in bite-sized cards that they could edit via a story editor feature to create their narrative.

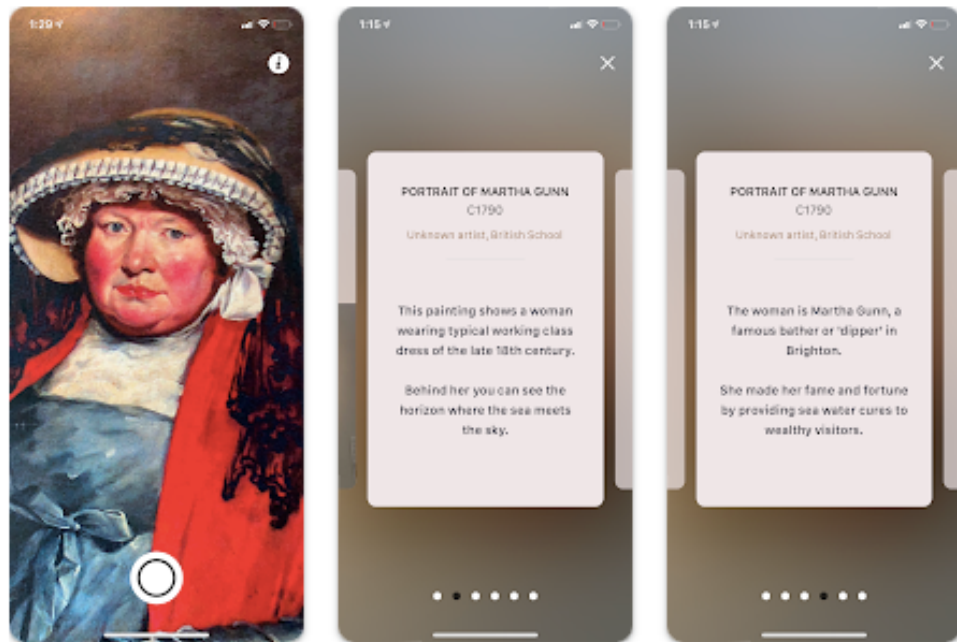


Figure 4. Screenshots from Google Play store

6.2.3 Access

As Kevin Bacon noted in the blog post “Four days with the One Minute Experience” (<https://brightonmuseums.org.uk/discover/2019/12/27/four-days-with-the-one-minute-experience/>), the possibility of reading and writing a personal caption of the artwork, increases the access and understanding of the artwork by anybody, bypassing “default modes of communication” of the caption, which are often long and presume a certain familiarity with the work, the art movement and the artists themselves.

6.2.4 Interpretation

Testing the story editor with museum personnel and experts from outside the museum proved important to capture insiders’ and outsiders’ perceptions of the artworks, however, due to the level of expertise and closeness to the pieces, it was difficult to interpret texts in an alternative way. In this predicament, co-creating with



the involvement of a community of non-expert moved the needle from a traditional curatorial voice to a more subjective and less structured one.

6.2.5 Manipulation

Through the story editor feature, users could engage more freely and critically with the objects. However, due to the playful and carefree tone of the texts to be edited, users might become less committed to the “seriousness” of the experience, which is intended as a thought-provoking one.

Moreover, the chance of instant reading and editing might interfere with the unique learning style and pace of the visitors, suggesting that many visitors might not be at all ready to formulate some thoughts on the art object, the moment they faced it but they needed more time to reflect on it. This translates to a future design decision of mapping an emotional journey from visitors’ observations and responses to provide some relief from deeply loaded experiences and some downtime to let the interpretative process settle.

6.3 Agency: the GIFT

As per the theoretical basis and previous research sections of this study, the analysis of agency also varies in time. The dominant cognitive and positivist view of the museum object had it that the simple act of “seeing” would stimulate cognition (Knell, 2007). The object’s agency is however nowadays outdone by the notion of the user’s agency within the interaction. The more rational learning outcome that many users achieve during the exhibition is surpassed by a more holistic connection with the object, its context, and evocative power, through the lens of each user’s background. This is referred to as “numinosity” (Latham, 2013). According to a series of articles written by Gatewood & Cameron (2004), these users or “numen-seekers” experience what Prentice, Witt, & Hamer (1998) described as “cognitive states in which there is intense engagement, a loss of the sense of time passing and a transcendence of self”, as they come into contact with a particular object or place that resonate with them. To demonstrate how interactive technologies changed the way the object is engaged and how it is shared interpersonally, we analyzed the second use case, The Gift Project.

6.3.1 Aim

In the case of Blast Theory’s artists’ app “Gift App”, the aim was for the users to personalize the experience of other users, with whom they share a gift of a museum object as a hybrid digital experience (Spence, 2022). Gift sharing in the physical world is associated with the action of wrapping and unwrapping, to hide and reveal the content and generate surprise and expectation. While the real gesture of wrapping and unwrapping couldn’t be achieved, to evoke these feelings, the gift-giver was able to decide on some conditions: schedule the gift, set a passcode, instruct the receiver to get to a specific place, or perform some task before being allowed to unwrap.

6.3.2 Design

According to the report shared by Horizon (2020), MRL researchers presented the artist group Blast Theory as a prototype for the Gift App. This prototype included:



image recognition technology (<https://www.artcodes.co.uk>), 3D object scanning that linked objects to stories; an app for planning a trajectory in the museum space, two paired apps: the Maker app and the Unwrapper app, for the users to connect. We presented a rendition of the Interpersonalisation loop.

The gift-giver used the maker App via e-mail registration and followed the on-screen instructions to take photographs and intervene in the media. They then chose to send the gift to a receiver they knew via the e-mail address or someone unknown at the museum or elsewhere. The receiver got a notification handled by Mailgun service (<https://mailgun.com>) and completed their task, got to the museum, or simply unwrapped the gift. The receiver could optionally send a customized message or another gift back to the giver.

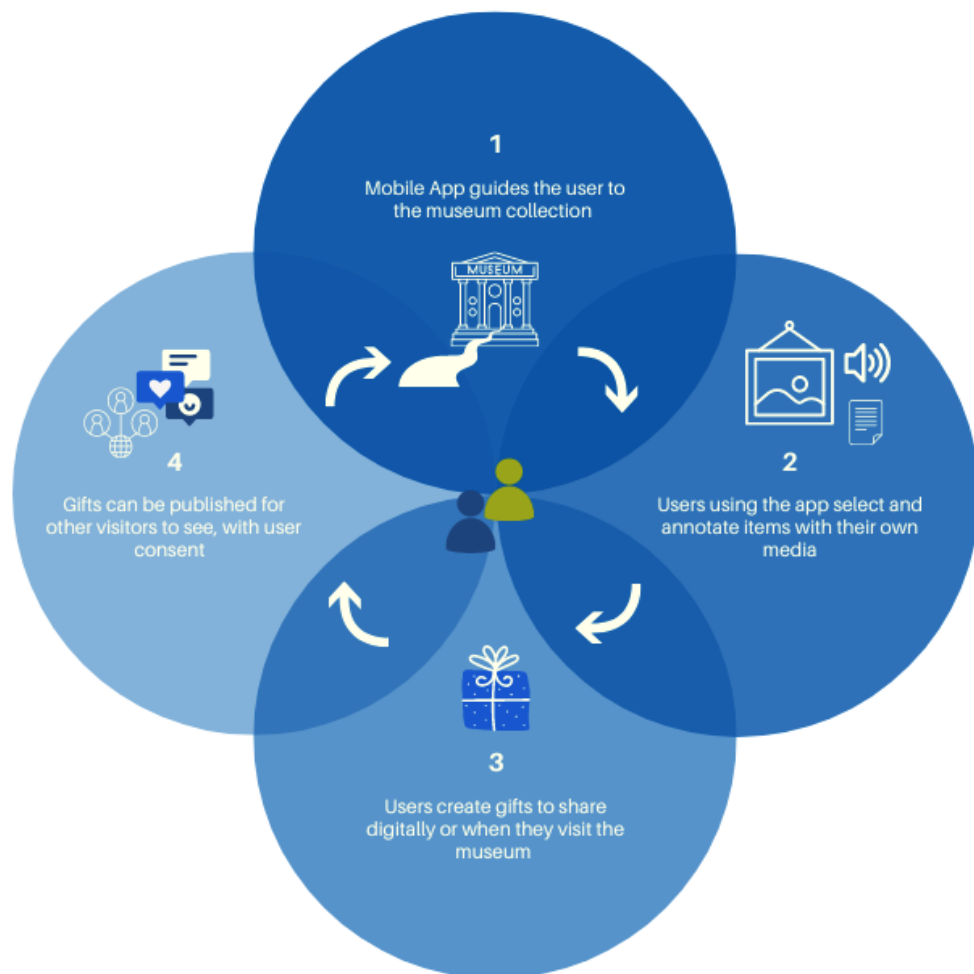


Figure 1. Gift App prototype. Own design based on Horizon (2020)



6.3.3 Decision-making

As mentioned, the giver might know the receiver or not, the receiver might be at the museum at the same time, or anywhere else in the world. A special note or music could be added to the object to create new media. The results of photos and notes created with the App, called ‘payloads’, were extensively questioned and tested by the researchers and artists to solve these design questions:

- How will it work for users that want to send a gift to unknown people?
- How will the experience change if givers are present at the unwrapping?
- How to integrate already-owned media or digital collections in gift-making?
- How many instructions to give and can they be ignored?
- How will the experience work in 1:1 gifting, Remote, to strangers, and many strangers?
- How will the experience work with physical museum objects vs. digitally born objects?
- How will the experience look like if the giver or receiver decided to share it on social media?

These questions concerned the Interpersonalisation experience when the giver and receiver might find themselves in the same space, or not, or interact with a bigger group, known or unknown. The choices enabled by technology to the participating parties defined the new agency and control over the museum object in that it could be physical, digital, mixed, and could be shared interpersonally or publicly.

6.3.4 New ethnographies

The users that were involved in the gift-giving and receiving created a new interpersonal relationship between each other and the object. By interacting with the object at the museum, virtually via the museum digital gallery, or anywhere else, the receiver gained a new perspective on it and created their meaning and story about it, having the chance to respond or return the experience to the giver. Sherry (1983) tries to understand the grounds of this rediscovered ethnography or user behavior, focusing on the personal dimension of gift-giving, mentioning Belk (1976). Belk refers to this process of gift-giving as one of affirmation of one’s identity, which can be either rejected, accepted, or reciprocated by the receiver. Sherry further mentions how some authors such as Marx and Mauss connect the “self” to the object donated as if they held part of the energy of the donor. In their social and economic dimensions, the most common expectation with gifts is that they reciprocate, following the Western etiquette by which to reciprocate means to prove one’s generosity, being equal, with the same means as the giver. In so doing, users are then able to expand into a network of givers-receivers and transmit a set of values, so one of the questions researchers had was:

- How do cultural norms about gifting inform the GIFT app design?



When translating this question into a design component, researchers had to focus on further aspects of the gift-giving process. One was that anything can be made into a gift, according to their context. Some gifts are considered appropriate for specific occasions but not for others, ie. Birthdays, anniversaries, promotions, religious festivities, graduation, sickness, and death. Their temporality is also based on the cultural calendar that affects their reciprocity and frequency. Similarly, social conventions establish that some roles are forbidden to be givers or receivers, for example, politicians, for whom giving or receiving gifts is unethical. Others, like students, priests, the elderly, or patients aren't expected to follow the gift exchange either, based on having scarce resources. On the same line, gifts of objects that implicitly have a high monetary value might be more sought after than gifts that have a transactional lower value, although that mechanism largely depends on the motivation for gift-giving and the nature of the given gift that might therefore be more utilitarian (fulfilling a concrete need) or symbolic (evoking a more emotional connection).

When designing the GIFT APP, the appropriateness of the context still mattered for the receiver, however, the artists and designers leveraged the idea that gifts could be made and received by anyone, at any time and place and they were effortlessly created, highly customized and intimate, with less dependency and constraints to the concept of monetary value, timing, motivation, and social role.

6.4 Spatial awareness: Never let me go

As per the theoretical basis and previous research sections of this study, the analysis of what is commonly understood as museum space and how users interact with it is mutable, largely due to technological advances in exhibition design. Users in museums interact within the museum's space and the space that is created amongst other users, to several degrees of proximity (Hall, 1964), however, this raw measure is only part of the scene. Proxemics has been used since the first waves of HCI as a discipline, which as mentioned previously in this thesis, has concerned itself mostly with physical devices connections that have certain lengths therefore much emphasis was given to explicit-implicit interaction, attention, discrete proxemic zones, continuous movement, device-to device awareness, context-aware sensing and so on. To demonstrate how interactive technologies changed how the users react to the museum's proxemics to how they interact within the space, we analyzed the third use case, Never let me go.

6.4.1 Aim

In this project, the aim was to change the space perception of the user and facilitate free exploration. To achieve that, Interpersonalisation introduced a broader concept of proxemics such as the position, orientation, movement, and identity amongst the object (and its interactive possibilities), the user, and the rest of the visitors, interpersonally.

6.4.2 Design

As mentioned in the Background chapter, identity and knowledge about a user's history and behaviors introduced a whole new variable in the design of exhibitions aided by new technologies, such as that Personalisation. As deeper Personalisation,



or as addressed in this study, Interpersonalisation experiences developed, users, have been building their perception of the space and the proxemic dimensions according to their context, background, and previous knowledge. In this case, the experience, tested at the National Gallery of Denmark in 2019, was designed to take place in the setting of an Art museum as the particular space was central to the meaning-making. The Art museum is compared to some kind of “theatre” (Adams, and. as cited by Duncan, 1995), where the setting of the museum traditionally creates the (unconscious) dramatis personae who somehow follow the enactment played by the museum spatial setting.

In this case study, two paired users (via a code) engaged in role-play where one (the Controller) chose messages that prompted some actions for the other (the Avatar) to perform. The Avatar could freely choose not to engage in the cues, however the experience of interacting unusually with the artwork and interpersonally made the users reframe the museum space and challenged the notion of keeping a more conservative behavior in the CH context.

6.4.3 Free Exploration

From the user’s perspective, a playful interaction with the museum’s space was somewhat different from the one directed by the exhibition’s design, the curator’s intention, and even the lighting, which resembles that of a “ritual” (Duncan,1995). In his view the ritual performance at the museum means “following a prescribed route, recalling a narrative or engaging into some kind of structured experience that relates to the history or meaning of the site (or to some object on the site)”, additionally, he refers to the term “ritual” as something empty of subjectivity, a routine. Because of Interpersonalisation, the interaction with the museum’s space followed new unwritten rules, handed over to the users themselves who were free to explore and wander, without following a specific purpose (as otherwise happens with in-app audio guides) but rather following their subjectivity.

6.4.4 Behavioural changes

Related to the free exploration enabled by interactive technology is the subsequent behavioral change that happens during the museum experience. In one interesting observational study by ethnographers Veron and Lavasseur (1983), visitors’ behavior was compared to animals to derive the “style” of visitors. They identified the visitor-ant who follows a linear path and visits the exhibition; the visitor-fish who moves in a circle and observes the overall exhibition from the center of the room; the visitor-butterfly who does not follow any path but compared to the ant, only visits part of the exhibition and lastly the visitor-grasshopper who pauses at some very specific parts of the exhibitions and ignores the rest. This classification helped in an early study of user models for an ANN (artificial neural network unsupervised ML) and many other works attempted to validate the classification empirically. Although human behavior is complex and hard to encapsulate into predictive models and it’s beyond the scope of this thesis to do so, behavior is shaped by the physicality of the space itself as the community accesses it and experiences it via interactive technologies. The museum environment is pervaded by technologies that give it its experiential attribute that interrelates with the social context and individual activities (Dunlap, et al., 2002). In regards to the



technologies embedded in the environment, according to Bently et al. (1985), one of its qualities is personalization, ie. The user's participation and sense of personalizing the environment.

The case study demonstrated how behavioral changes related to new proxemics happen within traditional museum spaces when subtext or meanings between the lines are introduced between users and art objects and when the user is given the choice of interacting with the space according to their subjectivity.

6.5 Which effects do the new user experience have on the user within their social context?

To answer point b) as stated in the Methodology section (chapter 5), we analyzed Interpersonalisation in each of the case studies to define their effects on the user experience in a broader context.

6.5.1 One-minute experience: new interpretations by giving users their curatorial voice

Traditionally, the role of the curator entailed choosing which objects to display, highlighting specific factual information, and imposing a general intention on the exhibition objects and the ways that users could observe and manipulate them. To enable understanding through observation or reading was not enough for the user to create meaning (Veverka, 2005). Thanks to technology applications such as Interpersonalisation, the user experience was enhanced and enriched by new ways in which they could interpret and re-signify the objects. The users could now choose which objects to consider, and how to connect them to their background and experiences. Through Interpersonalisation, the user discovered and created a new narrative for the objects, as they were allowed to write and share short texts to attach to them. Those texts, so short they could be written in one minute, sparked new interest in the object and evoked powerful memories and social connections. The annotations became something intimate and deeply personal, the foreign museum objects became part of the user's daily life in ways that could not be simply predicted by tracking algorithms. The users (including socially underrepresented ones) were in charge of their exhibition which could be altered in time, according to changing contexts.

6.5.2 The GIFT: Recounting and appropriation

The social significance of visiting the museum in groups has been long overlooked, however with the hyper-connectedness of social media, users had the illusion that sharing and posting selfies and 'liking' museum posts would bridge the gap among their peers (Harper et al., Eds., 2008). These practices prove particularly detrimental as they tend to associate the museum experience as something purposefully commercial or entertaining. Thanks to Interpersonalisation, however, new user experiences could be designed to support more meaningful practices, such as gifting, one of the most ancient staples of social ties (Davies et al., 2010).

Through Interpersonalisation, the user's experience changed twofold: the user was led to think differently about the museum's objects in a process called "appropriation" (Blythe et al., 2005), ie. when the user found in the object a sense of



belonging and was able to explore the space in ways that were no longer bound to the exhibition's logics. The user was also led to think about someone else's preferences, so they saw the objects through the other's eyes while they looked for something especially relevant to give. The control and agency over which particular object to choose, how to intervene with the object with different media (music, voice message, collage, etc.) lastly increased the emotional connection with the objects and reinforced the process of "recounting"(Blythe et al., 2005), ie. when the user recalled the experience and made sense of it while sharing with the other, creating a relationship that was also beneficial for the museum. The museum was made aware of the objects that were collected and shared between two users or the community thanks to data analytics visualized via a Network graph, called Gift Viz. The visualization helped the museum personnel design similar exhibitions through insights into the most popular collections (<https://www.mixedrealitystorytelling.net/gift-viz/>).



Figure 2. Brighton Museum
Gift Viz



Figure 3. Munch Museum
Gift Viz

Despite the output being simple digital files created by visitors, not different from social media posting, the way that it was shared was different: firstly, the recount and appropriation of the object connected to the receiver was an intimate experience that was not shared massively on Twitter or Facebook. Whether with a physical or digital gift, it was observed that this social habit maintained its character of private yet social practice. Secondly, messages on social media are soon lost in the feeds, reducing the chances of them being remembered, engaged with, or simply spotted. The gift shared via the App was, on the contrary, always in the mind of the receiver, linked to a certain time and space, and retrievable within the App at will.

6.5.3 Never let me go: New connection and social behavior in the museum space



Bell (2002) introduces the idea that one of the main motivations to design exhibitions according to new museological practices is to convey a “transformative experience” for the users. Physical space heightens the user’s awareness of the exhibited objects and creates new behavioral patterns, as spaces become multi-functional and hybrid. Technology permeates spaces in invisible ways and defines the user’s experience even after the visit ends. Thanks to Interpersonalisation, haptic interfaces introduce new ways to interact with objects and elicit meaning, that is connected to a more playful dimension. Play experiences (contrary to gamifying, competitive ones) can be very valuable but are primarily associated with children’s creative engagement with the museum. When correctly applied (Sicart, 2021), though, they even promote critical thinking on the museum as an institution and its objects. The effect of Interpersonalisation, in this case, resided in introducing alternative ways to discover the museum space while changing what was socially acceptable by having the user perform some suggested action. Users commonly follow some predetermined behaviors within CH: they walk from room to room, mindful of their tone of voice, their steps, and any cause of disturbance for others, they do not engage too much in conversations even when they are accompanied, they tend to listen to the individual audio tour or visited tour without further interaction with the objects.

As mentioned above, gamification and competitiveness are devoid of the experience of the social and introspective aspects that UX designers wish to maintain. In this regard, the interface design that was only available to the Controller’s app featured some interesting categories such as commands (to prompt motion), body (to involve the senses), personal questions (to create a connection to lived experiences), becomings and imaging (to prompt embodiment and abstract thinking).

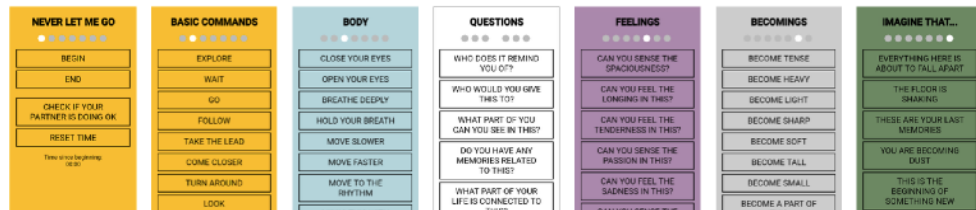


Figure 5. Screenshots from the app. Official project website.

Nevertheless, the whimsical nature of the cues that were received by the Avatar allowed for a wealth of open-ended, unpredictable, and ambiguous experiences. These were the practices by which new social behavior materialized in CH.



6.5.4 Relationships table

In this section, we presented a summary of the case studies and their main contribution to the user’s experience dimensions considered.

Table 1

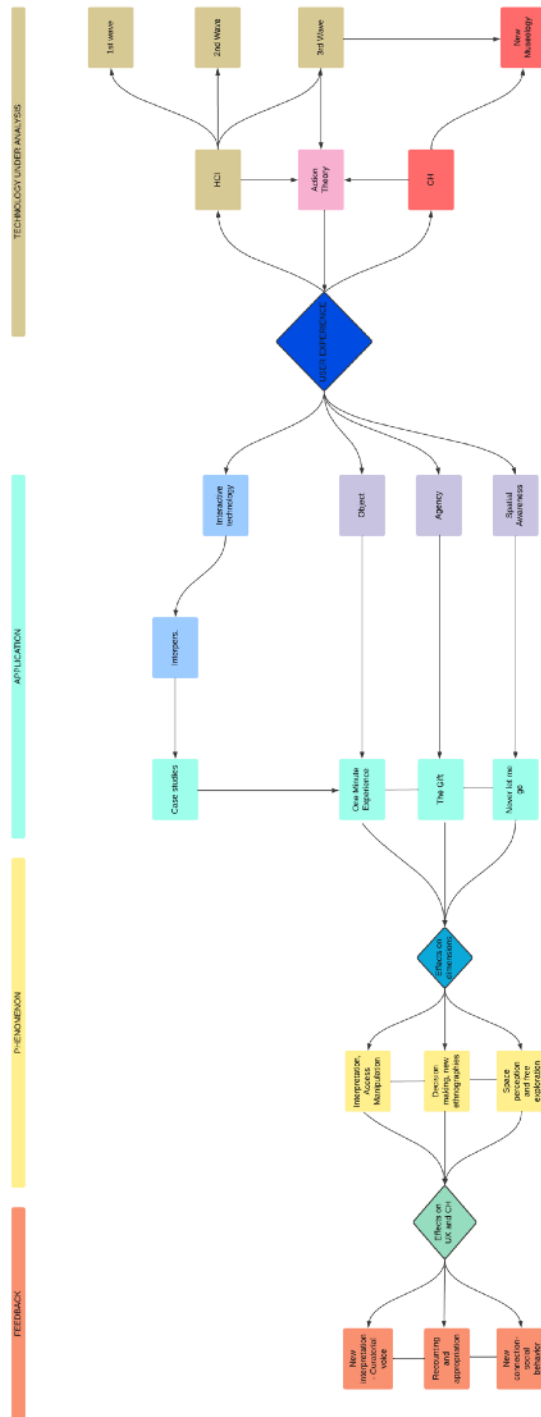
	UX Dimensions				
	Object	Agency	Space	Altered dimensions	Effects on UX
Case 1 “1-minute experience”	Story, cultural context, intimacy	Writing stories based on own interpretation	New use and exploration	Interpretation, access, manipulation	New interpretation - curatorial voice
Case 2 “The Gift Project”	Deeply emotional connection, meaningful social practices	Creating new media, deciding to keep private	Discovering via the other’s eyes filter	Decision-making and new ethnographies	Recounting and appropriation
Case 3 “Never let me go”	Playful interaction with objects	Role-play, open-ended scenarios	New proxemics and use	Space perception and free exploration	New connection and social behaviour

Ways and effects of Interpersonalisation in UX dimensions in the analysed case studies



6.5.5 Concept map

Conceptualization of this research work. Own design. August-December 2022.





6.6 Additional ethical considerations for future design experiences

The analysis presented in these case studies touched upon 3 main effects of technology on the user's experience in CH. The analysis method clarified that it would provide a general overview of Interpersonalisation applications in 3 case studies, concerning the user experience and the social context.

Although digital technology might be seen as a vast area of development in learning and cognition applied to CH and other fields, it is made of many tools and it abides by many rules such as those of the tools themselves and the museum's codes of practice. As tools are freely available or custom-created by commercial brands for museums, ethical issues around the museum's responsibility and accountability for capturing, using, storage, and dismissal of users' data become central (Murphy et al., 2020). As technology has got the potential to enhance the individual user's experience and solve issues already rooted in the museum's institution, it is necessary to consider its effects on society as a whole, and critically rethink the role of the museums as a mediator between society and culture as it makes use of interactive technologies.

6.6.1 Marketing of CH

Marketing processes are integrated into CH as this field is part of a global industry. Technological progress has increased the toolset available to marketing processes to "plan, promote and distribute ideas and services" (Dulskis, 2008) to create offers and demand between users (or customers) and museums (or companies). To create the offer around CH collections and predict the emergence of needs and expectations, data must be consolidated and analyzed around customers' profiles, preferences, and cultural, social, and spending habits. Once "cultural analytics" (Manovich, 2020) is captured and analyzed, collections as products can be crafted, and connections via social networks, ads, and sponsors established to create awareness in the customers. Visibility and searchability of the museum product, as some of the affordances of the new cultural network configure interactions amongst users (dana boyd, 2010), however, not exactly result in stronger intercultural relationships.

This emphasis on quantification and measurement practices downplays the transparency around real user feedback, experience, and the integrity of collection data (Schradi, 2011). Cultural Heritage as a whole becomes a byproduct of marketing processes, as [bits] do not only alter the flow of information but the architecture of everyday life (Mitchell, 1995). To minimize the negative consequences of analytics within CH's marketing strategy, it is important to employ technology as a tool of co-exploration to serve and make the user's experience more meaningful (or even, "constructively disruptive", Parry 2007), rather than as an instrument of co-exploitation to gain profit and popularity.



6.6.2 Anyone can be a curator

According to Not and Petrelli (2019), interactive technologies aid in creating a scenario in which both the physical and digital aspects merge. One of the downsides of Interpersonalisation is that it promotes an environment in which the user can be their curator, irrespective of any external factor or agent. The user designs their method for spatial exploration, creates their metatext and interpretation for the museum objects, and finds new ways of social sharing.

While these possibilities come about as liberating and empowering for any user, technology should not replace cultural heritage practitioners (CHP, such as designers, curators, collection managers, etc.), or more uncontrollable circumstances could emerge, for example, the new inter-personalized museum visit could be trivialized and transformed into a “scavenger hunt”, a game in which the object and the critical look on the artworks might be discarded in favor of some pastime activity. The role of technology should be that of support and vehicle to promote user’s active visiting, create a deeper connection to the object, enable creativity and give agency in an easy-to-use and enjoyable environment. Just as the user must have control over a CHP pre-defined yet rich environment, technology applications should be able to interpret the context of the user’s interaction with a system and adapt to it dynamically. Per McKeown (1985) new curatorial practices supported by technology can be developed and adapted by changing elements of the Experience Schema (narrative, appliance, device, interaction script) to create unlimited and scalable user experiences.

6.6.3 Biased meanings and memory

Per Murphy et al. (2020), algorithmic biases are present at each stage of the workflow when working with interactive technology. Paradoxically, quality assurance made by humans (who themselves are biased) should ensure that data is unbiased before designing applications that will be available to visitors. It is then safe to assume that algorithms potentially amplify human biases, introducing their own, which are generated by wrong data collection and coding. In the CH context, this impacts users’ misrepresentation of objects’ erroneous categorization and labeling, and ultimately public awareness, knowledge building, and engagement. In some applications using neural network models and deep learning, the inner mechanisms of the algorithms become undecipherable (Kuang, 2019), and the scale of application is so extensive that it affects decisions on a systemic level. To provide an example, according to an article published on CIAT (Inter-American Centre of Tax administrations, www.ciat.org) a judicial ruling of the Court of Bologna has established that an algorithm for a popular European food delivery application classifies and offers shifts to its workers in a discriminatory way: the workers that are considered more reliable by the calculation have the lowest number of cancellations of their booked shifts and are offered more bookings and thus chances to increase their gains. Technology does not take into account the nature of the cancellations, such as emergencies or sickness therefore applies an unfair treatment in providing less work for those riders who had serious reasons to cancel.

In the CH context, image recognition can detect artwork features and categorize immense public datasets for learning and researching purposes. While this



possibility has propelled search engine capabilities to a whole new level of specificity and speed, it has also undermined the quality of information made available to the public. One app called “Mereasy” (www.mereasy.com), a combination of the last name “Merisi” (better known as Caravaggio), and the English word “easy” uses art image recognition to identify any artwork in museums in public spaces on the go or using already stored files without, quoting the official website “needing those bulky and sometimes incomprehensible guides that weigh down your holidays, just tap, snap and learn”. For testing, having tried to upload an existing building around my whereabouts, the app returned the result of a similar manor house, but no recognition of that specific building.

For how advanced in its multi-layer detection, the algorithm is not able to critically interpret the artwork or museum object and cannot, therefore, replace the judgment call made by users that connect the object to their context or the overall cultural and historical events. In the case of objects that have a connection to memory, the automation brought by technology is also particularly concerning. For example, in a recent controversial case, the handwriting analysis of the Great Isaiah Scroll, one of 900 ancient Hebrew texts that were found in caves by Bedouin nomads in the late 1940s were believed to be copied from the Book of Isaiah by a single scribe because of an apparent consistent style to the naked eye. A complex technological application has given researchers the ultimate confirmation of the identity of two scribes performing the work (Popović, et al., 2021). Despite this extraordinary development, many issues arose, such as the one related to the access and ownership of these ancient texts, as also due to this discovery, digitized content was interpreted as pro or anti-Judaism (Schuller, 2020).

From the CH perspective, interactive technology for digitization requires an immeasurable amount of funding, manual work, and digital space which inevitably leads to poor decisions such as selecting only some of the objects in a collection and choosing the most convenient storage provider. The issues of public accessibility, data management, and preservation of digital records are at a crossroads of different disciplines and interests (including very profitable ones). The reliability and authenticity of memory (Duranti, 1995) society, history, and artifacts are at stake and risk being equal to a commercial commodity (Moreno et al., 2014), something that can be constructed and cannot be verified or trusted.

To overcome these ethical issues and inform better user experience design, technology applications must be regulated and stakeholders’ accountability clarified. Quality assurance processes must be designed and implemented to mitigate biases and the museum’s vision and service to the public good should not be compromised by more advantageous business conditions. Similarly, the community should be involved as their presence plays a fundamental role in the inclusiveness and fairness of archival, data management, and preservation practices as well as in the participatory design of user experiences connected to memory and beyond.



7. Discussion

In this chapter, we discuss about the purpose and research questions of this thesis to clarify whether they were achieved and answered and if so, how. Further, we define whether findings can be generalized in regards to the Theoretical framework, and how this study can contribute to future research across the fields of HCI, Museology, and Interpersonalisation.

The purpose of this thesis was to observe the changes in UX dimensions throughout the user experience in museums, to assess the impact of Interpersonalisation in the museum context and suggest future design practices, and to identify the effects of the new user experience in the social context.

The UX dimensions considered were those of object, agency, and space, derived by the compositional threads of the experience, which relate to the broadest research field of HCI and in particular the Activity Theory. As per the theoretical framework, the activity theory explains how the micro-level interaction of users in a socially shared environment is the vehicle to create new learning and meaning around an object in its contextualized space and event. The museum context as the set of complex interrelations amongst users mutated its role of mediator between culture and society, as informed via the changes in its museological practices over time. Interpersonalisation was considered a socio-technological phenomenon that affects the user experience in the context considered and beyond it, leading us to reflect on the risks and benefits for future design implementations in CH.

To support the main Research question (RQ1) about how the UX dimensions changed in CH, we adopted 2 sub-questions and analyzed 3 specific case studies of Interpersonalisation applied to the museum context, of which we analyzed the Aim, some Design aspects, and the changes to specific concepts.

We answered sub-question *a) How does Interpersonalisation alter the user experience across these dimensions and what could this change suggest for future design practices?* by identifying each dimension as predominant for each case study.

In terms of object, we considered One Minute Experience. The change happened at the object level in the Access, Interpretation, and Manipulation when the interactive technology introduced the possibility of co-interpreting and co-editing artwork metatext according to contextual data. Observing these changes, the suggestion for new design decisions would be to seek the collaboration of the community in the collection and exhibition design and to map out their emotional response to it.

In terms of agency, we considered The GIFT App. The change happened at the agency level in the decision-making process and the creation of New Ethnographies when Interpersonalisation allowed users to make a subjective decision on whom and how to interact, creating new objects. Observing these, changes, the suggestion for new design decisions would be to take into consideration how cultural norms might affect the experience of gifting and the control the users were granted on it, to



eventually question, revisit and create new social practices supported by Interpersonalisation.

In terms of spatial awareness, we considered Never let me go. The change happened at the space level in the enablement of Free Exploration and the possibility of Behavioural changes when Interpersonalisation added a new layer of meaning to the space and object. Observing these changes, the suggestion for new design decisions would be to allow users to let go of the traditional museum visiting pattern and experiment with new ways of exploring and acting using the new proxemics created by interactive technologies embedded in the space.

We answered sub-question *b) Which effects do the new user experience have on the user within their social context?* by indicating in each case study analyzed the main contribution to the shared experience from a wider perspective, that is, the social one.

The One minute experience case showed how through this new user experience, new narratives and re-signification about the object could be made, empowering all users collectively including underrepresented ones to be critical and in charge of the artwork, according to their voice.

The GIFT APP case showed how through this new user experience, a new sense of evocation of the object and belonging to their selves and the social dimension emerged. The users found new ways to create sharing practices in a meaningful and intimate way through the processes of appropriation and recounting, that eluded the senseless, pastime posting on social media.

The Never Let me go case showed how through this new user experience, haptic interfaces could elicit meanings for the object which are approached and experimented with in a more direct, playful, and intuitive way. Critical thinking arises from play if applied correctly within an educational design purpose.

As mentioned in the research method chapter, non-randomized use cases were employed to highlight specific aspects of the user experience that changed via the implementation of Interpersonalisation in the museum context. The findings, therefore, are contextually relevant to those specific case studies and cannot be generalized to any museum, any technology application, or user experience design. User experience design, even for a group use case, remains a discipline that studies in detail a micro-interaction, for a single user or a group of users, each with a personal story. Interpersonalisation brings together two users who are interrelated in a certain context. The museum, is the backdrop of these events, with all the complexities of its practices and its role as an institution. The museum's history and vision, its policies regarding the use of interactive technologies, and the implementation of these in UX design are all variables that talk us out from adopting a generic textbook approach or a toolkit to copy-cut to similar circumstances. Such generalization would lead designers, scientists, and museum professionals back to the origins of the issue: the adoption of unquestionable rules (much like early HCI calculations) to fit the content to its form, to exclude users from participation, to create less intuitive and less meaningful museum experiences, to stop reviewing the museum role in society. Although the principles of UX



theories and Interpersonalisation disallow the adoption of general usage without taking into account specific contexts of time and space, we can extend the findings about ethical concerns that might be applied in any museum context.

Firstly, we live in a reality where marketing has infiltrated every industry, including cultural heritage and the museum industry. Everything around the user's habits can be recollected and analyzed to implement selling and advertising strategies aimed at creating more engagement and more profit. It can be generally argued that technology should be applied as a tool of co-exploration rather than co-exploitation.

Secondly, the museum visit as intervened by Interpersonalisation technology might become a scavenger hunt, a game to pass time. We can therefore establish that the role of technology should be promoting a deeper visitor's relationship to the object, the space, and other users in a creative and meaningful way, rather than a trivialized one.

Lastly, technology can't replace the judgment call on meanings and memory when it is used as a tool of analysis and interpretation. A multi-disciplinary approach should ensure quality mechanisms be in place to define accountability in the implementation of UX design and the community should be involved to ensure the inclusiveness and fairness of museum practices.

In the research gap chapter, we mentioned how there wasn't a single view on how Interpersonalisation applies to and changes the three-dimensional UX, its ethical aspect, and how it changes the perception of the museum when the user takes part in this created UX. This thesis contributed to creating new underlying knowledge across the interconnected disciplines of UX design, Museology, and Interpersonalisation by analyzing real-case scenarios in which these dimensions were more or less present. It also critically uncovered ethical issues that already plague other research fields and might impact these in the future adoption of interactive technologies. It moreover analyzed the phenomenon of Interpersonalisation from a philosophical point of view, following its ongoing development along the temporal and conceptual changes in CH and HCI practices from a multi-dimensional perspective, always correlated to the effect on the user in its individual and social context.



8. Conclusion

This thesis aimed at identifying new ways in which Interpersonalisation alters the user experience (UX) in CH within its dimensions: object, agency, and spatial awareness and the effects that the new user experience has on users within this social context. The application of Interpersonalisation within the museum as a social space was investigated using 3 case studies to reflect on its effects on the user experience and shared social practices, with a critical approach to this application as a phenomenon. The lack of a general theory of design within the museum context has created a fragmented user experience in which Interpersonalisation is applied without further ethical considerations on the museum's and user's contextual factors.

The findings suggested from our case studies did not point us to the establishing a general theory of design, which according to the nature of UX and Interpersonalisation, would be counterintuitive and risky as a practice, but rather provided a preliminary conclusion or understanding of how the possibilities and risks of using these technologies might shape future museum practices and future user experience design that will be considered in their time and space of the application.

It was demonstrated how re-framing the CH institution and the user experience design over time, put the focus from object to user, however, we did not side by either as we considered these two elements to be part of an ever-changing scenario, rather than in opposition. Through the different phases of museological practices, its philosophical underpinning changed the perception of its role and responsibility towards the users and society, and this thesis followed this evolutive process as a means to understanding the museum today and possibly getting a glimpse of tomorrow's.

In the museum of tomorrow, it is suggested that technology should be context-and ethically-aware. It should enrich the user experience of the user, by supporting museum practices and enabling deeper and more meaningful relationships with the space, object, and other users. Moreover, the user experience design should be made inclusive and participative, and make use of applications by using thorough research methods to investigate its limitations and affordances. The role of the museum within the broader society should not regress to that of a controller that dictates the truth about the object or a narrative, but it should not blindly sell out to profitable marketing strategies around interactive technologies. The museum should ensure accountability and governance when adopting interactive technologies and should adapt dynamically and consciously to the new forms of the user experience.





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