Project no. 727040

GIFT
Meaningful Personalization of Hybrid Virtual Museum Experiences Through Gifting and Appropriation

Horizon 2020

SC6-CULT-COOP-2016-2017

CULT-COOP-08-2016
Virtual museums and social platform on European digital heritage, memory, identity and cultural interaction.

Start date: 1 January 2017. Duration: 36 months

D5.2
Final Report: Life-cycle Analysis

Due date: Due date: 30 December 2019

Actual submission date: 16 December 2019

Number of pages: 24

Lead beneficiary: Uppsala University

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Project Consortium

Beneficiary no.	Beneficiary name	Short name
1 (Coordinator)	IT University of Copenhagen	ITU
2	Blast Theory	Blast Theory
3	Next Game	NextGame
4	University of Nottingham	UoN
5	Uppsala University	UU
6	Europeana Foundation	EF
7	Culture24	C24

Dissemination Level

PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	
EU-RES	Classified Information: RESTREINT UE (Commission Decision 2005/444/EC)	
EU-CON	Classified Information: CONFIDENTIEL UE (Commission Decision 2005/444/EC)	
EU-SEC	Classified Information: SECRET UE (Commission Decision 2005/444/EC)	

Type

R	Document, report	x
DEM	Demonstrator, pilot, prototype	
DEC	Websites, patent filling, videos, etc.	
O	Other	
ETHICS	Ethics requirement	

D5.2 Final Report: Life-cycle Analysis

1. Introduction

This document reports on the primary activity of Work Package 5 during the final half of the GIFT project, up to and including December 2019. This period has included the furthering of the development and analysis of theory on meaningful interpersonal experiences in museums, and the finalization of methods and guidelines that make sure that the theoretical understanding can be used in design practice. It has also included work on life-cycle assessment of hybrid experiences, through case studies of implemented hybrid experiences in different museums. The work has been led by Uppsala University, with contributions also from ITU and University of Nottingham.

To summarise the previous work of WP5, we have been focusing on *meaningful interpersonal experiences* in museums. Paying attention to social, shared experiences has been central to the approach taken in GIFT theory development. We have further studied different stakeholders in order to arrive at actionable design recommendations, for designers and academics.

This report is structured into three different sections. The first section presents our approach to design knowledge and making it actionable in practice, summarised as the *guidelines* in the work package plan. As will be discussed further below, given the complex and nuanced type of design knowledge that hybrid experiences require, the GIFT project has chosen to focus much more extensively on developing and recommending processes and methods of design than on prescriptive guidelines. The work on guidelines in WP5 is also closely aligned with the GIFT framework (WP4). In this report, we thus focus on the specific contributions from WP5 to the GIFT framework.

The second section is devoted to the life-cycle analysis activity, and reflects on the processes and issues that arise from maintaining hybrid museum experiences over time. It builds on interview studies with two different museums, Museum of Yugoslavia and the DAnish Architectural Centre.

The final part of the report is a brief summary of publications coming out of the work. The WP5 results have been extensively published, or submitted for publication and under review. An important outcome is also the GIFT book manuscript, which is a separate deliverable from WP5. This report is for this reason kept short, summarising key publications. GIFT publications are available as open access or 'green' access and available to the general public.

2. Guidelines and sensitizing concepts

The design knowledge in GIFT has been made accessible in the form of a joint design and tools framework, available at gifting.digital. This section first presents a meta-theoretical reflection on what such a framework *is*, in terms of what kind of design knowledge it communicates to academics and designers. The second part focuses on the WP5 contribution to the framework.

2.1 Designerly Knowledge: Concepts, Guidelines and Methods

Within design research, there is a long-standing discussion of what kind of knowledge it produces, and can be expected to produce. The problem arises from the observation lucidly expressed already by Simon: that design is not about what is, but about what could, or ought to, be. Researchers have long recognised that it is notoriously hard to generalise design knowledge, in that each design project serves to solve a specific problem or achieve a specific goal. Gaver (Gaver, 2012) argues that design knowledge is never generic, unlikely to be falsifiable (as it builds on the fact that

something was constructed), but rather is inspirational and generative of new designs. Design knowledge also tends to diverge rather than converge, as new knowledge is added, as the strife of design is to constantly look for new opportunities and expansions to what is considered 'possible'.

The GIFT project builds on a recent trend in Human Computer Interaction research, Research through Design (RtD) (Zimmerman, Forlizzi, & Evenson, 2007), which foregrounds the competence built through and in the design process as such. This methodological stance is philosophically grounded in pragmatism (Peirce, 1905), which considers all meaning-making, including theoretical concepts, as grounded in the lived experience. For pragmatists, theory is not an abstraction of general truth, but a tool to be used in action, and constructed and re-constructed through action. RtD emphasises the practical engagement in design as a research activity, looking upon processes of reflection and documentation as central. In RtD, knowledge is often derived 'bottom-up' through reflecting on multiple design experiences or designed artefacts. The work within WP3 in GIFT has been practitioner-led and WP2 work artist-led. The latter is an approach to RtD that taps into the artistic sensibilities of designers to capture novel design opportunities within a domain or a particular technological setup, and the analytical capacity of academics to study and conceptualise the resulting installations and performances.

From a pragmatic perspective, knowledge must be actionable, while the *form* that this knowledge takes is of immediate concern. In RtD, the very design exemplars, the 'ultimate particulars' (Stolterman, 2008), are considered a form of design knowledge in themselves. In Gift, this is reflected through the importance placed on the concrete design examples of hybrid museum experiences developed in WP2 and WP3. However, while skilled designers look to other designs for information and inspiration, they also need concepts to talk about them; ways to inspect and reflect on the exemplars. Löwgren expresses such conceptual tools as design knowledge at the intermediate level. Actionable knowledge is not so abstract that it applies generally (and the precise limitations of such knowledge are often unarticulated), but still sufficiently abstract to express properties of multiple designs. Höök and Löwgren (Höök & Löwgren, 2012) and Dalsgaard and Dindler (Dalsgaard & Dindler, 2014) suggest that in order to establish academic rigor in RtD, concepts must at the same time be grounded in practical design experience *and* in abstract theory, typically theories brought in from neighbouring fields. It is also common for RtD research to develop process tools, modes of working with design, as a concrete result.

GIFT has primarily taken an RtD approach to what is considered a knowledge contribution. Löwgren considers a host of conceptual tools possible, including guidelines, design patterns, more openly scoped concepts, and processes. In GIFT, the results have primarily been articulated as process tools. In WP4, work on articulating goals for museum digitization projects has elicited a host of process tools for setting goals for a design project, and ideating ideas for solutions. Together with tools for rapid prototyping and evaluation, the GIFT results constitute a framework that is able to scaffold design processes for hybrid museum experiences.

Within WP5, work has focussed on grounding this work in 'high theory', finding concepts and ways of incorporating concepts in design that allow design to be directly informed by the social sciences and museum studies. This effort has included work on articulating particular concepts and on developing process tools focussed on how designers can become sensitised to complex and nuanced concepts from the social sciences. It has also resulted in a number of publications on both tools and concepts.

Sensitising Concepts

The notion of sensitizing concepts originates in the well-known epistemic critique of positivist approaches to sociology originally articulated by Blumer (Blumer, 1954). Blumer argued that for concepts developed in sociological theory through qualitative research, it makes little sense to construct formal definitions. Sensitizing concepts, Blumer argues, merely suggest directions along which to look. Their role is to sensitize the researchers to phenomena that manifest over and over again, but every time in a unique way. Blumer's conceptualisation has been very influential for qualitative method development in the social sciences (Hammersley, 2018).

Sensitizing concepts can be conducive to design or be "developed with the intention of improving the practice of design" (Zimmerman et al., 2007). The kind of 'intermediate level concepts' suggested by Höök and Löwgren (2012) and Dalsgaard and Dindler (2014) allow for the articulation of desirable features and solution options in a design process. Examples from previous research include 'pliability' as a useful experiential feature (Löwgren, 2009), 'trajectories' as a way of analysing and designing interactive narratives (Benford & Giannachi, 2008), and 'reflective practicum' as analytical frameworks for design for reflection.

In WP5, we have explored if it would be possible to also draw on more complex theories from the social sciences and museology. The kinds of open and complex theories found in social science and museology are not easily communicated. This does not mean that they cannot be useful for design; Zimmerman et al (Zimmerman, Stolterman, & Forlizzi, 2010) argue that more broadly scoped "guiding philosophies, which take the form of sensitizing concepts" can work to help direct designers and researchers in solving design problems. Bardzell et al (Bardzell, Bardzell, & Hansen, 2015) mirror this perspective, arguing that "The role of the work of art or RtD is not to present us with new facts about the world, but rather to enrich our capabilities of perceiving and interpreting the world". In the work conducted for WP5, sensitizing concepts have been used in order to make complex theories available to designer teams as well as draw out actionable design lessons from empirical research.

2.2. Interpersonal Museum Experiences

Background

Museums are social spaces, were visitior's social interactions sometimes overshadow the content and context of exhibitions. As previously reported in the mid-term report D5.1, we performed a study of visitor's social interaction and meaning making in a museum, with the goal of providing actionable design guidelines to account for social interactions in the museum space. Focus was placed on young visitors and groups of friends. We approached this through an ethnographic approach, combining observations and extended focus group interviews. In this study, no technology was introduced but a standard museum space used.

The results highlighted how museums are social spaces, made so by active participant visitors. Processes of social meaning making were explored and results showed how visitors support a social framing of the experience, draw on objects in social identity making, share knowledge, and the importance of embodiment. From this we have argued that for designing *interpersonal* rather than *personalised* experiences, see D5.1 for more details on this study.

Progression

Continued work on this has included the drawing out of four design challenges. These design challenges for hybrid museum experience were drawn out from the empirical material gathered in this study. The challenges are: supporting collective identity making, supporting playful sociability, support collective information sharing and acquisition, and supporting social movement.

Design guidelines

1: Supporting collective identity making. The social and cultural context in which museum objects make sense is stripped away or at least reduced in the museum setting. Here digital solutions offer potential to further processes of (social) meaning-making. Digital solutions could offer further opportunities for this social reinterpretation. Supporting interpersonalisation, collective identity-making, and co-creation could assist visitors in making sense of museum artefacts. Designed solutions need to take into account the power of collective meaning-making, not only individual.

2: Supporting playful sociability. There is an inherent conflict between having fun, play, and the serious topics many museums deal with. In western societies and in particular those from a Protestant tradition, ideals about work and seriousness have relegated play and fun to the realm of children (Grimes and Feenberg 2009). Play and fun are not seen as appropriate matters for adults. At the same time, we know that fun and play can be conducive to learning, and indeed that even very serious topics can be played with (Flanagan 2009). Any digital design solution wanting to create meaningful interpersonal experiences would do well to consider such social release mechanisms, perhaps in particular when dealing with serious topics.

3. Tensions between information sources. The tension between the museum as an official and static source of information and the visitors' more immediate and present sharing of information presents designers with interesting opportunities. The visit and artefacts of the museum trigger an informal exchange of information between visitors where the museum has little control; how it takes place, where, or what is exchanged. Digital technology offers ample opportunity for tailored and extended information.

4 Structuring movement in space to support social interaction. Experiences aimed at supporting meaningful interpersonal experiences should consider the movement in space and the embodied nature of interaction. Embodiment in our context means taking into account the role of the physical body in social interaction. That even if not talking, visitors interact with each other through orienting themselves physically in space. While embodiment is an increasingly important theme in HCI (Dourish, 2004), we emphasises embodiment's importance for the social and interpersonal during museum visits. Visitors draw on their bodily resources in the processes of meaning-making that occur during a museum visit. Various types of trace technologies could offer visitors the chance to spread out yet feel like they remain connected to the group. One could also imagine a system which supports asynchronous communication and the ability to locate group members. We should try to accommodate for the social, rather than offer alternatives to it.

Concluding remarks

This work was conducted by Lina Eklund at Uppsala University. The study and the concluding guidelines have been submitted to *International Journal of Human-Computer Interaction* and is included in appendix 2.

2.3 Gifting and Inalienability

Background

Already in the project proposal for GIFT, Gifting was identified as a meaningful human practice that can serve to support meaningful hybrid experiences in museums. The gifting tool developed, trialled and delivered in WP2 builds directly on previous work by Fosh et al. (Fosh, Benford, Reeves, & Koleva, 2014) that showed how meaningful reflection emerged through gifting personal interpretations in a museum context.

Progression

The understanding of gifting as an interpersonal practice is increasingly used as a framework for understanding digital exchanges. However, most digital exchange practices do not bear the significance that we would expect from a gifting exchange and would better be described as *sharing* practices. Within WP5, the focus has been placed on furthering our understanding of when digitally exchanged resources become interpersonally meaningful in a way that allows them to be experienced as gifts.

This has been a stumbling block in design work that aim to create meaningful digital exchange experiences. In particular, there is a clear difference in how sharing and gifting are experienced, but in design practices they are very often muddled. This is particularly true in digital or hybrid situations, where the giver loses nothing in the exchange, often not even financially. Not only have designers sometimes failed to create designs that are accepted as meaningful gifting, but it has been difficult to even express what the problem is. Designers lack words to express what is the desired property of digital gifts, and analytical tools to evaluate their designs from this perspective. This is a classic case of a situation where design knowledge in the form of strong concepts (Höök & Löwgren, 2012) can help designers. In this case, we were looking for ways to tap into abstract theories on gifting that could directly inform design in the form of bridging concepts (Dalsgaard & Dindler, 2014).

Gifting practices have been extensively researched in both sociology and anthropology, and more recently in market research. Tapping into this required an extensive literature review. While most theoretical work on gifting has emphasised the way in which some kind of reciprocity is expected, this concept did not help to distinguish sharing from gifting in a digital context. However, the concept of inalienability emerged as a candidate. Annette B. Weiner (Weiner, 1992) argues that the value of a gift partially resides in how the receiver perceives it as connected to the giver through the act of giving. 'Inalienability' refers to the fact that thoughts of the giver are inextricably linked to thoughts or use of the gift, at least while memories of the giver and gift experience persist. A gift's inalienability lies in its power to evoke memories and emotions, or otherwise exert symbolic value. While the bulk of Weiner's research centres on cultural artifacts and the groups or individuals that hold them, she allows that the basic concept also applies to more commercial gift-giving practices.

The concept of inalienability helps us understand both the difference between sharing and gifting, and why it is important to differentiate the two. Thus a digital or hybrid transaction in which the giver loses nothing and spends no money - as in online sharing - can be understood as a gift when what is 'shared' is mentally and emotionally inalienable from its giver. Moreover, inalienability is a matter of degree: a gift's inalienability can be as weak as a vague memory of having received it from some cousin or other at an unimportant holiday gift exchange event, or as strong as a deceased loved one's antique wedding ring. Multiple example designs were analysed from this perspective, leading to the set of guidelines presented below.

Design guidelines

In order to understand what gifting entails and how designers can design for and alter the personal and social impact of gifts we have contributed with the concept of inalienability and propose the following three strategies, cited from (Spence 2019).

1: Differentiate between sharing and gifting. Gifting requires inalienability between the gift and its giver. In other words, the gift is somehow tied to its giver in the receiver's mind.

2: Personalise the gifted object in terms of the giver. It is important that the gift is tailored to fit the relationship between the gifter and the person who receives the gift, in other words to reflect their relationship. DIgital media objects have the opportunity to be tailored, which suits this strategy well.

3: Highlight the effort the giver must go to in order to create, acquire, and/or give the gift. For inalienability to be visible, the receiver must understand at least who gave it to them, and ideally with some sense of the effort that the giver went to in creating it, just for that receiver.

Concluding remarks

This work has been conducted by J. Spence at University of Nottingham. A full-length article on the topic of inalienability was presented at CHI 2019 (Spence, 2019). The text above summarises the article.

2.4 Sensitising through LARP

Background

This is one of the method contributions in GIFT.

In D5.1 we reported on our work creating role-play scenarios as a way to sensitize heterogeneous designer teams to complex theoretical concepts related to museology as social and cultural phenomena. These have now gone through several iterations and testing. We here discuss the design requirements on such scenarios and the importance of connecting their execution closely to the context of the design and the current stage of the design process. We have chosen to explore role-play as a way to sensitize heterogeneous designer teams to theories from the social sciences. We had two goals with the work. First, we wanted to allow for an embodied learning experience related to nuanced concepts that could further the aims of the project team collective. Second, we wanted to foster group cohesion in a meaningful way.

Progression

Since the mid-way report, the scenarios has further developed and tested. An important design decision was to use *only* scenarios that included some pre-scripted characters. The reluctance of some to engage in role-play has been reported in literature (Strömberg, Pirttilä, & Ikonen, 2004). We speculate that this reluctance may emerge from stripping them of their alibi (Deterding, 2018) to act in uncharacteristic ways. The alibi created through role-playing helped participants in our tests to overcome their performance anxiety, and in contrast with literature we did not encounter any reluctance towards role-play.

Major trials were done to evaluate the scenarios with experts, and towards the end of the project, two of the scenarios (*My Museum* and *The Object*) were run in authentic design projects, at Museum of Belgrade (Serbia) and Jönköping Museum (Sweden). In both cases, the scenarios were run as part of extended workshops focussed on reconceptualising ideas for hybrid experiences, that were not meeting the goals of the respective museums. In addition one scenario, The Gift, has also been run as an educational activity for museum staff at SFMoma, but not in the context of an ongoing design project

During these runs, *The Gift* was abe to instil an understanding of concepts that were not well-understood by the participants, whereas *My Museum* and *The Object* dealt with concepts that were already known to the participants. For the two latter, the concepts were well-understood by the participants, but both still contributed with an emotional and embodied experience that made the theories come alive. They provoked post-experience reflections. We have learned that even when sensitizing scenarios are not presenting radically new knowledge, they seem to make analytical concepts accessible for reflection and for connecting to personal experiences. In Belgrade and Jönköping, the scenarios provided a way to build group cohesion that carried over to the subsequent design exercise.

The experiences also show that the scenarios contributed to group cohesion, and did so in a meaningful way. They do this through creating a joint experience relevant to the project at hand, which seems to make them accessible as boundary objects, in which every participant has their own experience and subsequent meaning-making process, but these are still sufficiently shared for the purposes of referencing and creating joint narratives.

Four scenarios have been developed and integrated into the GIFT framework: *The Gift, The Space Race, My Museum*, and *The Object*. While the scenarios are mostly relevant for the museum domain, some of them can be relevant in other contexts.

Design Guidelines for using Sensitising Scenarios

5. When to use scenarios. Sensitizing scenarios are most useful when there is a need to understand complex and nuanced concepts and theories both intellectually and affectively, and when a shared experience can create a ground for this understanding through discussion and reflection. They are intended to be run with design project teams, and they work particularly well when run right before ideation exercises.

2. Relevance. A good fit between the design project and the chosen scenario is critical for allowing the participants to reconnect the experience to their own design challenge. The fit, and the sense of authenticity, can be heightened by letting participants bring authentic elements into the scenario. *My Museum* takes this into account, by its requirement to be played in an authentic museum context. *The Object* is relatively easy to modify to fit with a specific museum context.

1, Using roles as alibi. Pre-written characters help participants engage in behaviours atypical for each individual, and also to alleviate some of the burden of acting in their professional capacity; i.e. establishing an alibi. This is made easier when roles focus on emotions and attitudes rather than professional functions. All four GIFT scenarios use pre-written roles with scripted relations and emotions, rather than tasks.

3. The importance of a structured debrief. In order to connect to the underlying concepts and theories, the scenarios need to include a highly structured and facilitator-led debrief. While there are several ways to structure a debrief, it should be structured in a way that introduces, explains, and contextualizes the theory in terms of the scenario. However, when run with a design team, we can

expect the re-contextualisation process to continue long after the debrief. Hence it is not necessary to close the discussion fully within the debrief – some questions and reflections can be left for later. All of the GIFT scenarios include scripted debriefs and recommendations for further reading.

4. Heightened energy fostering group cohesion. The way the scenarios foster meaningful group cohesion and create heightened energy in the group can be useful follow-up exercises such as ideation. However, we saw a need to act quickly to capitalize on heightened energy levels, as they fade rapidly during the subsequent reflection and re-connection process.

Concluding remarks

- This work was carried out in collaboration between Uppsala, ITU and University of Nottingham.
- Four scenarios have been delivered as part of the GIFT framework and are available at https://gifting.digital/scenarios/ .
- Practical tips on how to design and run sensitising scenarios are included in the book manuscript, Chapter 'Sensitising Designers to Theory'.
- A full-length article on the Sensitising Scenarios has been accepted for publication at CHI'2020. A draft of the text is included as appendix to this report.

2.5 Resident Theorist

Background

This one of the method contributions from GIFT.

The idea of introducing a resident theorist role was developed in the mid-term report from WP5, as a path towards making more abstract theory accessible and relevant in a research and technology development process. Its purpose is thus similar to that of the sensitising scenarios. However, a resident theorist can cover a much broader scope of theory and be present during a much larger part of the design process. The opportunity to introduce such a role was foreshadowed in (Benford et al., 2013) but has not been developed or tested in their previous research.

A 'resident theorist´ is a functional role within a design team, keeping track of how the team develops their terminology and making sure that team members share a somewhat common understanding of concepts that are critical for the project focus and direction. The RT is tasked with provoking the design team with relevant concepts and theories from the social sciences, to heighten their critical awareness of both misunderstanding and critical gaps in their reasoning.

Progression

Throughout the GIFT project, one person has acted as 'resident theorist', taking on a double role of actively helping out in design workshops and field studies, and doing a self-reflective ethnographic study of what it means to participate in a project in this role. The Resident Theorist intervention is best described as a form of action research. As in all action research, acting as Resident Theorist requires a constant circle of personal experience, action, and reflection on the result of the action (Lewin, 1946) .

Through the GIFT experience, we found two main reasons why the resident theorist would move from observation to intervention. The first type of interventions related to instances where the group

was engaged in discussion, but some terminology was used differently by participants from different backgrounds. An example from GIFT was the recurring concepts of *appropriation*. For interaction designers the concept of appropriation is a largely positive term which relates to the ability of a user to adapt the content and use of a design to fit their own perspective or purpose. Among museum theorists and practitioners, appropriation is however typically discussed with a negative connotation, as the insensitive inclusion of (objects from) other cultures into western-centric exhibits. This is an example of how differences in meaning can be factual, or related to the kinds of values that different participants attached to a word. In this particular case, the word bred misunderstandings at both levels.

The second type of interventions were done to bring tensions to surface. One example related to differences in attitude towards making use of playfulness, where the researchers were much more enthusiastic than museum representatives. The discussion stranded on this difference in priorities. In order to highlight the tension, the RT rearticulated the arguments from both parties to clarify if they were correctly understood, and then rephrased them in reference to museum studies literature. In doing so, the arguments became rephrased using a vocabulary more accessible to the museum participants and through that, enabled a more constructive discussion of the pros and cons of different design options.

Guidelines for Resident Theorists

Be flexible. As characteristic for action research, the method actualizes itself in the field, and adapts to the progress of the project based on the gathered data. We found the Inclusion of the RT role particularly useful in verbalizing expectations and possible sources of conflict, before they had a potentially harmful impact. While this is a likely benefit also in other project, the role of the RT may also develop in a different direction.

Be a part of the team. The Resident Theorist is there to provide help and to contextualize the available information for a group that receptive towards their interventions. The Resident Theorist must be seen as a collaborator and not an external authority. All of the group members must be aware of the role of the Resident Theorist and agree to their presence.

Be there. The role requires in-the-moment feedback on often complicated topics. This means that the resident theorist needs to not only be present at various events, they need to actively participate and try to provide the vocabulary and knowledge that seems most relevant at the time. There is a learning curve to the role.

Concluding remarks

The full process of reflecting and analysing the experience and effect of having a Resident Theorist in place in GIFT will be covered in a forthcoming Ph.D. thesis by Paulina Rajkowska, Uppsala University (est. 2022).

The practical guidelines summarised above are elaborated further in the GIFT book manuscript, chapter 'Sensitising Designers to Theory'.

3. Life-cycle analyses

We here report on what we have chosen to call *life-cycle* studies of hybrid museum designs. The purpose of these studies is to understand a design project from its creation, development, implementation, testing, but also what happens once the project is launched and takes on a life of its own. There are two reasons why this is an important thing to do. Firstly, most evaluations of hybrid experiences are done right after they are installed. At that point of time, they retain a novelty effect and have not been thoroughly integrated in the museum's offer, and evaluations tend to be skewed towards the positive side. Furthermore, the way hybrid museum experiences get integrated and used in the museum can be considered a form of design, done through appropriation and adaptation by both museum staff and visitors. In literature on research through design, this has been labelled design-after-design (Bjögvinsson, Ehn, & Hillgren, 2012).

We were thus interested in the full life-cycle of hybrid design projects, and what can be learned from this holistic type of study for future projects.

3.1 Your stories

"Your Stories" is a hybrid museum experience that was created by the interactive design company NextGame in Belgrade, Serbia. The project was run in collaboration with the National Museum of Serbia that was just recently reopened after 10 years of renovations and collection changes. The core idea behind "Your Stories" was to invite visitors to contribute their own stories to the museum. A public call online resulted in multiple donations of objects that were then 3d scanned and documented by our team. Over 6 months of collaboration time, the museum and NextGame used those items to develop a hybrid installation in which the digital versions of everyday objects of today were paired with the historical objects in the exhibit. Upon purchasing a ticket, every visitor is informed about "Your Stories" as they receive a flyer that describes the process of setting it up, and the map of where the extra items are within the exhibit space. To access the experience, visitors need to download the "artcodes" application and then visit the area in the museum where the artcodes are located (always in close vicinity to museum objects that they, one way or another, can be considered related to).

"Your Stories" is an important case for two reasons. Very often, technology developed in projects similar to GIFT is introduced to the museum for purposes of testing and exploring and then discontinued due to lack of maintenance or resources. In this case, the experience remains available to visitors on a regular basis. Secondly, 'Your Stories' is fairly unique in how it reached out to a general audience during the curation phase, inviting them to contribute with their own objects and stories.

The visitor perspective

Being able to add your personal possession to the museum collection was very appealing to visitors who then volunteered their private time and effort. Visitors who were involved in that part of the project talk fondly about their experience, and continue to stay updated and in touch throughout the process of exhibition design. For regular visitors, bringing the modern stories into the museum helped recontextualize the museum objects, provoking reflection on how they once held similar value to people.

The museum perspective

Representatives from the National Museum of Serbia emphasised how "Your stories" connects to the mission statement of the museum, related to activating their audience and helping people to relate to historical content in new meaningful ways. They further emphasised how this was made possible through the way the exhibit was developed in-house rather than commissioned.

Furthermore, the museum appreciated how "Your stories" allowed the museum to access contemporary material, that could be incorporated in the exhibit. Preserving current events for posteriority is also part of the museum's mission.

Despite the fact that "Your stories" requires very little maintenance, it is not maintenance-free. The 3D content and stories are hosted on the museums own website, which means that it does not require any extra resources to maintain the digital content. However, they way visitors are informed about the exhibit through flyers available in the reception has sometimes rendered the service unavailable. When these run out, someone has to order them anew and put them in their designated spot. This would not always happen -- and in contrast with the physical exhibitions, this exhibition simply becomes unavailable when the information folder is not in place.

Collaboration

The three main actions, collection, curation, and exhibit necessitated constant communication, expectation management and working together. Co-creation polished the raw ideas of all participants into the forms that are acceptable and pleasing for everyone involved. Maintenance of the experience also strongly relies on the continued agreement with the digital company Nextgame who were involved in creating the exhibit and collaborating as closely with the museum to be considered close to an in-house specialist.

Concluding remarks

Our life-cycle analysis of "Your Stories" point to the need for close collaboration between technology and museum specialists, identifying actors involved in the design process, as well as the actions needed for design, development and maintenance.

Another important insight is the role of physical resources in the museum, when the experience is virtual. The fact that an information folder runs out is typically not a big issue. For 'Your Stories' however, this folder was all that enabled access to the exhibition – when the folder ran out, the exhibition was effectively offline.

This study was performed by Paulina Rajkowska and is more extensively reported in the GIFT book manuscript, chapter 4.

3.2 "We Dare You". Playing with substitutional reality at the Danish Architectural centre

The Danish Architectural Centre known as DAC implemented a substitutional reality experience to their permanent exhibit in 2019. This hybrid, playful experience engaged in through a VR headset and physical elements was created by Immersive Stories in an open call to the museum for submissions on a new digital exhibit. The *We dare you* experience won, developed by Ane Skak from Immersive Stories, in collaboration with Khora VR and supported by Realdania.

We dare you is a playful, hybrid, substitutional reality experience where the user is dared to jump out a 3rd story window at the DAC and view the building from outside. The installation is a first in the

permanent exhibition of the museum and has at the time of writing been up for 3 months. It is advertised as:

> *One more step. One more step. We challenge you to an out-of-building experience in virtual reality.*

> *You break through the glass, fall down and land softly like a superhero right in front of the entrance to DAC. Do you dare walk the plank?*

Through interviews with stakeholders such as head of exhibition, head of visitor experience, the project manager, designer, and IT support person, we have explored their perception of the design process, implementation, and day to day running of the experience.

All stakeholders agreed on the difficulty of getting the technology to actually work. For the first 3-month period the exhibit was down at least 50% of the time, as the VR headsets broke and other problems emerged with installing the technology in the space of the museum. The materiality of technology comes to the forefront. Part of the problem was that the technology had not been tested on-site before released for public release, but there was also a mismatch in expectations between the museum representatives and the technology companies, where the former believed that the experience would work flawlessly without maintenance. The upkeep of software and hardware that technology requires in this sort of setting was probably underestimated by all partners.

Results highlight how the different parties also had different opinions on the resulting exhibit. What some stakeholders considered a success was sometimes seen as a failure by others. One museum representative was positive towards the way the exhibit drew more visitors to the museum, whereas another had difficulties understanding how it was relevant for the museum offer. These considered the exhibition a failure as it did not connect to architecture enough, or med any educational goals. While it was appreciated for how fun it was and how many of their visitors that wanted to try it, the museum IT staff complained about how difficult it was to maintain.

Concluding remarks

In this case study, we see how the various stakeholders pulled meaning and purpose in different directions, in how it was considered successful from some perspectives and a failure from others. The various point of views of various stakeholders, emphasises the importance of clarifying the goals of any such project, managing expectations from the start, and of developing the installations in close collaboration,.

Regarding the design outcomes, many of the issues expressed could have been countered through a more deliberate design process, potentially making use of some of the design tools developed within GIFT. In contrast with the previous life-cycle example, *We Dare You* was not developed in-house in close collaboration with the technology provider(s), but rather commissioned to external parties.

Another difference lies in its higher requirements on technical installations. *Your Stories* is available as an app that runs on visitors' own phones and the Museum web server and thus, the requirements on technical installations and maintenance by museum staff are minimised. By contrast "*We Dare You*" required physical installation of fragile technical equipment in the museum space, making the setup brittle for both physical wear and tear and software malfunctions. The issue of daily maintenance *must* be taken into account already in the design phase, for any museum technology that is intended for permanent or semi-permanent installation.

A manuscript on this study is under preparation, to be submitted to ACM Journal on Computing and Cultural Heritage, Special issue on Culture Games.

4. Conclusions

The work in WP5 has not always come to the forefront in everyday activities within GIFT, with its focus on practical collaboration between researchers and stakeholders, in the internal design and development projects in WP2 and WP3 as well as in the action research project in WP4.

However, it is precisely through engaging with this practical work that design-relevant theory can be developed. The continuous interaction with concrete design activities, and the introspective and self-reflective process of GIFT as a whole, has been instrumental in building a consistent perspective on hybrid museum experiences.

While this report has been focussed on the specific activities in WP5, we wish to conclude the report by highlighting that the work package also has been responsible for producing the GIFT book manuscript. The manuscript has been developed in collaboration, by representatives from all work packages, as a way to present a consistent perspective on hybrid museum experiences from the GIFT project as a whole. Together with the GIFT framework and its design and development tools, the book presents a rich and actionable knowledge resource for future development projects in the area of hybrid museum experiences.

4.1 GIFT publications related to WP5

Overall, GIFT has been very successful in disseminating its results both academically and towards a general audience. As many publications are reported upon also in other work packages, we here list only such publications that relate directly to WP5 work.

2020 (Forthcoming)

Anders Sundnes Løvlie and Annika Waern (eds): The Gifted Museum: Book manuscript, reported in a separate deliverable.
Annika Waern, Jocely Spence, Jon Back, Paulina Rajkowska, Anders Sundnes-Løvlie. Sensitizing Scenarios: Sensitizing Designer Teams to Theory.Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems.

2019

Knudsen, L. V., & Olesen, A. R. (2019). Complexities of collaborating: Understanding and managing differences in collaborative design of museum communication. The Routledge Handbook of Museums, Media and Communication, 205–218.

Løvlie, A. S., Benford, S., Spence, J., Wray, T., Mortensen, C. H., Olesen, A., Rogberg, L., Bedwell, B., Darzentas, D., Waern, A. (2019). The GIFT framework: Give visitors the tools to tell their own stories. MW18: Museums and the Web 2019.

Spence, J. (2019). Inalienability: Understanding Digital Gifts. Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, 657:1–657:12. https://doi.org/10.1145/3290605.3300887

2018

Back, J., Bedwell, B., Benford, S., Eklund, L., Løvlie, A. S., Preston, W., Rajkowska, P., Ryding, K., Spence, J., Thorn, E-C., Waern, A., Antoniou, A., Wray, T. (2018). GIFT: Hybrid Museum Experiences through Gifting and Play. In A. Antoniou & M. Wallace (Eds.), Proceedings of the Workshop on Cultural Informatics co-located with the EUROMED International Conference on Digital Heritage 2018 (EUROMED 2018) (Vol. 2235, pp. 31–40). Nicosia, Cyprus: CEUR Workshop Proceedings.

Olesen, A. R., Holdgaard, N., & Laursen, D. (2018). Challenges of practicing digital imaginaires in collaborative museum design. CoDesign, 1–13. https://doi.org/10.1080/15710882.2018.1539109.

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Appendix 1 : Sensitising Scenarios, draft article

Sensitizing Scenarios:
Sensitizing Designer Teams to Theory

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ABSTRACT

Concepts and theories that emerge within the social sciences tend to be nuanced dealing with complex social phenomena. While their relevance to design could be high, it is difficult to make sense of them in design projects, especially when participants have a variety of backgrounds. HCI has yet to develop a rich palette of methods to sensitize designers to relevant theories in a nuanced way.

We report on our experiences with using role-play scenarios as a way to sensitize heterogeneous designer teams to complex theoretical concepts related to museology as social and cultural phenomena. We discuss design requirements on such scenarios, and the importance of connecting their execution closely to the context of the design and the current stage of the design process.

Author Keywords

Sensitizing Concepts; Sensitizing Designers; Role-Play; Social Science Theory;

CSS CONCEPTS

• **Human-centered computing~HCI design and evaluation methods**

INTRODUCTION

Designer teams need to be sensitized to a complex web of issues and design qualities specific to their design context. Within HCI a range of methods have been developed to sensitize designers, e.g. to their target user's needs within the fullest relevant context [8,17,25], to bodily experiences [38,39,43], and to the capabilities and constraints of technology [62]. The notion of sensitizing concepts has gained traction for this purpose, the term adopted from

Blumer's approach to qualitative theory in the social sciences [4]. However, the sensitizing concepts and theories that Blumer is referring to are complex and nuanced in a way that does not lend itself easily to comprehensive articulation, but they are also phenomena that manifest in everyday social interaction between people and in culturally conditioned practices. Qualitative social theory is not just theory, but fundamentally grounded in human experience.

We suggest that role-playing may form a tool for sensitizing designers to such theory. We engaged in a design exploration of live role-playing scenarios, intended to convey complex theories from experiential as well as analytic perspectives. While role-play has a long history of being used in design research, previous work has primarily been informed by theatre and focussed on users and technology usage (current and future). We engaged with a tradition of role-playing as a technique for learning and as a form of artistic expression to develop ways to encourage social, bodily and affective engagement, and to use this as a basis for reflection.

The target use for our scenarios is to sensitize heterogeneous designer teams towards concepts and theories brought in from the social sciences; more precisely from sociology, anthropology and museum studies. Our domain was projects aiming to develop museum technology, a domain in which design teams tend to have vastly different backgrounds, goals, and knowledge. We report on our design process, during which the scenarios went through multiple iterations and playtests. The process provides useful insights into critical design features for the scenarios. Finally, we present two case studies in which two different scenarios were run in the intended context, as sensitizing exercises with heterogeneous designer teams in the museum domain.

BACKGROUND

Sensitizing concepts

The notion of sensitizing concepts originates in the well-known epistemic critique of positivist approaches to sociology originally articulated by Blumer [5]. Blumer argued that for concepts developed in sociological theory

through qualitative research, it makes little sense to construct formal definitions. Sensitizing concepts, Blumer argues, merely "suggest directions along which to look." Their role is to sensitize the researchers to phenomena that manifest over and over again, but every time in a unique way. Blumer's conceptualisation has been very influential for qualitative method development in the social sciences [26].

While sensitizing concepts have gained traction in pragmatic design research, an additional requirement emerges in this context. Sensitizing concepts must also be conductive to design, be "developed with the intention of improving the practice of design" [67]. This leads to concepts that either provide direct design guidance [30] or that provide analytical lenses through which the context and use of a design can be understood [41]. Concepts and frameworks are actionable but limited in scope [30,41,42] and encompass design knowledge towards achieving particular design goals [42]. Examples of such design concepts include 'pliability' as a useful experiential feature [41], 'trajectories' as a way of analysing and designing interactive narratives [2], and 'reflective practicum' [56] as an analytical framework for design for reflection.

While this work has been very productive, it stands in contrast with how Blumer originally framed "sensitizing concepts" as open-ended tools for analysis and reflection. "A sensitizing concept", Blumer writes, "lacks such specification of attributes or bench marks and consequently it does not enable the user to move directly to the instance and its relevant content. Instead, it gives the user a general sense of reference and guidance in approaching empirical instances." [5:7] These kinds of open and complex theories are not easily communicated. This does not mean that they cannot be useful for design; Zimmerman et al [67] argue that more broadly scoped "guiding philosophies, which take the form of sensitizing concepts" can work to help direct designers and researchers in solving design problems. Bardzell et al [1] mirror this perspective, arguing that "The role of the work of art or RtD is not to present us with new facts about the world, but rather to enrich our capabilities of perceiving and interpreting the world".

HCI has yet to develop a rich palette of methods to sensitize designers and design teams to relevant theories in a nuanced way [3]. The use of common HCI methods for sensitizing designers to, primarily, user contexts and needs [8,17,25] does not cover the range, depth, and nuance of the social science theories that can be of most use to some design teams. The use case we present below is an ideal example, as museums are deeply rooted in long-standing struggles over who gets to contribute to and even define a given culture. With regards to *theory,* only design fiction [15,22,36,37] will sometimes come close to this goal.

Role-play as art, community-building and learning
Henriksen [27] defines role-play as "...a medium where a person, through immersion into a role and the world of this role, is given the opportunity to participate in, and interact with the contents of this world, and its participants." In a role-played scene, participants are instructed to improvise the actions and reactions of a character in a particular situation. Players can play themselves in fictional situations, or they can take on fictional characters. One of the reasons for using characters is that they present an *alibi* for participants to engage in non-normative behaviours [19]; taking on roles makes it possible to freely express emotions via the character mostly while lessening the risk of affecting real-life relations with other participants [29], such as co-workers on a design team.

Role-play has long been used for education [9,10,46] and therapy [47,53] as well as for leisure and entertainment. The tradition of improvisational drama [4] has long worked to develop ways to use role-play for community-building, learning and reflection among the participants. What sets this genre of drama apart from theatre is that it is typically not performed for a separate audience, but for the benefit of the participants. Role-play has been argued to broaden the perspective of the participants [21] and give opportunity to both formulate one's own opinions and to meet and argue with the opinions of others [55]. Blatner [4] proposes six possible uses of improvisational drama: for community-building, in education, in psychotherapy, for empowerment of marginalized groups, and finally as life expansion and entertainment. Augusto Boal [6,7] developed a range of methods for involving audiences in improvisational drama and developed the concept of the spect-actor, who sometimes spectates and sometimes acts or instructs.

In this article, we draw in particular on the emergence of *the role-play scenario* as an art form. With its roots in Live Action Role-Playing [64], 'Nordic Larp' [60] and freeform role-playing [64], role-playing scenarios are pre-designed role-play experiences that can be playable in very short time, stageable with few or no props, and well documented to be re-stageable with little effort.

We were particularly inspired by #Feminism [59], a collection of role-playing scenarios that illuminate a range of concepts from feminist theory through role-play. Apart from being very powerful experiences, they illustrate well how complex theories from feminist literature such as "emotional labor" [48] can be made accessible through an embodied and affective experience. In addition, the #Feminism scenarios are organized into a clear and uniform format, making them easy to stage.

When role-play is used for learning purposes, it is important to include an element of recontextualisation [28], bridging the experiential learning process in the fictional setting of the scenario to problems situated outside the learning situation. While every participant may need to recontextualize the experience somewhat differently, the process can be facilitated through a staged debrief. This is largely missing from artistic role-play scenarios, which is why we wanted to explore this as a critical design element of our designs.

Role-playing in design

Also in HCI, we find a rich tradition of using role-playing, this time for design. It originates in the approach of using "scenarios", brief scenes describing user and/or usage situations, to charter the domain and usage for new products [8,16]. In role-play these are taken one step further through enactment. (Note that in HCI, "scenarios" typically refer to very short scenes. The Nordic Larp role-play scenarios discussed previously are full role-playing sessions including preparations and debrief.)

Role-play is particularly well represented in the Scandinavian tradition of participatory design. Early work includes Ehn and Sjögren [23], who developed a range of games that are best described as table-top role-playing games that allow users to play out future usage situations while designers act as facilitators. Brandt and Grunnet [11] took inspiration directly from theatre to introduce bodily enactments. Inspired by Stanislawski's principles of method acting [57], they experimented with role-playing future users as a way of sensitizing designers to their context and needs. Buchenau et al [14] used a very similar method to envision a future train journey. A radical scenario-based design approach was developed by Iaccuci and Kutti [33], in which the designers would shadow their future users *at home*, in their everyday life, using an evocative object to inspire role-played scenarios of future use.

Boal's Forum Theatre [6] has been adopted for this purpose. These have actors acting out scenarios for an audience, who can suggest changes and replays. Brandt and Grunnet used the form to enact future uses in front of representatives of the target user group, to let them reflect on the scenes, give feedback and change the designs. Newell et al [49] used professional actors to record scenario videos that were played to the future users, with opportunities to pause and discuss.

As these seminal examples indicate, HCI primarily uses role-play as a way to ideate new designs, with or without the involvement of end users. For this purpose, authors argue that enactment should interleave with design [14,31,34] in a tight loop. We can also note a striving towards making scenarios as authentic as possible. Iacucci et al let "participants play roles or act as themselves in given situations" [34:196]. Bødker emphasizes the careful way scenarios must be constructed from ethnographic data [8], and Brandt et al. [11] let future users provide feedback on how the staged scenarios can be made more correct. This contrasts with our approach, where explore the power of make-belief and the alibi created by role-playing. Only a few researchers have engaged with the power of suspension of disbelief, such as Brodersen and Dindler [12,20] who used fictional stagings and games to trigger imaginative design explorations.

DESIGN APPROACH: SENSITISING SCENARIOS

Domain: hybrid museum experiences

The work reported was carried out within [withheld], a project that targets the development of hybrid digital-physical museum experiences. During the course of the project, we observed a need to create a richer common ground between technology developers and museum personnel, both practically and theoretically. In discussions with museum professionals and project teams, we saw how teams tended to be heterogeneous and work in a distributed manner, giving little opportunity for developing a joint vision or even common terminology. We also saw a distinct lack of knowledge (or at least placing low priority on the knowledge) related to the visitor experience, hybrid or not, and in particular on how the social context of a visitor group influences the museum experience, despite the documentation of this importance in the literature (see e.g. [24,32,51,65]).

For this reason, we set out to explore a way to use role-playing as a way to sensitize a heterogeneous design team towards complex concepts from sociology or museology that could help to develop a joint frame of reference for their target design.

Sensitizing scenarios

'Based in the acknowledged lack of methods to make nuanced theory relevant in design, and our own experience of the potential for role-play to create powerful insights into complex and nuanced concepts, we chose to explore role-play as a way to sensitize heterogeneous designer teams to theories from the social sciences.

We had two goals with the work. First, we wanted to allow for an embodied learning experience related to nuanced concepts, that could further the aims of the project team collective. Second, we wanted to foster group cohesion in a meaningful way. Brandt et al [11] suggest that participatory methods including enactment functions can act as *boundary objects* [58] for a heterogeneous group of designers and stakeholders, in that they give meaning to different participants with different professional practices and professional languages. McEvan et al [45] further argue that role-play gives opportunity for ethical experiences, to use communicative strategies in a new way, and gives exposure to the opinions of others. These are all properties that may help to build group cohesion and have lasting effects.

The format of (artistic) role-playing scenarios was adopted, since the form is fairly time- and resource-efficient. Examples from the art scene also illustrate their capability to foster embodied and emotional engagement with difficult topics. Two of the participating researchers had previous experience with designing in this format, and one had previous experience with educational scenarios. In our work, the role-play scenario is thus the whole exercise, and *not* a user or usage scenario as in HCI literature.

We deviated from the art scenarios in the framing of the scenarios. They were structured to begin with a preparatory workshop to explain the goals of the work, move on to the actual role-play, and conclude with a debrief and discussion connecting the activity to the theories we aimed to communicate. This follows a common way of structuring pedagogical role-play [29]. While artistic role-playing scenarios will include the first two, they tend to place less focus on the debrief, and the introduction is more focussed on preparing players for the role-play session than on making the purpose of the scenario explicit.

Method
The methodological approach to this project is research through design [66], where emphasis has been on creating a wide range of trial scenarios. Compared to technology development, designing a role-play scenario is a simple process requiring very few resources and often done in very small teams. Hence, it becomes possible to play-test a wide variety of designs and through that process to explore a wider design space than what is typically done in research through design. For each phase of the design exploration, we could – and did – develop and test *new* scenarios rather than iterate the existing ones. Within each phase, some play-test were done for polishing purposes. These are only rudimentarily documented below.

The major trials were done to evaluate the scenarios with experts, and towards the end of the project, were run in authentic design projects in the domain. To preserve the participant's integrity and in line with the principle for improvisational drama as not performed for an audience, we avoided filming role-play sessions. These were documented primarily through note-taking and a few photographs. Some (but not all) of the debrief sessions were recorded. The researcher notes and recording transcriptions have been thematically analyzed.

DESIGN PROCESS

First iteration: Establishing a suitable format
Our first step was to sketch five scenarios that varied wildly in their structure and setup. While all of them had at least a vaguely defined sensitizing goal, we were at this point of the process less concerned with accurately reflecting a theoretical body of knowledge than with developing a format that would make the scenarios playable as well as provide room for reflection. In particular, we wished to explore what kind of role-taking would be suitable. We briefly describe the five scenarios below, to give a glimpse of their variety.

- *A Multi-layered Story* aimed to convey what museums talk about when they talk about "telling a story." It had no pre-defined roles, but participants were expected to play themselves. They were tasked with creating a story out of random objects, representing museum objects.
- *Holiday at Grandma's* illuminated how objects hold different meanings for different people. This was a role-played scenario with pre-written roles.

- *Constrained Communications* was intended to make participants reflect on how media affect what stories can be told. It was a playful charade exercise, in which one person at a time was tasked with telling a joke with constraints on how to communicate.
- *Life on Display* was meant to provoke discussions on history use. The participants built future historical exhibitions with contemporary objects. It used *group* roles; the participants played different types of visitor groups.
- *Speed Dating* was meant to provide reflection upon how interactive exhibitions are perceived if they provide pre-constructed answers but visitors have other questions. It was a playful speed dating game; in which the dating parties only could use answers they had prepared in advance.

Four of the five scenarios were play-tested on two different occasions. *Constrained Communications* and *Life on Display* were tested with a group consisting of the researchers, one larp designer and one museum pedagogue. *A Multi-layered Story* and *Holiday at Grandma's* were tested in a larger workshop with project members who included several experienced designers and curators from the museum domain. In both sessions, the participants were allowed to select which scenarios they wanted to run – the fact that they chose two that we had not tested previously was a happy coincidence. *Speed Dating* has not yet been run. We also experimented with letting the players self-organize without an assigned facilitator. Both of these thus required that the participants read the scenarios in advance.

Results
All of the scenarios "worked" from a technical perspective: the participants were able to read them and collectively select which one they wanted to play. However, we noted that one participant would step up to facilitate in the sessions where no facilitator was present. With short time frames, it was also too much to require the participants to read through five complete scenarios in order to select which one to play.

The participants in the second session expressed some reluctance to engage in role-play. *A Multi-layered Story* was chosen first precisely because it did not include pre-written roles. Two people, both of whom had theatre training, also opted out from participating *Holiday at Grandma's*. The participants considered the scenarios to be slightly too long, and a total running time of no more than one hour was recommended.

The most important feedback related to the relevance of the scenarios to the museum domain. Several of the scenarios were intended to be metaphors or analogies rather than explicitly situated in the museum context, and participants had trouble connecting them to the museum domain. This became clear in debrief sessions, where the participants (including museum experts) had trouble making sense of the scenarios from a museum perspective. In *A Multi-layered Story*, this was expressed as a lack of authenticity: the

storytelling exercise was deemed too different from what museum curators actually do despite the direct relevance of the scenario's underlying theme.

During the post-experience discussions, the participants also offered a range of new ideas for scenarios.

- *The Legal Case*. Enacting an authentic legal case regarding cultural heritage.
- *Letting Go*. A museum has to trim its collection and participants argue about which objects to cull. This was later on incorporated into the scenario *The Object*.
- *One Object, Many Stories*: this inspired *The Object*.
- A scenario about telling stories in a museum with a lack of objects to show.

Second iteration: Museum relevance and theoretical grounding

Based on the experiences from the two first workshops, the scenarios were extensively re-designed. An important design decision was to use *only* scenarios that included some pre-scripted characters. The reluctance of some to engage in role-play has also been reported on in literature [61], so we decided to accommodate our participants' wishes. We speculate that this reluctance may emerge from giving the participants a choice in the matter since having a choice may strip them of their alibi [19] to act in uncharacteristic ways.

Also in line with feedback, we focused the scenarios on specific concepts and theories, with clear takeaways scripted into the debrief sessions. We developed three scenarios total.

New Museology. This scenario tells the story of how a museum exhibition comes to be, using all the different considerations of its influential stakeholders. We worked extensively with this scenario. A museum pedagogue was recruited as co-designer to ensure that it was sufficiently realistic. It features multiple alternative settings, so that the participants can choose the setting that is most similar to their own design project; one is taken from an authentic case. The scenario grew out of *A Multi-layered Story* but includes scripted roles and multiple scenes. The participants are split into three groups: curators, artists, and audience. In each scene, the three groups work in different constellations in ways that affect the final exhibition. The scenario is also constructed to generate a conflict between the artists and the curators, emphasizing how different their goals are.

The Museum Guide was a very similar scenario, dealing with the design and introduction of a museum guide.

The Gift staged a reciprocal gifting ceremony within a family. It was designed to reflect social and anthropological theories related to reciprocal gifting [44], an important background for one of the design approaches developed within the wider context of [withheld] and one that we saw a need to communicate to museums that made use of the approach. This scenario consists of two scenes: the first is a gift-wrapping scene during which the players wrap gifts in small groups, then a gift-giving ceremony where the gifts are

Figure 1. Playtesting *The Gift* with museum professionals.

exchanged and opened. The reason for staging a ceremonial gift exchange that was not set in the museum was that the literature highlights the importance of such exchanges (see e.g [18,40,44]), and even though gifts may be made, bought or consumed in the museum, the gift exchange seldom takes place there.

Two of the scenarios, *New Museology* and *The Gift*, were first play-tested with invited participants. In this case, the testing group consisted of a professor in cultural heritage history, a graphic designer, a sociology professor and a role-play expert. The session was facilitated by one of the researchers. The group found it easy to play the scenarios and connect the experience to the museum domain; however, they gave multiple minor comments that helped polish the scenarios for the second trial.

The evaluative trial took place during a workshop in a separate but connected action research project. The participants were all museum professionals who were, at the time, involved in some kind of digitalization process at their museums. The scenario trial was run in conjunction with but not as part of the action research workshop, and only those who opted into testing the scenarios participated in the test run. The time was very limited and unfortunately, a full interview could not be done as intended. We were able to gather feedback both during the trial and afterwards, though, through a survey administered by the action research project team.

Results

In the second trial, participants did not have time to play more than one scenario. Based on brief descriptions of the three scenarios, the participants first voted for which of the scenarios to play and based on the results were subsequently split into two groups, one playing *New Museology* and the other *The Gift*. We experienced no reluctance to engage in role-play in this trial. The players were also highly engaged and seemed to enjoy the experience. *The Gift* received positive feedback related to the way it provided for emotional engagement with the topic at hand, as well as to how the debrief was able to contextualize these experiences with theories on gifting.

However, in the debrief, criticisms arose. In particular, the request for authenticity was voiced again, this time even more vocally. *New Museology* was criticized for giving too little time to construct an exhibition and causing people to disengage when playing as museum curators or artists. For *The Gift,* the participants found it hard to understand how the takeaways could be made relevant in the museum setting (apart for designing the museum shop). This we saw as a lesser problem as the scenario was expected to be relevant only to design projects that included gifts or gifting.

This trial must be seen as a setback, in particular since we had gone through some length to make *New Museology* as authentic as possible. Giving participants more time to create an authentic exhibition was not considered an option, given the time constraints for scenario length that were uncovered during our first tests.

In order to develop a deeper understanding of what could account for this negative feedback, we organized a workshop with experienced role-play and larp designers at a larp design symposium. The six participants in this workshop came from different countries around Europe, and all had some experience with designing for educational role-play. The group first got to play *The Gift* and were then allowed to read both scenarios and work in smaller groups to develop an understanding of what made them work or not work.

The consensus that emerged was that the *New Museology* scenario failed to create emotional investment, primarily due to lack of time in the different scenes but also due to its emphasis on roles as functions (artist, curator, visitor) rather than nuanced characters and their attitudes. As one of the participants eloquently described it, in an educational role-play scenario what you want participants to *do* and *feel* must be connected to the learning goals of the scenario. Feelings can, to some extent, be scripted into characters, and this was one thing that *The Gift* succeeded in.

Third iteration: Contextual authenticity
An important realization from running *New Museology* was that authenticity is difficult to script into scenarios. We recognize this issue from HCI literature, in how authenticity has primarily been achieved through incorporating authentic users in the design process [11,49,52,61] and even, as in Iaccuci et al. [33], staging exercises in their homes. We judged that when running scenarios with experts from the museum sector we would not be able to simulate what they would accept as an authentic experience, if for no other reason than constraints on location and time.

In the last phase, we instead explored whether participants could *bring with them their own authenticity*. Could we design scenarios in which participants would tap into their own knowledge, expertise and experiences to make use of authentic spaces, or tie more closely to the participant teams' own issues? More importantly, could we do so without losing the alibi provided by role-play?

To investigate this, two new scenarios were developed.

1. The emotional	6. The rule obeyer
You love this quirky object and don't want to get rid of it.	You want to follow the guidelines and make the right decision based on them.
2. The hoarder	7. The crowd pleaser
You never want to get rid of anything. Keep everything!	All you care about is what is best for the audience and public opinion.
3. The pragmatic	8. The storyteller
If it is no longer of use, get rid of it.	Does the object have an interesting story? If not, get rid of it.
4. The planner	9. The team player
Knows that the museum needs more space so we need to get rid of stuff.	You want to find a solution everyone is happy with.
5. The effective	The facilitator
You just want this to be over quickly. Make a decision, you don't care so much which.	Outside of play. Their goal is to lead the meeting and get the group to make a decision.

Figure 2. Roles for the first scene of *The Object called 'The End'*, in which the object is culled from the collection.

My Museum highlights how visitors come to museums in different social groups and for very different reasons. The participants play different visitor groups on a guided museum tour, for which the facilitator plays the guide. It is intended to be played in an authentic exhibition and can, with small modifications, be used for testing a new museum experience design in a way similar to use-case theatre [54]. It ends with a role-played questionnaire session, in which the participants, in role, fill out an evaluation of the exhibition.

The Object is a scenario about provenance: the history of the ownership and transmission of a museum object. Concepts such as provenance and history use [63] are central to museum practices, but are not necessarily well understood by developers brought into a museum project. The participants play through a sequence of short scenes telling the story of how a museum object was created, used, collected into the museum and finally considered for display in two types of exhibitions, the first more old-fashioned and the second more experientially oriented. The scenario starts with a scene in which the object is culled from the museum collection. In most of the scenes, the participants play museum personnel and are encouraged to adopt roles that lie close to their professional or personal experiences. They are given pre-written roles that do not describe their functional role, but rather their emotions and attitudes towards the object or the exhibition (see Figure 2).

As in the previous iteration, the scenarios were first play-tested with invited participants before being staged with museum professionals. For this playtest, we had two museum and cultural heritage experts participating, as well as one graphic designer and one experienced larper. The test led to some polishing of details, but did otherwise not present any new insights.

RUNNING THE SCENARIOS WITH DESIGN TEAMS

The two latest scenarios have been used in their intended context, at workshops targeting ongoing design projects in the museum domain. In this section, we report on the way they were staged, how they were perceived, and how running the scenarios affected the projects.

Running *The Object* with [withheld 1] museum

The first occasion for using the scenarios in an authentic context was in the [withheld 1] museum, an institution with which we were already in contact with through the [withheld] project. This design aimed to develop a mobile app that could complement a museum exhibition in a similar way to a museum guide, but that would provoke affective and personal engagement and reflection instead of providing more information. The design had already gone through a couple of iterations, and a first technical prototype had been trialed about one year before the workshop was run. The prototype was a playful and critical reflection on the content of the museum, and the narrative related to a specific historical person with a close relation to the museum's collection. It should be noted that the project had progressed quite far before the sensitizing exercise was run.

Since the prototype trial, the museum staff had gone through some turnover and the project had stalled; hence, it was necessary to reconnect and find out how to proceed with the design. Previous feedback from museum staff had been positive but vague, and the app designers were unsure about how to proceed. We, the research team, were in this case invited by the app designers. The participants in the workshop included two museum curators, one person from the app development company, and two researchers.

The research team developed and facilitated a full-day workshop where running the scenario was just one part. The workshop started with a timeline exercise, clarifying what had been done in the project so far, by whom, and when and how the different partners had been in contact with each other. Next, the scenario was run, and it was followed up with a re-design exercise. The purpose of the timeline workshop was to clarify the process – which we knew from the start had been rather disconnected – so that changes could be suggested without implicitly blaming any of the participants. The re-design exercise was seen as a way of tapping into the experiences from the scenarios while they were still fresh. Since the goal of the scenarios is to encourage affective engagement, we did not want to interleave design with the experience. As a design exercise, we ran a situated bodystorming [54] session based on the current prototype, walking around in the museum and innovating ideas for content related to different spaces and artefacts.

We chose to run *The Object* for this workshop, as much of the previous feedback had concerned the relation between the app and the museum collection. The scenario was tailored so that the chosen object was of a type that was common for the particular museum's collection, and the 'use' scene was modified to reflect typical use of that type of object.

Results

During the debrief, participants reflected on how useful it was to adopt a different attitude towards the museum and its collection than their own. They found it both challenging and enlightening to have to argue from a perspective that they would not normally take.

The curators considered the roles realistic while stylized.

> "For me, It felt really realistic" … "I don't think that anyone is so clear about it, attitude of the perspective. It's always a mixture of a lot of different of perspectives."

The curators also reflected on that the type of discussions reflected in the scenario happened frequently at their museum.

> "I think that since we often really have this sort of discussions in the museum, it's good to try to see things from other side and make yourself create arguments for that."

The museum curators did not feel that they learned much about museum collections from the experience. With *The Object*, this is to be expected, as museum participants take roles that lie close to their professional expertise. In a separate debrief, the main app designer reported on seeing the exercise particularly useful as a way to develop group cohesion and as a stepping stone to further design activities.

After the scenario

The debrief became very interesting, when the curators declared that they would *not* install the designed app in their museum. This came as a surprise to the developers, who had never received this type of feedback before. The curators were also able to articulate their reason: the thematic focus on a single person was not in line with the way the museum wished to portray itself, and neither was the content produced so far was sufficiently nuanced.

We believe that the ability to articulate such negative feedback originated in a combination of the heightened group cohesion created by engaging with the scenario, as well the alibi created by the initial timeline exercise and through role-playing. The curators were now able to articulate *how* the museum and the developers did not share the same design goals for the app.

The following discussion and brainstorming was oriented towards finding out how the current design could be re-appropriated for the wider historical purpose. As a result, the

the participants up for the potential of also staging the envisioned design in a very much less than perfect manner.

Checking in on the project some weeks later, we learned that it was progressing according to plan and that the reflections from the workshop were used in further developments. The exhibition will launch early 2020.

DISCUSSION

Learning and meaningful group cohesion

We first turn to the key design goals for the scenarios: to allow for an embodied learning experience related to nuanced concepts that could be contextualized and meaningful for a project team; and to foster group cohesion in a meaningful way.

Some, but not all, of our scenarios seem to have fulfilled the first goal. *The Gift* was particularly successful in this respect, as it dealt with theories and concepts that were not known to most of the participants, and managed to convey these both in the affective role-play engagement and in the more analytical debrief session. *My Museum* and *The Object*, the two scenarios that were used in actual design projects, were less successful in this respect because they dealt with concepts that are (or should be) well-known to museum professionals. However, while the analytical takeaways from these scenarios were not so obvious, both still contributed with an emotional and embodied experience that *made the theories come alive*. They provoked post-experience reflections, in *The Object* about different perspectives and attitudes, and in *My Museum* about the visitor experience. Even when sensitizing scenarios are not presenting radically new knowledge, they seem to make analytical concepts accessible for reflection and for connecting to personal experiences.

In the two authentic projects, it was clear that the scenarios contributed to group cohesion, and did so in a meaningful way. They do this through creating a joint experience relevant to the project at hand, which seems to make them accessible as boundary objects [58] in which every participant has their own experience and subsequent meaning-making process, but these are still sufficiently shared for the purposes of referencing and creating joint narratives.

In both runs, the scenario provided a way to build group cohesion that carried over to the subsequent design exercise. In the [withheld 1] museum, issues related to the current design might not have surfaced had this not been achieved. In the [withheld 2] museum, the alibi created through role-playing helped the participants to overcome their performance anxiety for the subsequent use-case scenario exercise. In the [withheld 2] museum, we also saw that some of the learnings from playing the scenario directly carried over to the subsequent design exercise.

The quest for authenticity

We found that running the scenarios in the context of an authentic design project worked *very* differently from play-testing. Participants indeed bring with them their own authenticity, but in more ways than we had expected. The intended function of the scenario to contribute to an ongoing design process, and the fact that the participants were members of a design team, contributed greatly to their ability to re-contextualize the experience and make it meaningful.

We saw this through the way participants would reconnect to their ongoing project in unforeseen ways, such as when the [withheld 2] museum team reflected on how little the different visitor groups took notice of each other. In both debriefs, the participants made numerous references to their own museum's exhibitions, work practices and personnel.

In general, we believe that the request for authenticity must be approached with some care for sensitizing scenarios. First, the domain experts will have high expectations on authenticity in reolation to their own expertise, something an outside scenario designer cannot provide. Second, a scenario can only be meaningfully situated the domain if the theories already have a clear connection to it. If the goal of the design project is to build that connection, the scenario cannot achieve this in advance. Third, if sensitizing scenarios are made too authentic and too close to the domain, they risk becoming simulations instead, in which participants are forced into their professional capacities, leaving no room for emotional engagement and embodied exploration. Finally, role-playing a character will never reflect what it means to actually be that person. A scenario that closes in on becoming a true-to-subject simulation risks conveying the impression that this would be possible.

Design principles for sensitizing scenarios

As design exemplar, the supplementary material to this article consists of a collection of scenarios from the project. While they are mostly relevant for the museum domain, some of them can be relevant in other contexts. Example roles and other printable assets are attached, most also require other equipment.

Below, we discuss the most important design and run takeaways arising from our project.

Using roles as alibi. An important design decision was to use pre-written characters as an alibi. This helps participants to engage in behaviors atypical for each individual, and also to alleviate some of the burden of acting in their professional capacity. We believe that in order to establish this alibi it is important to not give participants the opportunity to opt out of role-playing. This belief is partly supported by the observation that once we took this choice out, we did not meet with any reluctance to engage in role-play.

Relevance. While authenticity can to some extent be created by careful contextualization, there must still be a good fit between the design project and the chosen scenario. This fit is critical for allowing the participants to reconnect the

experience to their own design challenge. The fit, and the sense of authenticity, can be heightened by letting participants bring authentic elements into the scenario, while still keeping it fictional to enable suspension of disbelief. It is also useful to design scenarios so that they can be easily adapted to the design project at hand.

The importance of a structured debrief. In order to connect to the underlying concepts and theories, the scenarios need to include a highly structured and facilitator-led debrief. A debrief may for example start with a presentation held by the facilitator, followed by a more open discussion among the participants. We are even considering to complement our scenarios with pre-recorded videos, that the group should watch together before initiating discussions. While there are several ways to structure a debrief, it should be structured in a way that introduces, explains, and contextualizes the theory in terms of the scenario.

It should also be noted that while the debrief is an essential part of the process, when run with a design team, we can expect the re-contextualisation process to continue long after the debrief. Role-play experiences are at the same time personal and shared. While they go on only for a short time, their meaning grows through reflection and discussion over an extended period after the experience [35]. Hence it is not necessary to close the discussion fully within the debrief – some questions and reflections can be left for later.

Heightened energy fostering group cohesion. The way the scenarios foster meaningful group cohesion and create heightened energy in the group can be useful follow-up exercises. However, we saw a need to act quickly to capitalize on heightened energy levels, as they fade rapidly during the subsequent reflection and re-connection process.

When to use scenarios and when not to. Most likely, a design team will need to gain a shared understanding of many different things, including the available budget and the target technology. But for these, there are other methods that are more efficient and appropriate (e.g. show a spreadsheet for the budget and demonstrate the technology). Sensitizing scenarios are most useful when there is a need to understand complex and nuanced concepts and theories both intellectually and affectively, and when a shared experience can create a ground for this understanding through discussion and reflection.

CONCLUSION
Using the principles that we have begun to uncover, role-play scenarios can be used as a tool for making concepts and theories from the social sciences, which often are both complex and vague, relevant for design. In the context of digital design for museum experiences, we explored the use of role-play scenarios, an emerging art form, as sensitizing tools for designer teams. We reported on a widely-scoped design exploration of such sensitizing scenarios, and on two concluding runs of scenarios in ongoing design projects. We saw how the scenarios contributed to group cohesion, and an

embodied experience of concepts and theories that could contribute significantly towards resolving critical issues in each project. We conclude by identifying key design components that make them work: the use of scripted roles to provide alibis, the relevance of the scenario to the project at hand, the importance of a structured debrief, and heightened energy fostering group cohesion.

Future work
The sensitizing scenario approach that has been sketched out in this paper can be further developed in multiple ways. One open question relates to how closely a scenario must lie to the domain at hand in order to become relevant in the design process. In our trials, the chosen scenarios were designed to draw some authenticity from context, and they were also modified to fit each museum. However, as discussed above, several other factors also contributed, including the workshop context in which the scenario was run.

We intend to explore this further by tapping into the rich resource of pre-existing and well-crafted scenarios from the art world that might be used as sensitizing scenarios. For example, the art scenario *Public Memory* by Maury Brown [13] deals with the public debate around a controversial statue in a small town. This scenario has striking similarities to the idea for *The Legal Case* that emerged during our first trials, and is a good fit for the museum domain.

Another very interesting development would be to develop a design kit for sensitizing scenarios, so that a project leader could design their own bespoke scenario. Creating a scenario can be done quickly with very limited resources.

However, this does not mean that it is easy. The design challenge we experienced was to create scenarios that illustrated complex concepts and theories in a way that was, at the same time, focused enough to create a useful debrief discussion and re-connection, while still allowing for affective and bodily engagement while playing. The design team for a scenario must include people who know the theory well, but this is not enough – at least some artistic sensibility is need in order to achieve the latter.

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Appendix 2: Interpersonal Museum Visits, draft article

APPENDIX 2 Submitted Manuscript

A shoe is a shoe is a shoe: understanding social interaction and meaning making in a museum. Research findings and design implications.

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Abstract:

Digital technology is increasingly used to enhance museum experiences for visitors. Concurrently, research show that people seldom visit museums alone, yet design often focus on creating individual experiences. This article addresses this conundrum by examining visitor's social interaction and meaning making in museums in order to provide empirical results actionable for design. It does so through an ethnographic approach combining observations and extended focus group interviews in an analogue museum.

Results highlight how museums are social spaces, made so by active participant visitors. Processes of social meaning making is explored and results show how visitors support a social framing of the experience, draw on objects in social identity making, share knowledge, and the importance of embodiment.

Results suggest shifting from designing personalised towards interpersonal experiences. Four design challenges are explored: supporting collective identity making, supporting playful sociability, support collective information sharing and acquisition, and supporting social movement.

A shoe is a shoe is a shoe: understanding social interaction and meaning making in a museum. Research findings and design implications.

Introduction

Since around the turn of the century, museums have increasingly shifted their focus from highlighting their physical collections to the stories and experiences they can share with their audience (Hooper-Greenhill, 2000). Creating opportunities for participation and engagement has thus become a central aspect of their work (Ciolfi, Bannon, & Fernström, 2008). The introduction of digital technology has proven to be relevant in this effort since it allows museums to engage visitors through personal devices in their everyday lives, and allows them to take part in defining their own experiences (Bannon, Benford, Bowers, & Heath, 2005; Ciolfi et al., 2008; Magnenat-Thalmann & Papagiannakis, 2005). However, a key issue with digital technology such as personal smart phones or tablets is a perception that they isolate users who are physically present from each other as they pay attention to the extended social life accessible through the screen and not people around them (Turkle, 2012). Digital technology has been shown to contribute to the social process of networked individualism (Castells, 2002), where communication and interaction with communication devices becomes an individual, private activity in the physical room while allowing the social space to extend beyond a user's immediate surroundings. Indeed, in a comparative study of different types of technology in the museum, using phones were the least preferred as it was perceived to isolate users from the exhibit and companions (Petrelli & O'Brien, 2018). Many studies have consequently shown how difficult it is to mesh social interaction and digital solutions in museum contexts (Fosh, Benford, Reeves, Koleva, & Brundell, 2013; Woodruff, Aoki, Hurst,

& Szymanski, 2001). As trips to museums are almost always social, in that people visit together with friends and family (McManus, 1989), designers with a desire to create digital solutions which support rather than undermine the social are faced with many difficulties.

In order to develop social user experiences allowing for meaningful encounters with museum content it is necessary to increase our understanding on how people already engage socially in museums. In other words, in order to be able to create tools to assist with both active participation and interpersonal, rich museum visits we need to allow for and take into account input from visitors themselves. This study is part of a larger EU Horizon 2020 funded project—GIFT—where the goal is to design meaningful interpersonal experiences in museums. To be able to support or mediate social interaction in museums we first need to understand said activity. Thus this pre-requisite study, looks at museums as already social places in order to investigate the social interaction taking place. Result can be used to better support visitor experiences through design.

To do so this study focuses on young adult museum visitors. In a combination of observations and interviews, groups of friends were shadowed as they visited an analogue museum in order to investigate how museum visitors draw on their social ties to make visits meaningful for them. After the visit, a focus group interview followed were the museum experience was discussed, a survey was also handed out as an extended focus interview (Berg, 2008). This study asks, What is a socially meaningful museum experience according to the young visitors studied? And what actionable design knowledge does those lessons offer us?

Museums increasingly desire to engage and activate visitors. In the now not so new paradigm of New Museology (Hooper-Greenhill, 1992) visitors are seen not as passive recipients of offered knowledge but rather as active participants. In order to achieve this ideal, many museums are now interested in digital technology, which could offer visitors new

ways to interact with collections (Magnenat-Thalmann & Papagiannakis, 2005). This study investigate how visitors react to heritage on display, and how this experience can be expressed and influenced by other people. It argues that this knowledge can be drawn on in order to support co-interpretation and active participation in museum settings through digital design. The purpose is to propose how technology can be integrated into the museum visit in order to assist in creating socially meaningful museum experiences.

Results suggest that not enough attention has been put on the social in designing for museum experiences. The study purports four design guidelines which are aimed at supporting the social interaction already taking place which affect meaning making in museums. Results further highlights the importance of thinking about visitors as embodied and how this embodiment is key in understanding social interaction in museums.

Museum research

Meaning making in museums

In order to support deep and meaningful encounters with cultural heritage, we must first understand that the making of heritage is, in itself, culturally constructed. Kirshenblatt-Gimblett defines heritage as:

> the transvaluation of the obsolete, the mistaken, the outmoded, the dead, and the defunct. Heritage is created through a process of exhibition (as knowledge, as performance, as museum display). Exhibition endows heritage thus conceived with a second life. (1995: 369).

Museums are key institutions in the definition and thus the construction of cultural heritage, they select what should be preserved and displayed. As such they have the power to define what heritage is; which meaning it contains. However, in practice this process is far from clear cut, and heritage studies beg us to ask, who defines what, and why? (Lowenthal,

2015). While museums used to give primacy to objects, in New Museology visitors are at the center (Hooper-Greenhill, 1992). Along with this shift towards audiences, entertainment has risen alongside education as key museum goals and digital solutions such as displays, touch interfaces, games and even augmented and virtual reality now proliferate within the cultural heritage industry (Witcomb, 2006). These shifts show us how multiple actors are involved in shaping museum work, which is far from stable (Prax, Sjöblom, & Eklund, 2016). As visitors reject, ridicule, cheat, and reformulate the meaning of museum objects these attempts can be interpreted as acts of resistance where the goal is to create new meaning (Waern, Bergström, Rosqvist, & Månsson, 2014). While the audience has always been part of meaning making, museums often try to restrain the potential for audience co-construction of meaning (Calcagno & Biscaro, 2012). Indeed, what museum visitors interpret and understand, might not at all be what curators intend. Meaning is created as visitors engage with an exhibition, but this meaning is dependent on all those things the visitors themselves bring with them, history, identity, previous experiences, etcetera (Rodley, 2018). There is thus a certain, yet often unrecognized power, in the meaning making that takes place as visitors engage with a museum exhibit. In this meeting between the visitor and an exhibit, visitor have the potential to claim content and make it their own through processes of interpretation. As cultural processes are inherently social, museums could create richer experiences by drawing on this reinterpretation of knowledge, in other words allow some agency to transfer to the visitors (Bellucci, Diaz, & Aedo, 2015). This process of reformulating meaning can be seen as a powerful strategy of reinterpretation that primarily targets the curated nature of cultural heritage and where technology can play an important role. At the same time, we must remember that museums and curators still holds the main defining power over heritage in museums and allowing some of that power to be transferred to visitors, is far from uncomplicated (Calcagno and Biscaro 2012).

Social interaction in the museum

Studies have shown that visitors seldom go to museums alone and families with kids, tourists, or locals all behave differently in museums (Hooper-Greenhill, 2006). Yet, when it comes to visitor behaviour we know perhaps more about how they interact with the exhibitions than each other and meaning making is often seen as taking place between a single individual and an exhibit, rather than the individual as a social creature. Often, museums desire to offer transformative experiences, to change the visitor in some way (Soren, 2009). Transformation is seen as something which happen inside a single individual, rather than as a social process. Thus introspection and reflection with museum content is often seen as the path to transformation. However, as Blud has pointed out "Interaction between visitors may be as important as interaction between the visitor and the exhibit" (Blud 1990, p. 43). Studies have highlighted the importance of the social in museums (Bellucci et al., 2015; Lehn, Heath, & Hindmarsh, 2001), and how visitors in groups experience museums as a social unit where group pressures are often given priority over individual preferences (McManus, 1989). Tolmie et al (2014) in their study of families visiting museums, showed how exhibitions in general are physically co-located and often visitors will move on from an exhibit before having had the time to consume it in the way they desire, particularly when visiting with small children.

Studies have further indicated that even when visiting a museum alone the experience can be a social one, this social aspect mainly takes place before and after the visit (Draper, 1985; Sintas, Álvarez, & Rubiales, 2014). Visitors also draw on personalized technology such as smart phones in order to create their own meaning outside of the meaning of curators, for example via sharing pictures on social networks (Weilenmann, Hillman, & Jungselius, 2013).

Another small strand of studies has looked at bodily movement and gestures and how these impact meaning making. In a study of an art museum the authors show that for youth visiting together bodily practices highlight how: "interpretive processes rely on a rich and complex set of movements, positions, and orientations toward artworks, co-participants, and resources." (Steier et al 2015 page 41). In a study of whole body interfaces in museums, the authors showed how physical actions can support social interaction in exhibitions (Price, Sakr, & Jewitt, 2016). Embodied actions and interpretation can thus enhance analyses of meaning making with cultural artefacts (Price et al., 2016; Steier, Pierroux, & Krange, 2015). Thus, previous research indicates that the socialness of the museum visit matter for the entire experience.

A call for hybrid solutions

In HCI there has been much work done on creating new experiences in museums where the influence of visitors on the museum experience is strengthened, as exemplified by the 2016 workshop 'Involving the crowd in future museum experience design' at the premier HCI conference (Vermeeren et al., 2016). In particular hybrid design solutions drawing on both digital elements and physical resources of the museum has been argued for, where visitors are turned into participants (Back et al., 2018). For example, designs for soliciting participation from visitors (Simon 2009, 2010), museum professionals (Ardito et al., 2018; Ciolfi et al., 2016), or both (Smith & Iversen, 2014). Moreover, much work has explored how to engage people with heritage in emotional or social approaches that suit the priorities and methods of New Museology (Bellucci et al., 2015; Betsworth, Bowen, Robinson, & Jones, 2014).

In this work there is a clear focus on individual experiences, designed for lone visitors, and researchers have suggested that most museum technology support a factual experience, at the cost of the social (Cosley et al., 2008). Even when experiences are

designed for more than one user, managing the social is often hard. For example, one study working with couples visiting a sculpture garden (Fosh et al., 2013) explored personal audio experiences and attempted to balance social interaction with introspective reflection. Visitors in pairs followed a path in the garden interacting with sculptures via a brief individual audio experience in headphones. A problem turned out to be pacing, occasionally one visitor would like to replay the short experience and the other visitor would have to wait around (Fosh et al., 2013) as the experience was individual. Another interesting design trying to encourage social interaction is the LEGA, where users leave haptic traces in an exhibit for group members to find and replay as vibrations in a handled, specially built device (Laaksolahti et al., 2011). However, the placing and finding was all done individually, and interpreting traces of a friend is surely not the same as a shared experience. Audio guides, which represent one of the most used hybrid design solutions in museums almost universally isolates visitors from each other by creating audio barriers (Berkovich, Date, Keeler, Louw, & O' Toole, 2003). So while much design work has acknowledged the problem in designing for the social, many solutions are not social but rather aimed at limiting the negative effects of designs usable by single-users. An example is techniques for eavesdropping on co-visitors using headphones (Szymanski et al., 2008).

In summary, in both research and design work the single user has been premiered, even designs attempting to create social solutions run into problems of how to do this well in practice in a way that supports the social as well as makes visitors engage with the museum content. However, when striving for active participation in museum exhibits we should acknowledge that museum visits are almost always social and that meaning making is an inherent social process.

Material and Method

An ethnographic approach was opted for where observations were combined with an extended focus group discussion (Berg, 2008); a focus group in combination with a short survey. First groups of friends visited the Uppsala University museum Gustavianum together, while a researcher shadowed the group as they progressed through the exhibits. The group was made aware that the researchers would accompany them on their visit in order to observe their interactions with the exhibits. Immediately after the visits, which lasted between 35 minutes and 1 hour 40 minute, the group took part in a semi-structured focus group interview, focus was on the visit and social interaction during the museum visit. The interviews in turn took between 45-60 minutes. A short survey was handed out individually to each participant at the end of the interview, the survey asked about habits of visiting museums, who one visited with, and asked a series of questions about the respondents last museum visit before this one. Informants were also asked to add information that might be important to the topic but that they did not have the opportunity to raise during the group discussion.

Five observations with a total of 16 participants were conducted, four on weekdays during different times during the day, and one on a weekend just after lunch. During the observations the researcher took extensive notes on all that happened, paying special attention to interaction (verbal and non-verbal) between the participants as well as with the exhibits and the museum space and other visitors.

The open structure interviews (Hayes, 2000) all followed an interview guide with 4 broad, open questions. The interviewer followed along with the discussion and asked appropriate questions depending on the nature of the discussion. As is the case with focus groups, the groups themselves asked and answered questions of each other. Five focus group interviews were conducted with the same participants as in the observations. Focus group interviews were used as they allow informants to discuss matters in a social situation,

offering insights into how people talk about their experience among themselves (Eklund, 2015). As a research method, focus groups often present new insights as participants have greater control over the direction of the discussion (Kitzinger, 1995). As the focus of the study was on social interaction, a method which allows insight into how groups socially construct meaning of such as visit was deemed appropriate.

The observation notes were transferred into a digital format by retyping by hand. The Interviews were transcribed with key sections being in verbatim. This means that discussion outside the scope of the study was summarized rather than fully transcribed. The handwritten survey responses were digitized by hand. All data, including the sound files from the interviews were then added together into one dataset in NVivo (*NVivo*, 2016).

In order to analyze the data a phenomenology inspired approach was used (see Aspers 2009). Thus, the theoretical perspective was put in 'brackets' during preliminary analysis, in order to allow an understanding of the first order of construction from the informants' lived experience (Aspers, 2009). After each observation and interview session the notes were transferred to digital and interviews transcribed. From this engagement with the data inductive analytical categories were created. After each new observation-interview these were returned to and improved upon. They thus changed as new data was obtained. After the last data gathering no changes were made. After the data had been transferred into NVivo, it was coded according to the inductive categories, in this process some refinement and change took place as some categories showed overlap and new ones emerged. After this stage a suitable theory was introduced in order to move from a first order of construction—lived experience—to a second –formal academic knowledge—(Aspers, 2009).

An informal interview with the museum's head of audience was also performed were we discussed the museums audience, the types of visitors the museum have and did a walk-through of the exhibits where the staff member explained the museum's rationale behind

different exhibits and known problems. The 1,5-hour interview was not recorded and followed no guide, but took the form of an informal discussion.

Context

The Uppsala University run museum, Gustavianum is located in central Uppsala, Sweden, and has around 85.000 visitors per year. It exhibits artefacts that the university has gathered since opening in 1477. The building was part of the original university, built between 1622 and 1625. The museum can be considered a classical "things in glass cases" museum as the focus is on displaying physical objects such as pottery fragments and books. The staff estimates that a visit takes around 45 minutes.

There are six rooms with exhibits divided over three floors, each with a different theme. The first is a room on ancient Mediterranean and Nile valley, displaying pots, mummies, sarcophagus, statues, etcetera. The second room deals with the history of the university, and also displays the Augsburg art cabinet. Room three and four are for temporary exhibits. At the time of the study one room was dedicated to the exhibit "A dream of the exact" dealing with the dawn of scientific measurement as it developed around 1800. The second was dedicated to an exhibit dealing with photography and archaeology from Uppsala University. On the third floor is the university's oldest class room, an anatomical theatre from around 1600, where students or paying members of the public could observe autopsies. Here visitors can climb the steep stairs and stand in the 'bleachers' looking down on the autopsy slab in the middle. It is located in a raised dome in the center of the museum. The last room up under the rafters is dedicated to the Vendel age and Vikings and in particular grave finds from a large boat grave from Uppsala. On the entrance floor there is a small gift shop. The vast majority of visitors experience the museum by walking alone, not taking part in any guided tour.

Results

The 16 participants were all in their twenties (20 to 29-year-old). 13 were born in Sweden. All except one was a student at the time of the study, three of these exchange students. 12 considered themselves frequent museum visitors while 4 did not. The informants visited between one and 10 museums a year yet more common was two or three. They went to museums with romantic partners, friends, and family members. A few occasionally went on their own.

A shoe is a shoe is a shoe

In the ancient Mediterranean and Nile valley room there is a pair of sandals in one of the glass cases. They are unremarkable, looks like any pair of modern sandals one could pick up at a market or when away on holiday. For more than one of the groups these sandals, while standing on the side in a display of lots of other, larger, artefacts became an instant focus point. In the interview extract below three young friends talk about the shoes and recount part of the discussion they had during the museum visit.

> Man 1: Yes, yes the slippers
> Man 2: Sandals
> Man 1: That fashion still works today, it is really crazy. [Man2: yeah] they created something revolutionary
> Man 3: Did you say they were Gucci, or?
> Man 1: It is like Converse; Converse shoes have had the same fashion for 150 years. It is the same thing they have had the same design for 2-3000 years.
> Man 2: They are still around

The shoes are an example on how museum visitors use social contextualization and humor in order to make museum items their own. A personalization of heritage via social

relatability and fun. Making jokes such as saying the shoes are Gucci, a modern high-fashion brand or drawing on popular culture were examples of how people engaged in meaning making by taking old and even alien objects and making them familiar, understandable. Museum objects have often long since lost their context, the cultural and temporal, setting in which they were understood and made sense. As the visitors moved through the exhibits, certain objects were drawn on in order to create links between the then and the now, between the unfamiliar and the familiar.

Another example was a pair of sunglasses exhibited in the room devoted to scientific measurement.

> *The young women all gather in the middle in front of a glass case where there is a pair of old sunglasses, they laugh at them and point. They ask each other why something like that is in a museum display. Woman 1: points to her own sunglasses pushed up on top of her head, she tells the others to put them here in the museum when she dies. They briefly engage in role-play *mild, ironical* discussing her *non-existent* scientific achievements in a made-up eulogy.*

In this excerpt from the observations a group of young women draw on the sunglasses as the only easily recognizable object in the room and plays around with it through humor and role-play. The sunglasses, as something recognizable among spectrometers and crystal measurements allowed them to add levity to the situation, to bring scientists into the realm of everyday people and connect on a personal level to the exhibit at hand. In joint play they, socially, assign meaning to the displayed objects.

Another key social mechanism relying on displayed objects was how visitors drew on museum artefacts in their social identity making. Previous research has shown how visitors engage in individual identity work in museums (Rounds, 2006), this study argues that same is true for social and group identities. By finding objects that in some sense could be linked to them and their shared group identity the items became part of an ongoing social affirmation

project, of saying we belong together. In the room devoted to Uppsala University's history two notebooks by former students from the 1600 and 1800-hundreds were displayed in a glass case close to the entrance.

> *The group gather at the glass case which displays the two student note-books. They look at the dense handwriting in the large books. One exclaim, "Wow, Christ!" they start to compare their own time as students with this historical era.*

The student notebooks were remarked upon by several of the student groups. They were poured over, the masses of notes marveled upon and compared to their own habits of taking notes on laptops and other digital devises. While discussing how academic life might have been, and for example which language studies must have been conducted in during the 1600-hundreds (Swedish or Latin?) the groups were able to reaffirm the values and shared life of being students together, and what defined this today, for them. For a mixed student/non-student group, a bust with a particularly shaped nose was drawn into an old and ongoing discussion concerning one of the friend's own nose. A well-meaning teasing drew on and reaffirmed an old and running shared discussion. This process worked to both make sense of the bust in question, reflecting on who this person could have been as well as reaffirming the groups relationship as friends backwards and into the present.

Other studies have also highlighted how visitors can experience museum visits meaningful to them when connections are being made between the stuff of the museum and visitors own life (Ciolfi & McLoughlin, 2012). The present results further highlight how this is a fundamentally social process, and how visitors draw on items that are easy to relate to, thus connecting their own life with history, as well as how discussing certain artefacts can be drawn on in an ongoing social identity project.

Sociability: having fun together

Play, referred to above, was a common theme observed in group visits. The visitor's play was subdued and brief, yet important in creating the "right" setting for the visit. The visitors played with voices, for example trying to sound like old radio broadcasters. This always brought a laugh by group members. All with the goal of making sure the visit retained its framing as a social experience.

> Man: and like we have discussed, you need energy and you get energy from having fun, when you have walked around and soaked in a lot of things and learnt some stuff, then you joke and laugh and then you get the energy to keep going.

Having fun together, as this man discuss in the quote above, had to be supported in order to make sure that the visit was indeed fun, a key value as friends spending leisure time together. "Fun" injected energy as visitors found themselves tiring during the visit.

Play was not always easy though. In the Vendel and Viking age room a large glass case, 1-foot-high dominated the floor space. The intention from the museum was for visitors to walk on it and be able to see the representation of a large boat grave under them, thus appreciating the size of the real thing. There was a bench for taking of shoes and footprints on the case to further indicate that visitors were allowed to walk on it. However, no one in the study did. Several groups had brief discussion and every time concluded that one was not allowed to walk on the glass. During the interviews they discussed norms of how one should behave and interact with museums as the reason no one considered walking on the glass, even in the one group where they concluded that one was probably allowed.

Another social technique used to make and maintain the social nature of the experience was the asking of questions. In a discussion on what you talk about in museums, a group of young women said:

> Woman1: a lot of questions that are not answered.

Woman2: and that you really might know that your friends can't answer, you just want the question out there

Woman1: and then you might make a few childish comments, 'that looks like you' and things like that.

Woman2: it is part of the museum visit

Asking, often rhetorical, questions kept the conversation going, while drawing on a shared understanding of the object of the museum visit to learn. Reading text in silence was a perceived danger, for most, of ruining the socialness of the situation and thus the experience as a social event. The groups asked questions about the objects on display, without necessarily expecting their friends to have the answers. The questions helped establish shared attention—that everyone was paying attention to the same things. In a group of young men, one discovered an old map of Uppsala, where the city is spelled with only one P (Upsala), an old spelling. He called for the others to share his discovery:

Man1 stops by the old map over Uppsala. He watches in silence for a while, then he looks around the room, reaffirming where his friends are. He calls out Man2 and then Man3, who are both standing close, they both join him. He points at the upper corner of the map where it says Upsala in old curling letters.

Man3: "Wow that is crazy"

Man2: "They failed".

They stay and discuss the map for a while, comparing different neighborhoods, finding Flogsta [the neighborhood where most student accommodation is located] and talk about how similar the city looks today. Man2 eventually walks away, then Man1. Man3 stays and takes a picture of the map with his phone before he joins the others.

A consequence of the desire of creating a shared experience, both play and asking questions helped to support and maintain the social framing of the activity. Through playing and engaging each other in discussion, sharing what one finds and discussing it, lightly or seriously, were ways of social meaning making. Artefacts were in this way reframed and interpreted in a social process where visitor drew on various social techniques.

Tensions between information sources

Reading texts and looking at objects on display was central to the experience. A key social mechanism here was personalized knowledge sharing. The visitors took the opportunity to go on tangents based on their own interests and expertise in order to share knowledge with each other. Here a different type of question, and also answers became important.

> *The group gathers around the historical timeline put on the wall just to the left of the door inside the Viking room. They start to talk about how Man1 just visited Haga Sofia [represented in the timeline] in Istanbul. Man3 explains that it is both a church and a mosque at the same time. He continues to add detail and explains that he has been there himself, a few years back.*
> *The two continues talking about the history of Istanbul while walking slowly around the room. Man1 asking questions and Man3 answering. Man2 follows behind, watching the glass cases with moderate interests, not stopping. They finish the loop around the room, not having stopped and looked at anything in particular, it is the last room and they seem tired.*

As in the excerpt this type of social knowledge sharing was common in the material, often as in this case, someone volunteered information about something they knew. They then mentioned how they knew this, and if there were more questions from friends the discussion continued. Like in the example above, an object of some sort triggered the sharing. Another example was a young woman telling her friends that because the Nile flows North, North Egypt in ancient time was called Lower Egypt and south higher.

A young man explained when discussing visiting museums with friends:

Man: You can learn from each other, you can see the museum together and like, receive it differently and take it with you. It deepens the experience I think, *the others hum in agreement* you can share related knowledge you possess on the topic and like enrich the experience for others. That has to be the absolutely biggest advantage for me.

The man refers directly to how meaning is constructed socially, as visitors together change the meaning of the exhibit. Through discussing and knowledge sharing meaning making takes place.

When discussing how museums are social spaces and comparing museum visits to going to see a film in a group of young women one said:

> Woman: I thought it was a bit too much text in this place, I mean of course there has to be explanations about what the things are and such but otherwise it is fun to walk around and discuss and *I like your shirt today, what did you do this weekend?* and then you walk and look at the things at the same time, or? And then it becomes this social thing instead of going to see a film which is more common but when you just sit quietly.

Reading signs in silence was of course engaged in, yet often one person read something and then shared it to the rest of the group, drawing on the information provided by the museums and making it social, shared. However, many signs were skipped and the visitors browsed, rather that dedicatedly read everything, as much previous research has confirmed about visitor behaviour (e.g. Berkovich et al. 2003). The point of the quote is to show how the visitors experienced a conflict between reading text in silence and the social nature of the visit. In other words, an experienced difficulty was how the museum's knowledge authority sometimes was at odds with the social nature of the visit. The quote highlights how reading was part of what visitors expected, yet ideally knowledge gained by reading was shared, discussed, and reinterpreted together. When asked after the visit what they had learnt or remembered from the visit, it was almost invariable the things that had been discussed and shared realizations that changed how you thought about something. Knowledge that was shared and discussed was easier to remember and connected with greater pleasure.

I feel like dancing, and problems of keeping the same pace

The final theme concerns moving physically in the museum. It was fascinating to observe how groups of visitors moved in sync with each other in very similar patterns between groups. Visitors started each room together, and then engaged in a braiding pattern where people spread out briefly but always came back to each other at regular intervals. It was necessary in order to keep the group together to regularly, physically be close. The physical proximity allowed other forms of interaction, yet sometimes people moved silently through these dance steps. The glass cases were obstacles which they weaved around, never straying too far from each other.

> *One young man has stopped to finish reading all the signs around the mummy. The other two continues further into the room. He reads quickly and as soon as he has finished he walks quickly across the room towards the others. He crosses it in a diagonal, not looking at anything until he has re-joined the others.*

The group member's bodies orbited each other as they interacted with the exhibit, always keeping each other in sight and in awareness. This dance allowed them to keep the same pace without conversing on the topic, they were in tune, a largely unconscious process. Only one group openly discussed this movement, describing it visually by making repeated shapes of eights with their hands to symbolize how you move through a museum exhibit.

A key problem when visiting museums with others is linked to this. Namely, the need to keep a similar pace. The time it takes to walk through a museum largely depends on how thorough a visitor is. The informants during the interviews spoke repeatedly on the importance of matching up with people who would take the same amount of time as them during a visit and had similar interests. As one informant wrote in the survey about their last museum visit to a temporary Anne Frank exhibit: "Our guests were very slow, which made the visit a bit tiresome".

It was important to keep the group and social situation together. This meant making allowances for others and adjusting your visit to them, their pace, and principles. People who do not, who for example reads every single sign without paying attention to the fact that this bore others were one example of unwanted companions on a museum visit. Another example was going to a museum with people "who do not like museums", having to run through the exhibit without having the time one desires to experience it. Being in both positions was talked about as stressful and unfulfilling. Finding people to go to museums with that could match one's pace and interest was therefore important. Indeed, this theme came up in all interviews, it was something almost everyone had experienced. As other studies have indicated, not anyone can serve as an appropriate museum companion, visitors need a shared language in which the experience can be discussed (Sintas et al., 2014) and in addition keep a similar pace, as in the quote below:

> Woman1: It is more fun to go with people [to museums], you get go talk about things [Woman2: yeah] but you are not as, you are not looking as much at the items when you go with other people because there is that social eh pressure to move on and not spend time [Woman2: it depends what kinds of friends you are with] but in generally you are not gonna go at the speed you want to go at you are gonna go at other's speed. Unless you are a really, really bossy person *laughter*.

Walking separately in a museum was discussed as an extreme solution, only possible if you had very little time and vastly different interests. Yet even then informants explained that they instead adjusted to what others wanted. Again, this highlight how important the social understanding of the situation is.

In the observations the groups used many techniques—both verbal and bodily—for maintaining the dance. For example, one visitor took hold of their friend's shoulders moving them to the side and pointing in order to show a thing they liked in a cabinet full of curios. The item was a cylindrical mirror that had to be looked at from a correct angle in order to

appreciate what it was (mirror anamorphosis). This is simply one example of how the groups pointed and moved each other as they attempted to make sure that their friends saw what they saw, to make the experience shared.

> Man2: I think the difficulty lies in that if you go see a film, then you know for a guarantee that the other people you are there with have seen everything you have seen but if you go to a museum then you can't guarantee that that the other people have seen precisely everything you have seen and read everything that you have read and then it is harder to talk afterwards because if you bring something up that you yourself has read then it is not necessarily that the others have read or even seen the object and then there isn't any back and forth but just you tell them what you have seen.

Calling out, pointing, and moving someone physically was techniques to make sure that your friends saw the same thing as you—establishing shared attention. It was important that as the visit ended, everyone had seen the same things. If your co-visitors had nothing to contribute with to the discussion of an artefact or event, then the social opportunity for discussion and reflection could be lost. Shared attention mattered, because of the social framing of the situation; and visitors worked hard to support social meaning making.

Design challenges

The results presented here, highlights tensions which present challenges when designing for museums. Results showed how social identity work and interpersonalization of museum artefacts, sociability and play, tensions between information sources, and pacing of the visit and embodied movements in the space are all structured by a desire to maintain the social framing of the situation. The challenges, presented in table 1, are in the form of "sensitizing concepts", which rather than providing absolute knowledge are meant to guide designers into suggesting which direction to look (Blumer, 1954).

Supporting collective identity making

The social and cultural context in which museum objects made sense is stripped away or at least reduced in the museum setting. Here digital solutions offer potential to further processes of (social) meaning making and reinterpretation. In the data, visitors were drawn to objects that they could make sense of, object they—in some way or another—recognized or could re-interpret in the context of their own lives and experiences.

Traditionally, museums through text define artefacts on display, yet as seen here meaning is further reinterpreted in the social context of the visit and dependent on who the visitors are (see also Rodley, 2018). There is thus a certain, yet often unrecognized power, in the meaning making that takes place as visitors engage with artefacts together. In this meeting between the visitors and exhibit, visitors select and filter information provided by the museum, and can thus be seen as active participants in their visit. This social process of reformulate meaning have the potential, if further strengthened, to reinterpret or even change the meaning of an artefact or activity, and could be a powerful strategy of reinterpretation that primarily targets the curated nature of cultural heritage. Digital design solutions offer the opportunity to look beyond what is there in the room and to assist groups of visitors in the process of creating, to them, relevant meaning, drawing on museum artefacts. A potential avenue suggested in previous research is the mechanism of gift-giving, where visitors design bespoke tours as gifts for each other (Fosh, Benford, Reeves, & Koleva, 2014). Gifts could be tailored to speak to visitors shared history and identity, a potential issue is that creating the gift is a solitary activity which might not appeal to visitors were the goal is a day out together. While previous research has highlighted the need for personalization vís-a-vís museum content, the social nature of this process has so far been less investigated, in other words, the need for interpersonalization.

Supporting interpersonalization, collective identity making, and co-creation could assist visitors in making sense of museum artefacts. Designed solutions need to take into account the power of collective meaning making, not only individual. While many current design solutions support active participation and personalization this study highlights that the sense-making process is a social, shared project. Too often designed solutions for museums expect a user engaged in a single user experience (Woodruff, Szymanski, Aoki, & Hurst, 2001), and that by personal we only mean individual or single user.

Supporting playful sociability

There is an inherent conflict between having fun, play, and the serious topics many museums deal with. In western societies and in particular those from a protestant tradition ideals about work and seriousness has relegated play and fun to the realm of children (Grimes & Feenberg, 2009). Yet, we know that fun and play can be conductive to learning, and indeed that even very serious topics can be played with (Flanagan, 2009). In the study, participants engaged in spontaneous and brief play and banter which increased their willingness to continue, in their own words, "Gave them energy to carry on being serious". Any digital design solution wanting to create meaningful interpersonal experiences would do well to consider such social release mechanism, perhaps in particular when dealing with serious topics.

Play and social banter are some of the cornerstones of sociable interactions, interactions which offer us joy and pleasure in everyday interactions (Simmel & Hughes, 1949). Sociability or pure sociability was coined and defined by Simmel as the play form of association; that is, interaction free of meaning or purpose. Sociable talk, according to Simmel, is the only talk that is "a legitimate end in itself" (Simmel and Hughes 1949, p.259). Spending too much time reading text in silence was a perceived danger of ruining the

socialness of the situation and thus the experience as a social event. Many designs draw on the portable technologies people bring with them, which if used individually runs the same risk as reading text in isolation. Thus design needs to be careful utilizing personal technology as it runs the risk of disturbing social interaction with co-visitors. Another mechanism design can utilise, is how groups asked questions about objects on display, without necessarily expecting friends to have answers. It was a way of drawing friends in, of making the experience social and the interpretation of artefacts shared.

Something to consider, when implementing playfulness, is that it should not be to the detriment of people's own play. The goal should not be to replace this play but to support it; technology should aid play, not shape it (see Waern et al., 2014). The play observed was spontaneous and far from the rigid structures of games, so rather than gamification we can talk about a 'playification' of the experience. As, others have suggested, intrinsic motivators rather than extrinsic is important in successfully supporting gamified experiences (Chen, 2018). There is a danger that too gamified systems distract users from the learning objectives as users might start to focus too much on gaining points and winning. Drawing on the results here, a successful deign need to leave space for people to playfully engage with their co-visitors.

Tensions between information sources

The tension between the museum as an official and static source of information and the visitors more immediate and present sharing of information presents any designers with interesting opportunities. The visit and artefacts of the museum triggers informal exchange of information between visitors were the museum has little control; how it takes place, where, or what is exchanged. As apparent in the data, in some cases the exchange furthers visitors understanding of the subject of the exhibit, in other cases it subsumes it. However, digital

technology offers ample opportunity for tailored and extended information. Digital

technology is good at this, showing different content and information for different visitors

and groups, something traditional modes of information sharing in museums are less adapted

to. As previous studies have highlighted, audio from speakers where visitors choose between

various clips can be a good way to add extra information in a format that can be shared

(Berkovich et al., 2003; Woodruff, Aoki, et al., 2001). However, in some museum setting

visitors can be reluctant to make too much noise due to norms about being quiet and

respectful.

Tolmie et al. (2014) explored how information in museum exhibits can be delivered

during the visit, but also before and after. Offering information pre- and post-visit allows

visitors to go back and access information they might have missed during the visit (Tolmie et

al., 2014). It is however not clear how this information could be engaged in socially. We

should look for design solutions where visitors are encouraged to share knowledge or

experiences they possess, related to the topic of the exhibit.

As sharing information between visitors was one of the pleasures and perceived

benefit of visiting in groups more could be done to support this sharing. However, this poses

several conundrums as each visitor group will come with a different set of interests and skills,

yet prompting visitors to share their experiences or opinions on whatever topic of the

exhibition could prove a powerful tool in supporting the social nature of any visit.

Particularly as norms about what one should and should not do during a museum visit make

visitors occasionally hesitant to talk too much. We thus talk about knowledge as plural and

complex, and meaning making as emerging in the mix of artefacts, information from the

museum, the visitors themselves, and the social process of the visit. The opportunity for

design lies in drawing on and making information not already present in the exhibition

available and encouraging people to feel like the knowledge they have, is valuable in the situation.

Structuring movement in space with attention to social interaction

Experiences aimed at supporting meaningful interpersonal experiences should consider the movement in space and the embodied nature of interaction. As was clear in the data, visitors desire to be able to go their own way while being able to locate others and reconnect regularly. Embodiment becomes important, i.e. taking into account the role of the physical body in social interaction. Even if not talking, visitors interact with each other through orienting themselves physically in space. In other words, physical proximity and connectedness matters. Visitors desire to maintain proximity, not necessarily all the time, but both the space and activity should allow for a flow of constant disconnection and reconnection, preferably while keeping within visual range. I cannot find my friend to show them the artefact I learned something about if I cannot see them. While embodiment is an increasingly important theme in HCI (see Dourish 2004) this study further emphasize embodiment's importance for the social and interpersonal during museum visits. Visitors draw on their bodily resources in the processes of meaning making.

Research has shown that pace and pacing is essential to designing in museum and that visitors silently agree upon a pace where each individual member of the group contribute to the groups pace. This silent agreement created through visual and physical contact is hard to replace with digital tools (see Galani & Chalmers, 2004). Various types of trace technologies, could offer visitors the chance to spread out yet feel like they remain connected to the group. One could also imagine a system which supports asynchronous communication and the ability to locate group members. We should try to accommodate for the social, rather than offer alternatives to it.

Insert table 1 approx. here.

Discussion

This pre-requisite study has explored how users interact with each other in and with a museum exhibit engaging in social meaning making. The aim was to look at museums as already social spaces, made so by visitors seen as active participants of their experience in the museum space. By looking at how visitors in groups create meaning in the museum results have illustrated how visitors support a social framing of the experience, how they draw on objects in social identity making, how knowledge is shared, and the embodied aspects of social interaction. Users engage in many different types of sub-activities during a visit, seamlessly moving back and forth between sociability, play, exploration, navigation, reading, and so on while adhering to a social framing of the activity. The study has identified mechanisms that can be used to sensitize designers in design work. If we know what people do, we can build upon and further support that doing.

While topics such as personalization of museum experiences has been much discussed in HCI, this study highlights how this personalization can also be seen as a collective, social endeavor; as interpersonalization. Furthermore, while previous research has shown how visitors engage in individual identity work in museums (Rounds, 2006), this study argues that the same is true for social and group identities. In other words, many of our existing strategies for museum design could benefit from added attention to the social.

Results explored how groups of museum visitors engage in meaning making while visiting an exhibit; how they make it theirs. How they interpret the designed experience, and the collective techniques they use to make sense of it. In other words, the exhibited cultural heritage might be defined by the museum, yet the audience in turn add new meaning, bringing with them their lived experiences. Through the mundane and every-day, the ancient

and thus 'foreign' objects are untangled and made sense of. Humor and play are key mechanisms in this process, making jokes, role-playing with and through objects and locations supports sociability and engagement with the visit.

Museums are traditionally the ones who define what should be on display. While New museology has attempted to disrupt this power division by putting the visitor at the center this process is far from straightforward in practice. Visitors in groups brings with them, share, and create various types of knowledge, as in order to make sense of artefacts, visitors reframe, contextualize, and build on what the museum provide. Paying attention to the social affords us to move away from the top-down view of control over the knowledge and experience of a museum visit. The meaning of heritage is always already social, it is defined and framed through active processes filled with conflicts where stakeholders argue about what should and should not be considered heritage (Prax, Sjöblom, Eklund, 2018).

Table 1 presents the design challenges highlighted in the empirical data: supporting collective identity making, supporting playful sociability, support collective information sharing and acquisition, and supporting social movement and the social mechanisms connected to each. Furthermore, drawing on personal technology can be a trap as digital technology inherently premieres individual rather than social use (Castells 2002). In a study of how visitors perceive the bring-your-own-device to museums (BYOD) smart phones were perceived quite negatively as they got in the way of social interaction (Petrelli & O'Brien, 2018). Here, in combination with expectancies of how we should behave in museum spaces, we likely see a key reason why it has proven so difficult to design for social interaction in museums, particularly when we take visitors own personal devices as our starting point.

As Fosh et al. has stated, successful museum experiences need to: "enabling visitors to make rich interpretations from potentially large pools of information while also paying due attention to fellow visitors" (Fosh et al., 2013). Yet, there are inherent conflicts between the

social framing that visitors coming in groups or pairs to a museum construct and the nature of a traditional museum exhibit. Here there is a great potential for technology to solve this conflict between the social and individual, yet design solutions need to make sure to consider the social.

Even if this study builds on a small qualitative sample of Swedish museum visitors, the evidence in the study at hand suggests that interpersonal, social aspects of a museum visit should be more central when designing for museum experiences. While the techniques suggested are not new, this study highlight how they are also social, and needs to be considered as such.

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