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# A Shoe Is a Shoe Is a Shoe: Interpersonalization and Meaning-making in Museums – Research Findings and Design Implications

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## ABSTRACT

Digital technology is increasingly used to enhance museum experiences for visitors. Concurrently, research shows that people seldom visit museums alone, yet design often focusses 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 occur as visitors draw on objects in social identity-making and recontextualization – linking the past to the present –, play, share knowledge, and engage in embodied practices. The study suggests shifting from designing personalized toward *interpersonal* experiences. Four design sensitivities are presented: Interpersonalized meaning-making, playful sociality, social information sharing, and social movement.

## 1. Introduction

Since around the turn of the millenia, 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). In the now not so new paradigm of New Museology (Vergo, 1989), visitors are seen not as passive recipients of offered knowledge but as active participants. Creating opportunities for participation and engagement has thus become a central aspect of museum work (Ciolfi et al., 2008; Simon, 2010). The introduction of digital technology has proven 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 museum experiences (Bannon et al., 2005; Ciolfi et al., 2008; Magnenat-Thalmann & Papagiannakis, 2005; Petrie et al., 2017). However, a key issue with digital technology such as personal smartphones or tablets is the 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 (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 become an individual, private activity in the physical room, while allowing the social space to extend beyond a user's immediate surroundings. Digital, interactive exhibits often fall prey to design expectations of a singular “principal user” (Heath & Vom Lehn, 2008). Indeed, in a comparative study of different types of technology in museums, phones were the least preferred as they were perceived to isolate users from the exhibit and co-

visitors (Petrelli & O'Brien, 2018). Many studies have consequently shown how difficult it can be to mesh social interaction and digital solutions in museum contexts (Fosh et al., 2013; Hindmarsh et al., 2005; Woodruff, Aoki et al., 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. While several studies (e.g., Heath & Vom Lehn, 2004, 2008; Hindmarsh et al., 2005; Vom Lehn et al., 2001) on visitors in museums have looked at what visitors in groups do, fewer have asked visitors about these social strategies. 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, both through looking at what people do, and how they reason about this doing. 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.

Combining observations and interviews, groups of young, adult 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 where the museum experience was discussed, a survey was also handed out as an extended 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?

This study investigates how visitors react to heritage on display, and how this experience can be shaped 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 study purports four design sensibilities aimed at supporting meaning-making in museums; collective identity-making; playful sociality; social information sharing, and, social movement.

## 2. Museum research

### 2.1. 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 socially 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, p. 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; Vergo, 1989). Along with this shift toward audiences, entertainment has risen, alongside, education as a key museum goal 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 (Eklund et al., 2019). 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 et al., 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 exhibitions, but this meaning is dependent on all those things visitors themselves bring with them, history, identity, previous experiences, *et cetera* (Rodley). There is thus a certain, 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, visitors 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 visitors (Bellucci et al., 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 hold the main defining power over heritage in museums and allowing some of that power to be transferred to visitors, is far from uncomplicated (Calcagno & Biscaro, 2012).

### 2.2. 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). While studies have highlighted the importance of the social in museums (Bellucci et al., 2015; Vom Lehn et al., 2001) museums still desire to offer transformative experiences, to change the visitor in some way (Soren, 2009). Transformation is often seen as something which happens inside a single individual. Thus, introspection and reflection are often seen as the path to transformation. However, as Blut has pointed out “Interaction between visitors may be as important as interaction between the visitor and the exhibit” (Blut, 1990, p. 43). Debenedetti (2003) called this the conflict between social contact and self-actualization as goals for museum visits. The conflict between social desire and self-actualization means that 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 visitors to physically co-located exhibitions often moved on from an exhibit before having consumed it in a desired way due to social pressure, particularly when visiting with small children. Visitors used mechanisms such as summoning, pressurizing, herding, sidelining, and rounding up, to make sure people did not lag behind (Tolmie et al. (2014)). In a sense: “Museums are, therefore, not just about *what to see* and *what to relate to*; they are also about *who to see* and *who to relate to*.” (Jafari et al., 2013 p.1746, italics in original).

Furthermore, research has investigated bodily movement and gestures and how these impact meaning-making. An art museum study showed that for youth visiting together bodily practices highlight how movement, positioning, and orientation toward artwork were key to understand interpretation (Steier et al., 2015). In a study of whole-body interfaces in museums, the authors showed how physical actions can support social interaction in exhibitions (Price et al., 2016). Embodied actions and interpretation can thus enhance analyses of meaning-making with cultural artifacts (Price et al., 2016; Steier et al., 2015).

### 2.3. 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, e.g., the 2016 workshop ‘Involving the crowd in future museum experience design’ (Vermeeren et al., 2016). In particular, hybrid design solutions drawing on both digital elements and physical resources of the museum have been argued for, where visitors are turned into participants (Back et al., 2018). For example, designs for soliciting participation from visitors (Simon, 2010), museum professionals (Ardito et al., 2018; Ciolfi et al., 2016), or both (Smith & Iversen, 2014). Participation has been seen as key in order to make museums relevant to current publics and allow visitors to be part of meaning-making (Simon, 2010).

However, researchers have suggested that most museum technologies support a factual experience, at the cost of the social (Cosley et al., 2008). As the seminal work of (Hindmarsh et al., 2005, p. 3) argues:

The size and shape of traditional computer screens, the tendency to use single input devices, the positioning and housing of computer exhibits, the use of headphone technologies and so forth all tend to constrain and restrict opportunities for flexible forms of co-participation. (...) Moreover, and maybe in part related to the technologies commonly available, designers of computer-based exhibits tend to design activities for individuals.

Even when experiences are designed for more than one user, managing the social is difficult. 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 (Fosh et al., 2013). Tolmie et al. (2014) suggested that offering information pre- and post-visit allows individual visitors to go back and access the information they might have missed during the visit due to issues of pacing when visiting in groups. 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 were 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 isolate visitors from each other by creating audio barriers (Berkovich et al., 2003). While much design work has acknowledged the problem in designing for the social, many solutions are rather aimed at limiting the negative effects of designs usable by single-users, e.g., techniques for eavesdropping on co-visitors using headphones (Szymanski et al., 2008), or as Tolmie et al. (2014) suggests to compensate pre- or post-visit. As a contrasting example, a successful, hybrid social exhibit is the arts and craft work reported on in Hindmarsh et al. (2005). Here cameras projected images of visitors on various artworks, allowing visitors to play and explore the experience together. The playful design in combination with interactive images allowed for joint interaction. Note, however, that many of these studies explore artwork rather than museums with, e.g., historical collections.

In summary, single users are often premiered and designs attempting to create social solutions have found it hard to support the social while making visitors engage with museum content.

### 3. Material and method

An ethnographic approach was opted for, combining observations with extended focus group discussions (Berg, 2008), focus groups 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 minutes, the groups took part in a focus group interview (45–60 minutes long), focus was on the visit and social interaction. Interviews are good at capturing the reasoning of individuals and added a cognitive, interpretive layer to the observations. A short survey was handed out to each participant at the end of the interview, asking about habits of visiting museums, who one visited with, and a series of questions about the respondent's last museum visit before this one. Informants were also asked about information relevant to the topic that they did not have the opportunity to raise during the group discussion.

Five observations, totaling 16 participants (3–4 friends in each group), were conducted. Four on weekdays during different times during the day, and one on a weekend. 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. A desire to focus on young adults, an often valuable but hard to attract demographic for museums, led to recruitment through advertisement at Uppsala University. Students are also common visitors to Gustavianum, which made this group suitable for the study.

The sixteen participants were all in their twenties (20 to 29-year-old). Thirteen were born in Sweden. All except one was a student, three were exchange students. Twelve considered themselves frequent museum visitors, four 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 alone.

The open structure interviews (Hayes, 2000) all followed an interview guide with 4 broad, open questions, appropriate follow-up questions were asked depending on the nature of the discussion. As is the case with focus groups, participants asked and answered questions of each other. 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 meaning-making, a method which allows insight into how groups socially construct the meaning of such visits was deemed appropriate.

The observation notes and surveys were retyped into digital and the interviews transcribed with key sections *in verbatim*. Discussion outside the scope of the study was summarized rather than fully transcribed. All data, including sound files from the interviews, were added into one dataset in NVivo (NVivo (Version 11), 2016).

A phenomenology inspired approach was used for analysis (see Aspers, 2009). Previous research was put in ‘brackets’ during preliminary analysis, 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 a process to move to second-order construction (Aspers, 2009). In this process, some refinement and change took place as some categories showed overlap and new ones emerged.

An informal interview with the museum’s head of audience was also performed. The museum’s audience was discussed and a walk-through of the exhibits performed; 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.

### 3.1. Context

The Uppsala University run museum, Gustavianum is located in central Uppsala, Sweden, and has around 85.000 visitors per year. It exhibits artifacts 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 ~45 minutes.

There are six exhibit rooms divided over three floors, each with a different theme. The first on the ancient Mediterranean and Nile valley, displaying pots, mummies, sarcophagus, statues, *et cetera*. The second room deals with the history of the university. Rooms 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 archeology from Uppsala University. On the third floor is the university’s oldest classroom, an anatomical theater 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. 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. The vast majority of visitors experience the museum by walking on their own, not taking part in any guided tour.

## 4. Results

### 4.1. 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, look like any pair of modern sandals one could pick up at a market or when away on holiday. For many groups these sandals, while standing on the side in a display of other, larger, artifacts 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, what I here call, social *recontextualization* and humor in order to make museum items their own. 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. Interpersonalization of heritage via social recontextualization. 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; they were recontextualized. Like laughingly exclaiming, “Harry Potter!” to her friends as a group of friends entered the anatomical theater. Evoking a shared interest and knowledge of popular culture to make sense of a 400-year-old, dark wooden classroom.

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 to the dark-tinted safety glasses as the only easily recognizable object in a room devoted to scientific measurement 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 artifacts in their social identity-making. In the room devoted to Uppsala University's history, two notebooks by former students from the 1600s and 1800s- were displayed.

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 devices. While discussing academic life, for example, which language studies must have been conducted in during the 1600s (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 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 both made sense of the bust in question, reflecting on who this person could have been as well as reaffirming the group's relationship as friends backwards and into the present. 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.

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. Furthermore, studies have highlighted how visitors can experience museum visits as 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 in a process of recontextualization, as well as how discussing certain artifacts can be drawn on in ongoing social identity projects.

#### 4.2. Viking mustaches and playful sociality

Play, introduced 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. As in the sunglasses example above, visitors played with voices, for example, trying to sound like old radio broadcasters. This always brought a laugh. 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 discusses in the quote above, had to be supported in order to make sure that the visit was indeed fun, a key value as friends spend 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 experience the too-scale representation of a large boat grave, 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 a 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. The interviews revealed that while visitors played, due to norms on 'proper' behavior in museums, play had a note of the illicit. In one group made up of exchange students, two girls were joking about how a piece of steel in a case on Viking artifacts was a fake mustache. A third girl with a non-Scandinavian background joined and asked if it really was a mustache. Instantly the pretend play the girls were engaged in was dropped, and they told her about the use of the object at hand. Humor and play were instantly put aside when there was a danger of being taken seriously. The third girl laughed and said that she could never read the other two and determine when they were joking or not. She both attempts to explain how she believes something which she realizes is a bit silly, that it was a fake mustache, and draws on known cultural differences related to the understanding of play and humor.

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.

In the excerpt, we see how social identity comes into play as the group of students identifies the neighborhood where they all lived, which is closely connected to their social identity-making. In the interview, they all recount this example as a memorable episode and talked about how it led to a discussion on spelling reforms. Playing and engaging each other in discussion, sharing what one finds and discussing it,

lightly or seriously, were ways of social meaning-making. Artifacts were in this way reframed and interpreted in a social process; recontextualized.

#### 4.3. *I ask, you ask: Making information social*

Previous research has pointed at the need for shared attention in social museum visits, achieved through techniques like pointing and orienting one's body in space (Price et al., 2016; Steier et al., 2015). However, in this study a key social meaning-making technique 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

As these women discuss, 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 friends to have answers, this helped establish shared attention – that everyone was paying attention to the same things.

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.

This type of social knowledge sharing was common in the material. Often, as in this example, someone volunteered information about something they knew, mentioned how they knew this, and if there were more questions from friends the discussion continued. 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 times was called Lower Egypt and south Higher, something which in a Western map projection context might sound wrong. This discussion was more clearly linked to the exhibit and question, and unlike the first example, extended rather than subsumed the exhibit.

Reading texts and looking at objects on display was central to the experience. The visitors took the opportunity to go on tangents based on their own interests and expertise in order to share knowledge with each other and customize the museum experience. Here a different type of question, and also answers

became important. 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. However, many signs were skipped and the visitors browsed, rather than dedicatedly read everything, as much previous research has confirmed about visitor behavior (e.g., Berkovich et al., 2003). In other words, an experienced difficulty was how the museum's knowledge authority sometimes was at odds with the social nature of the visit. 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 remembered from the visit, it was almost invariable the things that had been discussed and shared realizations that changed how you thought about something. In connection to the first observation extract on the ancient Egyptian shoes, one man explained during the interview: "Yeah, like that with the slippers, that's why I will remember those slippers for the rest of my life. Because we had that conversation." He refers to the joking and play he and his friends engaged in, claiming that knowledge that was shared was connected with greater pleasure. A consequence of the desire of creating a shared experience, asking questions helped to support and maintain the social framing of the activity.

#### 4.4. *I feel like dancing, and problems of keeping the same pace*

The final theme concerns moving physically in the museum.

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.

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.

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. The physical body is key to unraveling the ongoing social interaction. Even if not talking, visitors interact with each other through orienting themselves physically in space. Pointing or other bodily moves becomes part of meaning-making (Heath & Vom Lehn, 2004). In other words, embodied (Dourish 2004) practices matter.

A key problem when visiting museums with others is linked to this, namely, the need to keep a similar pace. 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.” The time it takes to walk through a museum largely depends on how thorough a visitor is. As in the quote, informants spoke repeatedly on the importance of matching up with similarly interested people who would take the same amount of time as them during a visit.

Woman1: It is more fun to go with people [to museums], you get to 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\*.

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, e.g., read every single sign without paying attention to the fact that this bore others were examples of unwanted companions. Another example was going to a museum with people “who do not like museums,” as one woman expressed it. Having to run through the exhibit without having the time one desire to experience it. Both positions were talked about as stressful and unfulfilling by all participants. 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.

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 highlights how important the social understanding of the situation is, similar to how Tolmie et al. (2014) has shown how people want to keep the group together, yet also have time to experience the museum according to their own needs and wants. However, in Tolmie et al.'s (2014) study visitors employed more techniques to round up stragglers, in particular when families with small children visited together. Friends seemed more reluctant than family members to pressure others into keeping the pace. Instead, expectations to keep up were mostly silent, as visitors adjusted without discussion to each other's pace, groups also waited for others to finish, before moving on. Consequently, of the responses to efforts to keep the

group together which Tolmie et al. (2014) observed, following, skimming, and digging in, only following and skimming were observed in this study. Clearly, families and friends have different social expectations of each other in this context.

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. In a study on shared focus on museums, the authors explored how gesture and talk encouraged co-visitors to look at objects and how these actions fashioned ways in which objects in museums were examined (Heath & Vom Lehn, 2004). However, the interviews here further showed that was important because as the visit ended, ideally everyone had seen the same things. If your co-visitors had nothing to contribute with to the discussion of an artifact or event, then the social opportunity for discussion and reflection was lost. Shared attention mattered, because of social meaning-making.

## 5. Design sensitivities

The results, highlight tensions that present challenges when designing for museums. Results showed how social identity work and *interpersonalization*, rather than personalization, of museum artifacts, *recontextualization*, play and humor, questions, and embodied movements were employed to support a social framing. The challenges, presented in Table 1, are in the form of ‘design sensitivities’ (Hindmarsh et al., 2005), which rather than providing absolute knowledge are meant to inspire designers. Hindmarsh et al. (2005) have argued that loose design sensitivities are better suited for the museum domain where different exhibits have different demands. They are aimed at supporting social museum visits between visitors who come together, and do not talk about interaction with strangers.

**Table 1.** Linking results, design challenges, and social group mechanisms.

Result section	Design challenges	Group mechanisms	Overlapping mechanisms
A shoe is a shoe is a shoe	Interpersonalized meaning-making	Recontextualization Supporting collective identity making	Role-playing
Viking mustaches and playful sociality	Supporting playful sociability	Humor Play Playification	
I ask, you ask?	Supporting collective information sharing and acquisition Tensions between information sources Plurality of knowledge	Information sharing Collective information acquisition Asking/answering questions	Forming and un-forming of groups
I feel like dancing, and problems of keeping the same pace	Supporting social movement Supporting embodied meaning-making	Pointing, calling out, moving someone, etc. Spatial and visual awareness of group members Keeping the same pace	

### 5.1. Interpersonal meaning-making

Traditionally, museums through text interpret artifacts on display, yet as seen here meaning is further reinterpreted in the social context of the visit and dependent on who the visitors are. There is thus a certain, yet often unrecognized power, in the meaning-making that takes place as visitors engage with artifacts 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. As Simon (2010, preface) suggest, a participative museum is “a place where visitors can create, share, and connect with each other around content.” This social process of reformulating meaning has the potential, if further strengthened, to reinterpret or even change the meaning of an artifact 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 recontextualization; creating, to them, relevant meaning, drawing on museum artifacts. While previous research has highlighted the need for personalization *vis-a-vis* museum content, I rather argue for attention to the social nature of this meaning-making process, *interpersonalization*.

### 5.2. Playful sociality

There is an inherent conflict between having fun, play, and the serious topics many museums deal with. In many countries, ideals about work and seriousness have relegated play and fun to the realm of children (Grimes & Feenberg, 2009). Yet, we know that fun and play can be conducive to learning, and indeed that even very serious topics can be played with (Flanagan, 2009). In Hindmarsh et al. (2005) visitors through explorative play engaged with artwork. In Gustavianum, a historical museum, role-play was the prevalent form of play visitors spontaneously engaged in.

When implementing playfulness, the goal should not be to replace naturally occurring play but to support it (see Waern et al., 2014). The play observed was spontaneous and far from the rigid structures of games, we could talk about a *playification* rather than gamification. As Chen (2018) has suggested, intrinsic motivators rather than extrinsic are important in successfully supporting gamified experiences.

There should be space for people to playfully engage with the exhibition together with their co-visitors.

### 5.3. Social information

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. Asking questions, rhetorical or not, were active social techniques centered around knowledge sharing and learning; ideals central to many museums. The visit and artifacts of the museum triggered informal information exchanges. The museum had little control over how it took place, where, or what was exchanged. We should look for design solutions where visitors are encouraged to share knowledge or experiences they possess, related to the topic of the exhibit. Digital technology offers ample opportunity for tailored and extended information.

As sharing information between visitors was one of the pleasures and perceived benefits 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 visitor meaning-making processes. We can thus talk about knowledge as plural and complex, and meaning-making as emerging in the mix of artifacts, information from the museum, the visitors themselves, and the social process of the visit.

### 5.4. Social movement in space

Experiences aimed at supporting meaningful interpersonal experiences should consider the movement in space and the embodied nature of interaction. 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 artifact I learned something about if I cannot see them. Visitors draw on their bodily resources in these processes of meaning-making.

Pace and pacing are essential to design in museum. This, often, silent agreement about pace 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.

## 6. Discussion

This study has explored how users interact with each other in and with a museum exhibit while 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 *recontextualize* museum objects in a social meaning-making process, 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 and argue for thinking about *interpersonalization*, rather than personalization of museum experiences. If we know what people do, we can build upon and further support that doing.

While topics such as personalization of museum experiences have been much discussed in HCI, this study highlights how this personalization can 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.

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; are recontextualized. 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.

New museology (Vergo, 1989) has attempted to disrupt the traditional power division by putting the visitor at the center, yet this is far from straightforward in practice. Visitors in groups bring with them, share, and create various types of knowledge – as in order to make sense of artifacts – visitors reframe, recontextualize, and build on what the museum provides. Visitors interpret the designed experience, make it theirs. 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 (Eklund et al., 2019).

Table 1 presents the design challenges highlighted in the empirical data: supporting interpersonal meaning-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. Too often, designed solutions for museums expect a user engaged in a single user experience (Woodruff, Szymanski et al., 2001) and by interactive we mean a single user interacting with the exhibit (see Heath & Vom Lehn, 2008). In a study of how visitors perceive the bring-your-own-device to museums (BYOD), smartphones were perceived quite negatively as they got in the way of social interaction (Petrelli & O'Brien, 2018). Indeed, many digital installations to museums build on an interaction model with a single user which is unsuitable for the, often, social nature of museum visits (Heath & Vom Lehn, 2008). 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. have 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., 2014, p. 625). Yet, there are inherent conflicts between the social framing that visitors coming in groups 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.

Even if this study builds on a small qualitative sample of Swedish museum visitors, the evidence in the study at hand suggests an increased focus on interpersonal, social aspects of a museum visit when designing for museum experiences.

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