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## Type

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

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## Introduction

This document reports on the primary activity of Work Package 3 during the first part of the project: the development and analysis of two hybrid museum experiences based on the concepts of appropriation and play. The work has been done by NextGame in collaboration with a team of GIFT researchers at the IT University of Copenhagen with technical support from the University of Nottingham. One GIFT researcher from Uppsala University took part in the work as the role of a visiting theorist.

The GIFT project undertakes design experiments in museum experiences that are *hybrid*, *meaningful* and *interpersonal*. The concept of a meaningful interpersonal museum experience originates in the new museology perspective, dictating that such experiences should cater to the needs of visitors and should account for their social and cultural framing during their visit to the museum. In GIFT we engage with meaningful and interpersonal experiences through three key mechanisms: *strong personal ties*, *gifting* and *play*. Work Package 3 focuses specifically on play and playful appropriation. Our strategy is to work with playful involvement with museum experiences through the lens of “playification” [48], a term offered in contrast to gamification [49] to focus entirely on playful rather than gameful forms of engagement. The key to creating such engagement lies in fostering forms of creative and transgressive play, in which empowers players to not just play within the given rules, but also play with the rules. In such experiences, players can creatively and transgressively bend the rules of the game for their own purposes.

GIFT focusses on hybrid experiences, realised through mixed reality designs that complement, challenge or overlay physical visits with digital content. Digital media now merge with the physical museum experience in ways that expand the experience beyond the time and the space of the visit. However, it remains an important challenge to establish user experience designs that support complex and nuanced interpretations and forms for sharing. We found a lack of systematic understanding on how museums can create experiences that are able to overlay and connect multiple narratives and modes of engagement. It is critical that our technical installations do not ignore the nuances that are already in place, but rather enhance and deepen them. Hybrid, mixed reality solutions offer multiple ways in which the artefacts and the museum can be connected to digital experiences. The spatial organisation of the museum as well as its cultural identity as a (particular) museum are overlaid by alternative interpretations and trajectories offered by the digital content. This opens up for solutions where visitors can actively co-contribute with their own narratives.

In this report, hybrid experiences are presented as *layered* experiences, where visiting the museum and using the technology become separate experiences that both connect and disconnect from one other. A central challenge in designing these experiences is to ensure that the digital layer does not replace the physical museum visit. This report describes the specific tensions that arise when introducing hybrid visitor experiences to a museum.

First, the background and motivation of the work is presented in the form of a literature review. Following a *Research through Design* approach [47], the report then presents a detailed account of the process of designing, deploying, and analysing two prototypes. This is followed by a presentation of the findings of our deployments and a discussion of our design insights. The final contribution of this report is a framework that describes how the hybrid visitor experience connects or disconnects to the museum from three different perspectives: to its collection of artefacts, to the visit and the visiting group, and to the museum as an institution. The framework helps designers and museum professionals anticipate the tensions that will arise when designing hybrid experiences and points towards design strategies for dealing with these.

## Background

### Museum as Experiences

There is a fundamental divide in the museum world between the contrasting beliefs that the museum should be about objects or about ideas [43,44]. *New museology* [10] gives priority to the visitor experience rather than the museum as a cultural institution and a collection of objects. Over recent years, museum institutions have increasingly shifted their focus: from highlighting the physical collections on display to the stories and experiences that they can share with their audiences [22]. The introduction of digital technology has proven to be relevant in this effort since it allows museums to engage their visitors through their personal devices that they use in their everyday lives. Digital technology also allows visitors to co-create their own experiences [13,28]. Howes [24] argues for a ‘sensory museology’ in which visitors can interact with museums using all five senses — sometimes augmented or facilitated by digital technologies. Examples include Andermann and Arnold-de Simine’s work on memory-based museums and their focus on evoking emotions in their visitors [3]. Other research has studied various practical aspects of how visitors engage with museums: for example, how people move through cultural heritage spaces in relation to other visitors [27], how a museum’s curatorial intent shapes visitor experience [41], how visitors move in response to crowded points of interest [30], how groups of visitors manage a coherent experience [40], how families orient themselves to digital devices in an outdoor museum space [30] how visitors choose what to photograph for posting on social media [21], and the ethical concerns that arise when visitors engage with a museum by creating their own digital content [25].

### Hybrid Museum Experiences

Within the context of the museum, hybrid experiences [38] have often been seen as a way to engage visitors through participation. Such designs might solicit participation from visitors [34,35], from museum professionals [4,12,31], or both [36]. Participatory aims are also achieved, or attempted, by incorporating participatory art or performance art in museums [20]. Interest in this type of work within the HCI community is illustrated by the day-long workshop on ‘Involving the crowd in future museum experience design’ at the premier HCI conference [42]. Much work has pursued emotional or social approaches that fit well with the priorities and methods of new museology [5,8,9,14,29,39].

### Frictional Hybrid Experiences

While most work on hybrid experience design focusses on the challenges related to create as integrated experiences as possible [6], there is also a strand of interaction design research that has investigated ways in which the physical and digital aspects of an experience need not always be fully aligned. In early work on seamless design [11,12], Chalmers et al. argued that it may not always be beneficial to hide the inner workings of the digital infrastructure from users. Rostami et al. [31] explored how performance artists will sometimes combine VR and real-world experiences in ways that capitalize on, rather than hide, the friction between the physical and the digital. Work on experience design based on the concept of trajectories places particular emphasis on how to design transitions between different media [7] that are not only visible and actionable, but also engaging. In

the context of museum experiences, Fosh et al. [19] suggested an approach to overlaying digital experience on sculptures in which visitors followed a five-stage journey through each exhibit – approach, engage, experience, disengage and reflect – with the official interpretation only being revealed during the reflect stage. These examples show that it is critical to understand how the digital and physical are connected in hybrid experiences, and that a fully integrated experience is not always possible or the best solution.

## Methodological approach

Our approach has been one of *Research through Design* [47] in which research findings emerge from design practice. We worked in a practice-led manner through the design, prototyping and review of two contrasting visiting experiences as a way of engaging with the changing face of the modern museum and the role that hybrid technologies might play in reshaping the visiting experience. Our design team included a professional game design company as well as academic researchers with design, HCI and museology backgrounds. We worked “in the wild” [15] — selecting a museum partner that would help us engage with the challenges of contemporary museum interpretation and then working in its space and with its staff and visitors over the course of a year to inform, test and challenge our designs. The two designs as presented within this report were introduced as ways of critically probing the issues in a complex and challenging setting. In describing them, we present both the design tensions that emerged from team discussions and the feedback that we gathered from curators and visitors.

## Context: The Museum of Yugoslavia

The Museum of Yugoslavia, situated in the Serbian capital of Belgrade, has more than 100,000 visitors a year and is the most visited museum in Serbia. The museum is located on the grounds of the former communist leader Josip Broz Tito’s palace, and houses the grave of Tito and his wife. The museum presents a wide range of artefacts and stories connected with Tito’s life and work.

From our initial research visits at the museum, an impression emerged that the dominating presence of Tito’s legacy - the collection of artefacts and the grave - presented a challenge for the museum curators in developing a more critical perspective. While many visitors come to the museum with the main intention to pay their respects, the history of Yugoslavia offers many lines of conflict and contention. After five decades as a socialist state containing six republics held together under communist rule, the country fell apart in the early 1990s leading to a vicious war, and many conflicts remain unsolved. The museum aims to adopt a critical approach, presenting a broad view of the history of the Yugoslav republics.

“Principles, values, interpretation and even heritage itself are changeable categories which are created in relation to the contemporary context—ideology, politics, the economy and scientific models. Because of this, we encourage CRITICAL THINKING and presentation of diverse views of the same events, documents or data” (Strategic Plan 2014-2018 Museum of Yugoslav History, 2014, caps in the original).

The museum representatives in the project have expressed a desire for the museum to reinvent itself as a modern museum that explores how digital technologies may help enable a more participatory and dialogue-based visitor experience. The tension between the dominating presence of Tito’s legacy and the desire for a more critical perspective on Yugoslavian history presented us with rich

opportunities for using hybrid experiences to tell alternative stories and present alternative experiences.

## Twitto

*Twitto* was developed in direct response to the strong focus on Tito's legacy in the museum. The concept explores Tito's skilled use of propaganda and how it relates to contemporary political rhetoric. It was based on the idea that if Tito had been alive today, he would probably have been a skilled user of social media such as Twitter. After all, Tito was unusually successful, as he managed to hold a fractured country together and stay in power for 35 years. The app would teach visitors about Tito's propaganda tactics and then challenge them to put themselves in the role of an authoritarian leader constructing their own propaganda messages. The key design goals of the *Twitto* app were based on the ability for visitors to connect to objects within museum, adopt critical perspectives of the historical contexts that surround those objects, and appropriate their own perspectives based on the presented historical narrative of Tito's propaganda.

In order to connect the physical and digital elements of the experience, we created a series of visual labels that were placed around the museum that visitors could then scan with their mobile devices. These labels were placed near the relevant objects within the museum, so when a label was scanned, the player would create a propaganda story based on that item. The Artcodes platform [1] was used to provide the scanning functionality, as this supports the visual design of scannable labels that are customisable to suit the aesthetics and visual design of the experience. The intention was that, by scanning an ArtCode, visitors could connect the physical objects on the display to the propaganda stories within the app.



Figure 1: The placement of an ArtCode next to an object within the Museum of Yugoslavia

Given the historic tensions and still simmering conflicts in several parts of the former Yugoslavia, the design team was concerned about causing offence when inviting visitors to the museum to engage

in playful behaviour that could include transgressions such as mockery and incivility. At the same time, the team was concerned about adopting an uncritically laudatory tone -- possibly causing them to adopt the version of Tito's history that had been used in propaganda. A key focus of the game's design was its narrative: it was intended to strike balance between descriptive and critical perspectives, treading a careful line between several concerns:

- 1) Presenting Tito's historical significance and the rich contents of the collection from a critical distance.
- 2) Presenting an engaging and playful narrative combining historically accurate material with obvious elements of fiction (e.g. Tito using Twitter), without confusing visitors about which parts are true and which are fiction.
- 3) Inviting visitors to make playful contributions, while dealing with the risk that certain topics and prompts might invite disruptive behaviour (e.g. racism, hate speech).

The design of Twitto underwent two iterations, with the near-final version play-tested on 22nd February 2018. This version of the app was a single-player role-playing game, in which the player is cast in the role of a resistance leader and eventually dictator. The app consists of a series of "chapters" — each presenting a period of time in Tito's life and connected with an object in the collection of particular significance in the story (or myth) of Tito. Stickers with Artcodes were posted next to artefacts in the exhibition (see Figure 1), which were designed to resemble insignia on partisan uniforms from Tito's rebel army during World War II. Scanning an Artcode takes the player to a brief narrative explaining the significance of the object, after which the player is prompted to put themselves in Tito's shoes, e.g.: "If you were a political resistance leader, what would your party be called?", "What would your propaganda poster look like?", etc. For each "chapter" in Tito's biography, the player is tasked with answering a series of prompts (see Figure 2). The input is fitted into a pre-designed template, resulting in the player assembling a propaganda item - a poster, a party manifesto, a book cover, etc.

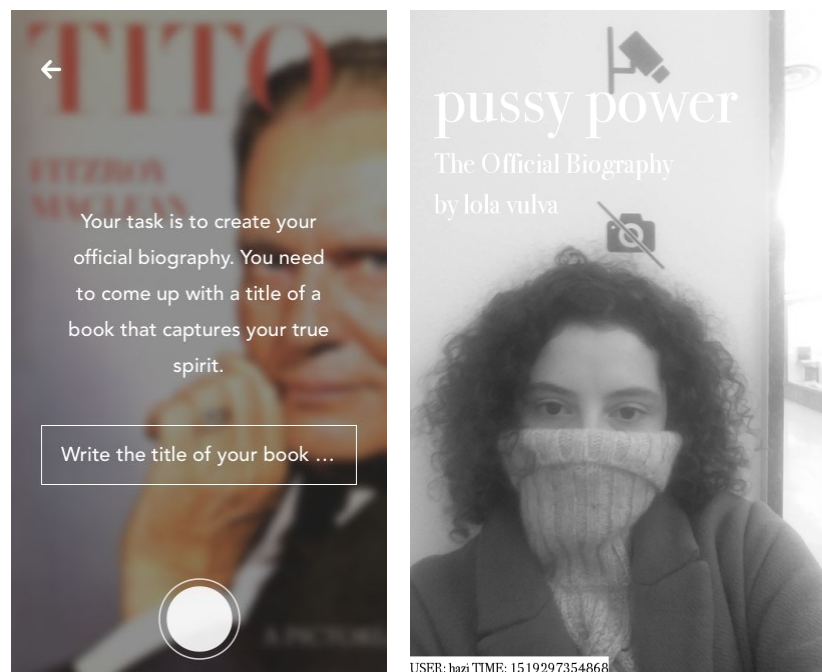


Figure 2: Players could create their own propoganda items by answering questions.



## Monuments for a departed future

Where *Twitto* was designed to be a humorous play on the narrative of the museum and closely connected to its objects, *Monuments* was designed as playfully poetic and serious. In contrast to *Twitto*, it focused on objects that were *not*, and could not be, on display in the museum. The selected objects were the ‘Spomeniks’, socialist monuments placed all over the former Yugoslavia. These are not represented in the permanent exhibition. Just as with Tito himself, the monuments are focal points for ideological battles and offer rich possibilities for contrasting interpretations, —something that a layered experience could highlight. Building on Andrea Witcomb’s [45,46] ideas on affective curatorial strategies that encourage critical engagement with a historical topic, *Monuments* presented users with a series of poetic provocations. The game was designed by one of the participating researchers, with the goal inviting a playful yet serious mindset that could trigger visitors’ imaginations, build attentiveness, evoke emotions and facilitate reflection.



**Figure 3: An Artcode representing a monument, placed at the back of a desk.**

In order to give the monuments a physical anchor point in the museum, we used Artcode markers that were graphically similar to the monuments. These were placed inside the existing exhibition (Figure 3). The app provided clues on how to find each marker, inviting a playful activity of searching for the markers inside the museum space and to let the hidden placement of the markers mirror how many of the monuments are in remote locations, hidden from public consciousness. Each marker served as an entry point to one of the existing monuments as well as to a specific theme relating to their history. The app included eight such themes, identified in collaboration with museum curators. After scanning a marker, the user was presented with an image of the monument and a short text on the theme. At this point the user could choose to get more detailed information about the monument, take on a challenge (the poetic provocations) or answer a question. For each marker scanned, the app would add the corresponding monument to the user's collection.

The challenges were presented on the backside of virtual postcards in the app. They would prompt participants to put themselves in a specific state of mind, using their imagination and their bodies to interact with the museum environment. Some of the challenges were light-hearted, others more emotionally challenging. The questions were written to provoke reflection and to link the experience

at the museum with the user's personal life outside of it. After submitting an answer to a question, users could view answers from other participants.

## Design process

We followed an iterative design process that resulted in the creation and evaluation of two prototypes that attempted to address these tensions and present experiences in two distinct ways. Following site observation and ideation processes in the first half of 2017, two prototypes were developed and evaluated within the Museum of Yugoslavia. A detailed account of the process is as follows:

### Kick off workshop in Belgrade 22-23rd March 2017

Our collaboration with the Museum of Yugoslavia was initiated by Belgrade-based NextGame. Together we set up a two-day workshop with representatives from the museum 22-23rd March 2017, in order to discuss ideas for playful hybrid experiences at the museum. Present at the workshop was three designers from NextGame, three curators from the Museum of Yugoslavia, one curator from the National Museum of Serbia and altogether five researchers from the ITU, Uppsala and Nottingham University.

### Developing ideas and prototyping

In the following months, NextGame and the ITU team engaged in a design process and developed a number of concepts in close collaboration. This resulted in two prototypes: *Monuments for a Departed Future* (*Monuments* for short) and *Twitto*. During this time, NextGame had several meetings with the Museum of Yugoslavia to discuss their ideas.

### Workshop 13th June 2017 at the Museum of Yugoslavia

In order to explore the content of the two concepts, a workshop was arranged at the Museum of Yugoslavia. The topic of the Yugoslav monuments was discussed in depth as well as the historical context for the *Twitto* concept — one that was based on the life and personality cult of Tito. Present at the workshop were three curators from the museum, three designers from NextGame, one researcher from ITU and one from Uppsala University. After the workshop the content of the prototypes were finalised before the first trial.

### First trial 19th June, 2017

The first trial of both *Twitto* and *Monuments* was carried out at the Museum of Yugoslavia on the 19th of June. NextGame recruited four students from the University of Belgrade to be testers. The trial was followed by semi-structured qualitative interviews. The interviews focused on the tester's experiences of using the prototypes within the museum environment.

## Second trial 28th June, 2017

The second trial took place on 28th June as part of a workshop with the research partners in the GIFT project, and was followed by group discussions. Audio from the interviews was recorded, and transcribed for analysis along with written feedback statements from each of the experts.

## Evaluation and design iterations

After the first two trials the data from the *Monuments* experience was analysed and made into an academic publication[32]. The *Twitto* concept was also evaluated and the design process involving NextGame and researchers at ITU continued with regular Skype meetings. Out of a need to improve the experience and address the design challenges that were raised in the previous iteration, a new iteration for *Twitto* was developed.

## Third trial 22nd February 2018

The second version of *Twitto* was implemented in a functional app and trialled by 28 people at the Museum of Yugoslavia on 22 February 2018. 10 of the test participants were members of the research team or representatives of the museum, and the remaining 18 participants were volunteers and members of the general public. The trial participants were invited to explore the exhibition on their own, using the app on test devices on which a screen capture system recorded video and audio through device. After the test, the participants were debriefed in group interviews with researchers. The content created by the participants were also collected, as well as technical analytics data and video recording of participants by one team member positioned in the museum space.

## Results from trials

Data from the trials were collected in the form of observations, interviews, screen recordings and content that was created by the participants. *Twitto* was described with as ‘fun’, ‘creative’, ‘really cool’, ‘really funny’. Participants ‘... liked the humour’, and found it ‘inviting’, ‘imaginative’, and ‘an unexpected experience’. The representatives from the Museum of Yugoslavia have expressed their strong interest in developing *Twitto* further with the aim to make it part of their regular offer to visitors at the museum, and a path towards this is currently being discussed with the commercial app designers. *Monuments* was described as ‘spiritual’, ‘powerful’, ‘thoughtful resonance [sic]’, ‘not fun’, and even ‘a historical / emotional rollercoaster’.

However, specific themes emerged that indicated challenges related to the introduction of digital content into the on-site museum experience, as indicated throughout the interviews with museum professionals and visitors related to *Twitto* and *Monuments*. It seemed like the hybrid design did not just enrich the visit, but was rather experienced as a “second layer” that both connected and disconnected from the museum experience. Participants indicated that these aspects were both positively and negatively received.

## Connecting to artefacts

Throughout the trials, establishing an adequate relation to artefacts proved to be one of the central concerns for museum professionals and visitors alike. The design team explored multiple ways to

connect the physical exhibition to digital experiences through technical and narrative means, and through the design of visitor challenges.

However, test users of both *Twitto* and *Monuments* commented that the app experience took their attention away from the physical artefacts on display. Participants widely saw this as an undesirable effect. One *Twitto* tester said, “It was fun, it was inviting, but I expected it to be more connected to the objects in the exhibition”. Another indicated that “I have some kind of expectation at some points I'll be looking at the exhibition, but my focus was only caught on the phone”.

In *Monuments*, the graphically significant Artcodes were placed on or near objects in the museum, and sometimes the playful challenges related specifically to nearby artefacts, such as Tito's grave. However, for the most part the app did not present information related to the objects in the vicinity, dealing instead with the (distant) ‘Spomeniks’. Hence, *Monuments* was deliberately designed to introduce a certain disconnect between physical artefacts and the digital experience, this in order to give presence to objects that were *not* in the museum. This created an experience that was almost physically detached, something that some participants liked and some did not. As one of the participants stated:

“it's taking you somewhere else. It is taking you to the past. It is taking you to the locations where these monuments are, which are all outdoors and then you are indoors. So, you try to imagine it a bit. It's a play of spaces, which we are surrounded with”

Another one stated:

“It's like I am here for the first time. It is completely changing your perspective. You really feel like you never have been here, and actually the things you're seeing now you see with completely other eyes”

For *Twitto*, the disconnect to artefacts became the main point of criticism. It was voiced both by those participants who stated they liked the experience overall as well as by those who didn't. The opinion was also shared among those who worked in museums and those who did not. This was a surprise to the design team, who had put much effort into making this connection clear. Each challenge in the game took a specific object in the exhibition as its starting point, and connected this explicitly to the topic of the challenge.

A possible explanation may be that the great emphasis on playful co-creation quickly lead the participants' attention away from the artefacts, instead getting caught up in the challenge of coming up with playful responses. Once the participant had scanned the Artcode, there was nothing in the app directing their attention back towards the physical artefact. When asked whether they had noticed what physical artefacts were next to the Artcodes they had scanned, none of the participants could mention a single artefact - not even those testers who worked in the museum.

An alternative approach towards reorienting visitor focus towards artefacts is to design visitor tasks that emphasize the artefacts and the museum collection through the way the visitor is asked to engage with them, both narratively and visual and bodily orientation.

One of the challenges in *Twitto* used this approach to connect the digital with the objects on display. This challenge was associated with the part of the exhibition that dealt with Tito's role as a resistance leader during World War II. On display is a famous “Wanted” poster put up by the German forces in 1943, offering a large sum of money as reward to anyone who offered information leading the capture of Tito. An Artcode placed next to this poster triggered a chapter briefly presenting Tito's role as a

resistance leader, and then tasked players with creating “Wanted” posters for themselves. They were asked to look around the physical exhibition and take a picture of a valuable object they would offer as reward for their capture. Since the majority of the artefacts on display in this part of the museum are objects given to Tito as diplomatic gifts, the challenge was well aligned with the theme of the exhibition and there was a rich selection of items for participants to choose from. Several trial participants mentioned this challenge in particular as triggering creative ideas and experiences, in searching the exhibition for precious objects they could offer as a reward for their own capture.

## Connecting to the visit

Both of our trial apps reframed the experience of the museum visit. While both apps were intended to be used while in the museum and contained no content that was relevant before the visit, they invited visitors to use the museum space differently than the ways they were used to. In *Monuments*, participants would move slower and in the form of a scavenger hunt search for the Artcodes. In *Twitto* one challenge encouraged players to search the museum for valuable objects. Both apps encouraged users to exploring the museum space in new ways.

A challenge emerged when it came to fitting the hybrid experience within the timeframe of a museum visit. Some of the participants saw *Monuments* as a deep, contemplative experience that required a slower tempo than the one in which they would usually go through a museum. As such, they would have liked to have more time to explore the content more in depth:

Interviewer: “Is there anything you would like to take away from this experience?”

Participant: “Maybe just the speed. Because in a way I was trying to achieve it as fast as I can because we are in the process. But, I am an art historian, you know, I know part of this so I didn't need to go through the material in detail. But I would actually add more places to sit around just diving into what am I reading. Maybe reflecting a bit more.”

*Twitto* was designed as a more light-hearted experience and several participants pointed out that the app experience left the visitor with little time to take in the exhibition. Some expressed this as feeling a bit guilty for missing out on the museum:

“I felt the pressure from the game to go faster to scan the other stuff and see what's going on and I didn't take the time to look at all the stuff that I would otherwise (...) this way it was just okay, let's just scan the next thing and finish it.”

In both cases the schedule of the trials may have contributed to the lack of time, as participants were given limited time to go through the experience before returning for an interview. However, museum visitors very seldom have unlimited time for their visit, and they are unlikely to allocate more time for a visit just because there is a hybrid experience available.

Adding to its temporal and physical framing, a visit is also socially framed. If the app does not support interacting with people who are not in the same visiting group, it may reframe the visit also socially. In the case of *Twitto*, while the app was designed as a single-user experience, the challenges were easily appropriated for social engagement in visitor groups. This is illustrated by how two trial participants decided to share one phone and complete the challenges together. With its introspective challenges and instructed moments of solitude, *Monuments* is more relevant for lone visitors that do not come with groups, and this is also how it was trialled.

Tolmie et al. [38] emphasise how the social conditions of a museum visit will affect the opportunities for partaking of virtual content. Since museum visits typically are done in groups, visitors will often prioritize the social needs of the group above their interest in the exhibit or the hybrid experience. They report that visitors who had become deeply engaged with an artefact through an AR augmentation were prematurely pulled away by the need to keep up with family and friends. As a partial solution to this, Tolmie et al. suggest that information might best be detached from the artefacts, so that it can be readily carried away (as with a traditional guide book). Both *Monuments* and *Twitto* follow this recommendation, in how the apps allow users to move freely around in the museum space after having scanned the Artcode that triggers a challenge.

## Connecting to the Museum as a Cultural Institution

In the two experiences explored in the Museum of Yugoslavia, the most interesting tensions arose with respect to the museum itself. Judging by the various reactions, both positive and negative, one might infer that both *Twitto* and *Monuments* challenged the expectations of both museum professionals and museum visitors, regarding what to experience in the museum as well as norms and ideals for visitor behaviour. Below we will discuss multiple aspects of the cultural norms around museums that seems to have affected the experiences of *Twitto* and *Monuments*.

### How to Behave in the Museum

At the most basic level, using an app in the museum causes people to behave in ways that depart from the expected norm. During the playtests, participants could be seen looking at their phones, searching for monument codes or sitting down in deep thought (the latter in *Monuments*). In post-experience interviews from both *Twitto* and *Monuments*, it became clear that participants were unsure whether this kind of behaviour was acceptable in the museum. Most test participants expressed no concerns around the activities facilitated by the app per se, such as taking selfies that invited playful posing for a prison "mug shot" and making playful commentary on museum content but rather on the inappropriateness of doing this in the context of the physical museum visit. Some instructions were seen as more challenging than other, as in this example from *Monuments*:

“One of the challenges required you to close your eyes. The sitting down is all right, and it does engage you to actually go through space and do something you would not actually do. (...) But the eye-closing one... I did it but not really sincerely. (...) Just the thought of it, looking weird to onlookers was off-putting.”

### Serious versus Playful

The invitation to play in the museum seems to have been challenging for visitors. As discussed previously, the *Twitto* app aimed to tread a careful balance between the playful, the critical, and the historical narratives. In the trials, several participants expressed uncertainty about this: “I was confused and I didn't know if it was meant to be serious or not”. In the interviews after the trial, participants mostly used words such as ‘fun’, ‘creative’ and ‘superficial’ to describe their experience. However, one participant suggested that the app should make it clear to users that joking is acceptable, by including an explicit instruction in the beginning to “remember to have fun”.

Looking into the co-created content, we see that participants responded to the challenge of making propaganda for themselves by connecting to their personal lives at varying levels of seriousness. Some adopted a playful tone, others aimed for a more serious approach. For instance, when asked to

give a title to a fictive manifesto, participants suggested titles like: “Revolutionary Cats: Cats are life”, “Gluten: Free gluten to everyone”, “Feminazi: One woman to rule them all” and “Justice: Death to capitalism”. Some participants who tried to write serious messages were instead worried that this might make them look silly.

“my slogan was ‘stand for new humanity’, and ‘I fight against mass-manipulation’, and those kinds of things. Sort of for me, like I look silly, [but] it was serious for me”.

With *Monuments*, players tended to take a more serious stance and be more emotionally engaged with the content. Test participants largely understood it as a serious experience and engaged emotionally with its content. One of the participants described it as a “historical / emotional rollercoaster”, because of how it connected historical topics with personal life outside the museum. Another participant described it as: “waking you up in a way”. Having a playful approach to serious and sometimes very personal topics was off-putting for some participants:

“One of the things that threw me off was the challenge about personal conflict and forgiveness, since I felt it was making light of that topic and I didn't like it.”

However, the same challenge was perceived as serious by another participant: “especially this part with the forgiveness. For me it was really deep and maybe most powerful”.

### **The Transformative Experience**

Museum professionals did not express concerns related to the playful and humorous tone of *Twitto*. Rather, their chief concerns related to the depth of the experience. The museum representatives were quite clear that they were not interested in bringing in play or technology just to attract new visitor groups. Rather, their motivation was to find ways for visitors to engage more deeply with the museum, seemingly reflecting the “forum” ideal of new museology [10], in which the museum should see its mission as facilitating dialogue and debate. Already at the start of the design process, in a workshop in March 2017, one of the museum representatives put it as follows:

“more people is not basic goal. Definitely not. It's to get those values that we don't have right now. Maybe you will hear stories that you don't know right now. Maybe you see perspectives you didn't see until this point. (...) We are trying to unlock one more perspective, one more meaning, what this object means to another person. This is how we see technology as a tool. Whether this tool is triggering them to use it while gaming, then sure, why not.”

The museum professionals' concerns reflect an idea often brought up in museum literature, that a visitor experience should be “transformative”. Soren [37] describes a prevalent motivation among museum professionals for visitors to not only learn something, but to have a meaningful and deep experience that has an impact beyond the visit – that somehow will change the visitor. This can be understood as part of how museums strive towards becoming “agents of well-being and as vehicles for social change” [33:2]. Making museums more participatory [35] has become a recognized way to support this development and this is reflected in the designs of both *Twitto* and *Monuments*. During the same workshop, one of the museum professionals explicitly echoed this line of thought:

“We want ten people to actually go out of the museum changed and not a hundred thousand of people that were gaming there.”

During early playtests, museum professionals expressed some concerns in this vein: Would play in the museum lead to trivializing the visitor experience? During one of the early design workshops when the design team asked the museum representatives to consider their concerns that a game might cause offense, this trivialisation concern was explicitly expressed:

“I don’t have [as much] problem with that as I have about the superficiality. I think it’s a tricky thing that we should be careful about when we are making games. (...) It should be the tool that makes the museum context more interesting, interactive and engage people, but we shouldn’t make a game for the sake of games. I think [your game] was super funny and I like that it uses the collection, but what else? I would need some other layer.”

## Museums as Collections of Artefacts

The significance of the museum as a cultural institution is not entirely separable from the museum as a collection of artefacts. In their role as curators and preservers of valuable artefact collections, museums become oriented towards the production of stable narratives, unified heritage values and socially symbolic meanings such as local or national identities [11]. The objects become the safe way to ensure stability of meaning, because of the historic belief in their being ‘objective’ [43]. Hence, when the connection to objects is broken or reframed through hybrid media, the cultural significance of the museum may also be challenged.

This issue comes to the forefront in museums with contested material such as the Museum of Yugoslavia, that aim to at the same time be a collection of significant artefacts, and something more. The tension was observed in particular with *Twitto*. We have already discussed how the placement of the Artcodes turned attention away from the actual artefacts, and how the playful tone challenged the visitors’ expectations of how to behave in a museum. We can also see how the mere engagement with the app ‘dethroned’ the objects from their usual significance in the museum context, as expressed by this *Twitto* tester:

“I really wanted more interaction with the museum, that's why I would come to the museum. (...) To look on objects (...) so I can pay attention to that object to see, okay, I see it, it's not only on a phone, it's right in front me.”

By dethroning the objects status as the core of the museum experience, both *Monuments* and *Twitto* sought to offer alternative narratives around the museum. This comment and other similar comments from trial participants show how this can come to challenge the very nature of the museum. In related work, very similar concerns were voiced by museum curators [26].

## Layered Experiences

*Monuments* and *Twitto* illustrate how hybrid museum experiences offer multiple opportunities for connecting, but also disconnecting, from the physical museum visit. We have shown how both apps were experienced as a layer placed on top of the visit, that connects to it in certain ways and not in others. This, we argue, is at the same time a design asset, a challenge and a necessary consequence of introducing hybrid experiences in the museum context.

In order to understand how the layer effect comes about, we can consider the conditions under which it does not. It is unlikely that solitary multimedia installations, such as a film kiosk, an immersive VR



experience, or a singular interactive cabinet would be experienced as a separate layer. While such installations are to some extent hybrid in themselves, they are largely isolated, leaving the overall shape of the wider museum visit unaffected. The museum layer dominates and clearly subsumes and frames the digital layer. The multimedia asset is experienced as ‘yet another object’ on display. At the other extreme, we have the ‘museum on the Internet’ approach in which the museum experience is completely virtualized. The digital layer dominates the physical visit and effectively makes it obsolete. Again, there is no sense of a ‘second layer’ as the experience is completely disconnected from the museum visit.

	<b>Artefact</b>	<b>Visit</b>	<b>Institution</b>
<b>Museum guide</b>	Preserved	Preserved	Preserved
<b>Twitto</b>	Reframed / Replaced	(Mostly) preserved	Reframed
<b>Monuments</b>	Replaced	(Mostly) preserved	Reframed

**Table 1: Preserving, reframing or replacing the museum.**

The experience of two layers thus comes about from a *partial* connection between the virtual and the physical aspects of a hybrid museum experience. As such, it is intrinsically tied to the notion of hybridity, as hybrid experiences require both physical and virtual content and presume that there also exists some kind of relationship between the two. When this connection is partial, a hybrid experience comes across as not just one but two (and possibly several) experience trajectories [7] that intersect and cross-feed each other in multiple ways and where neither dominates the other.

Below, we will discuss the design space of such connections. Some designs will aim to connect seamlessly, *preserving* and possibly enriching the way the museum is usually understood. But the goal may also be to somehow *reframe* the museum, e.g. by presenting an alternative motivation for visiting or an alternative narrative about its collection. Finally, some aspects of the museum may become entirely *replaced* through the visitor’s engagement with the digital content.

We can further distinguish three perspectives on how the connection is made or broken. First of all, given the importance of the museum collection of artefacts, the *artefacts* on display form an obvious point of connection for the physical and the digital. Secondly, we have discussed how the time, space and social context of a museum *visit* can be used to frame the hybrid experience. The final, and in our exploration of the Museum of Yugoslavia most challenging, connection to the museum emerges at the level of the museum as a *cultural institution*.

It is useful to compare the experience of using *Monuments* and *Twitto* to that of using an ordinary museum guide (Table 1) as a museum guide will preserve the significance of the museum from all three perspectives. The artefacts on display form the primary connection and their meaning is preserved, but possibly enriched, by the information available in the guide. The visitor guide is useful only at the time and place of the visit, and will typically either prescribe a canonical path through the museum or let the user select his or her own path. Finally, the visitor guide will seldom challenge but rather emphasize the cultural significance of the particular museum, as well as museums in general.

*Twitto* was designed to connect the digital context closely to artefacts, through tasking the player with finding specific artefacts in the exhibition. However, these were reframed through the co-creative game challenges connected to them. During the trials it became clear that the placement of the Artcodes drew the players’ focus away from the objects, effectively replacing them with the digital

content. *Twitto* connected closely to the visit, and only marginally reframed it through (potentially) requiring more time and suggesting alternative routes and places of focus in the exhibition. Finally, *Twitto* was deliberately designed to connect to and critically reframe the Museum of Yugoslavia as an institution, primarily through *Twitto*'s ambiguous narrative, that was sometimes serious and sometimes playful and satirical. This created challenges for visitors and museum professionals alike, as this created a disconnect to their expectations on how to behave in the museum as well as to what a museum experience should offer.

*Monuments of a Departed Future*, on the other hand, was deliberately designed to replace the artefacts on display with a focus on the 'Spomeniks', something that was reported as 'transporting' the participants to another place. As with *Twitto*, the hybrid experience was closely connected to the social, spatial and temporal frame of the visit, although the hybrid experience might require more time than an ordinary visit. *Monuments* connected fairly closely to the museum as an institution, and specifically to its significance as Museum of Yugoslavia through the introduction of the 'Spomeniks'. It was perceived as less challenging in the museum context than *Twitto* in that it was not interpreted as inherently playful, but more challenging in that it asked participants to change their behaviour in the museum (e.g. sit still and close your eyes).

## Design Insights

The explorations of *Twitto* and *Monuments* uncovered some critical tensions in the design of hybrid experiences. While these manifest in the way that hybrid experiences connect and disconnect between the physical and the digital, they reflect a much deeper tension present in the museum world and visitor expectations, around the role and the nature of the museum as such. Below, we describe these key tensions in terms of the design challenges that hybrid experiences will face, and suggest some ways in which they may be addressed.

### (Dis)connecting with artefacts

A hybrid experience will often aim to connect to museum artefacts due to their central role as the major asset of a museum. The virtual content may, for example, be used to provide additional information on artefacts, to turn the users' attention towards artefacts on display, or to discuss artefacts that are not displayed in the museum but are still relevant in conjunction with the ones on display.

If the experience is intended to connect the physical and the virtual via artefacts on display, that connection has to be physically construed so that the visitor's attention is – at least briefly – directed towards those artefacts. With a phone app, the most obvious way to achieve visual focus is to have the visitor direct their phone towards the object and look through its camera. In this sense, a scavenger hunt that requires the user to photograph objects and a visual object recognition algorithm fulfils the same purpose.

However, the placement of interpretative information in relation to artefacts of interest within a museum is not an entirely straightforward matter. Having the participants direct their phones at objects also shapes the visitor's behaviour in the museum. For example, if many visitors gather around particular artefacts and point their phones at those, this may lead to crowding and annoyance to others, while it might still hide the relationship to the artefacts as people focus on their phone screen.

There are indeed many reasons to question if the artefact-level connection must always be a priority. As mentioned, Tolmie et al [40] challenge the idea that using an app by necessity will enrich the physical artefact experience. Sometimes, it may provide a better experience to disconnect the digital content from the objects, letting the user experience the latter ‘live’, and perhaps revisit them digitally at a later time. One must also keep in mind that museum collections include a host of objects that are not on display. Hence, an important reason to disconnect the physical and the digital experiences at artefact level is to make room for showing some of the objects that are not on display. Today, many museum institutions have digitized large parts of their collections. While digital collections provide a rich asset for hybrid museum experiences, any such solutions invariably create a disconnect between the physical and virtual layers of experience. *Monuments* represents a design exploration into this space.

Finally, if the app does not connect at the artefact level, or if the artefacts are substantially reframed by the connection, the hybrid design runs a risk of challenging the very identity of the museum. While museums may have reframed their objective as presenting experiences, their artefact collections still form their major asset.

## (Dis)connecting to the visit

A museum visit is framed temporally, physically and socially: it takes place during a particular time, visitors typically come in groups, and visitors will traverse the museum in a particular way. In general, a hybrid museum experience need not be spatially or temporally constrained by the physical visit. The traditional museum guide preserves this relation, by being relevant precisely when the user visits the museum and offering content based on how they choose to traverse it. At the other extreme, a virtual guide to the museum would break the connection by letting the virtual replace the physical entirely. Some hybrid experiences that stay within the temporal frame of a museum visit can still encourage new ways to explore the museum, as with a treasure hunt that encourages people to go to unusual places within the museum. Others break the spatial and/or temporal frames by presenting content that is relevant in preparing for the visit, or is retained after the visit (e.g. by sharing it over social media). Finally, visitors can be encouraged to engage with other visitors to the museum during, before and after the visit. In our trials, we primarily explored opportunities for sharing the experience post-visit, publicly through social media or locally at the museum.

Even when framed by the physical visit, its structure can be deliberately reframed through a hybrid experience. Treasure and scavenger hunts create incitement for visitors to traverse the museum in new ways, while contemplative experiences such as *Monuments* create an incitement to go slower. Hybrid experiences can encourage visitors to connect to other visitors, or engage them in deeply personal experiences. In this context, we saw a need to present visitors with a clear sense of the scope of the experience, how long it will take and how intense it will be. Many apps will benefit from using short bursts of digital interaction, so that the visitor is free to pick up and put away the app at any time to focus on the actual exhibition and their visitor group. But as shown by *Monuments* it is also possible to foreground a rich second layer and an intense experience, wherein the ordinary museum visit experience becomes more of a backdrop.

## (Dis)connecting to the museum as a cultural institution

With the Museum of Yugoslavia, the most challenging forms of disconnect related to the deliberate reframing of the collection and the museum as such. In general, there are a couple of ways in which such tensions may arise.

Firstly, as the identity of a museum is largely that of offering a collection on display, reframing or replacing artefacts through virtual content becomes a challenge. But even when an artefact focus is maintained, the identity of the museum might become reframed. The museum's identity may be rooted in a particular collection of objects (e.g. a museum devoted to modern art), or in a specific person or archive (e.g. the Van Gogh Museum, the U.S. presidential libraries), it may be located in a place of particular significance (e.g. an archaeological site such as Colosseum), or belong to a particular city or region (The City Museum of Barcelona, The National Museum of Denmark). Challenging the museum's identity can cause friction with the museum professionals and confusion among visitors. Finally, the very idea of a museum is commonly understood as a revered institution, that comes with a set of expectations on what you can and cannot do as a visitor.

Both of our apps used a play-centric approach towards reframing the museum as a cultural institution, through offering playful challenges to their users. In *Twitto*, this reframing was light-hearted and satirical, in *Monuments* more reflective and introspective. Both were designed as reflections of the museum's identity, and this aspect was largely appreciated by museum professionals and visitors alike. However, the light-hearted and satirical format of *Twitto* was controversial with both museum professionals and visitors. While none of the apps really offered much in terms of information about the museum, it was only for *Twitto* that we saw concerns related to shallowness or trivialization. Perhaps challenging the serious nature of museums is even more controversial than reframing or hiding their collection.

Reframing or challenging the museum's identity is sometimes the very reason for introducing hybrid experiences. Hybrid experiences can contest dominant narratives as well as present opportunities for visitors to co-create their own narratives. They can provide space for reflection and critical assessment. But designing this requires establishing a sensitive balance between reframing and reverence, one that more likely than not will require intense collaboration with museum professionals and visitors to achieve.

## Conclusions

Museums turn to hybrid experiences as a way to layer their physical exhibitions with new voices and critical perspectives, as well as offering participatory forms of engagement within the space of the museum.

Throughout detailing examples of frictions, we have highlighted how this comes as a *cost*. To arrive at these desired qualities, hybrid museum experiences cannot integrate fully and seamlessly with the experience of an ordinary museum visit. While disconnects sometimes happen by mistake, hybrid experiences often need to be deliberately designed to create a certain disconnect. Reframing - or even replacing - some central aspect of the museum experience is often necessary in order to provide room for new forms of engagement and new experiences.

Hybrid experiences thus push back at the nature of the museum itself, and they do so in multiple ways. You cannot layer alternative perspectives and modes of engagement on a museum and not expect the *museum* to change. Museum professionals as well as visitors may not find this comfortable, at least not initially.

As a result of Work Package 3 at this point in the project, we propose a framework based on how the hybrid experience connects or disconnects, to the museum from three different perspectives: to its collection of artefacts, to the visit and the visiting group, and finally to the museum as an institution.

Our framework helps us in our future work to anticipate the tensions that will arise, and point towards some design strategies for dealing with these. Next steps will be to continue the process of designing hybrid museum experiences for appropriation and play and to improve our design strategies based on what we have learned so far.

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