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BEYOND CONTROL - THE COLLABORATIVE MUSEUM AND ITS CHALLENGES

International Conference on Design and Digital Heritage Stockholm, Sweden 2013, Proceedings

NETWORK	
OF DESIGN	
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HERITAGE	

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# Welcome to the NODEM 2013 Conference!

NODEM 2013 marks the 7th international and interdisciplinary conference forum on digital media and technology at museums and exhibitions. During the last decade, the Nordic Digital Excellence in Museums (NODEM) has been setting standards and has opened new collaboration opportunities in the digital heritage industry for the benefit of exhibition designers, media producers, educators, engineers, artists, ICT developers, museum and heritage sites professionals, science and discovery centers, etc.

Founded by Dr. Halina Gottlieb in partnership with Interactive Institute Swedish ICT and starting out as a Nordic initiative from the Nordic Council of Ministers, NODEM has quickly attracted partners and members from around the world and has become the leading conference in the field with a vibrant community of over a 1000 active members that represent a great variety of fields of activity and areas of research such as interaction design, exhibition design, museum studies, media and communication studies, digital curating and technologies. Ever since the NODEM forum's inauguration in 2003, we have continued our series of conferences, culminating with last year's NODEM Conference success in Hong Kong, the first NODEM Conference held outside the Nordic countries, bringing together 22 keynote speakers and 80 special sessions' speakers from different countries around the world.

We are celebrating our 10th anniversary milestone with a new conference hosted in Stockholm. Centered around the theme "Beyond Control – The Collaborative Museum and its Challenges", the NODEM 2013 Conference aims to highlight and investigate a variety of challenges that museums and other culture-historical institutions are facing in an increasingly digital and media saturated landscape. NODEM 2013 brings together museum and heritage professionals, innovation experts and practitioners to enable discussion on the potential of collaboration and innovation. The conference is organized by the NODEM Network of Design and Digital Heritage, Interactive Institute Swedish ICT in collaboration with Stockholm City Museum and the Swedish Exhibition Agency.

In this proceedings publication, we have made a selection of research papers and current projects run by professionals hailing from research organizations, cultural heritage institutions, creative industry and universities from all corners of the world. It is our sincere hope that these proceedings will inspire and contribute to the advancement of our understanding of innovating museums and other cultural heritage institutions, and serve as a point of departure for even greater achievements in the field.

We have also undertaken the effort to publish all the abstracts of selected presentations delivered in the past NODEM conferences or scheduled within this year's conference, in our digital repository http://repo.nodem.org/. Our ambition is to create a patrimony of knowledge, know-how and best practices departing from the experiences, innovations and insights that emerge in the context of multidisciplinary collaborations.

We would like to thank all our members from the organizational, coordinating, program and editing committees for the hard work and outstanding team effort, as well as our partners and all the dedicated reviewers and volunteers for their time and care with which they undertook their tasks. Finally, we would like to express our gratitude to the sponsors of NODEM 2013: Swedish Arts Council, The Swedish Foundation for Humanities and Social Sciences, Digital Heritage Center and Interactive Institute Swedish ICT.

You have all contributed to a very important conference in the digital heritage sector. Thank you ALL!

Halina Gottlieb Founding director of NODEM at Interactive Institute Swedish ICT



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# Bringing the kids along: creating a new Kon-Tiki exhibition for both parents and children

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#### Holger Fangel, Levende Bilder.no, Norway

# Cory Grier, Artworx

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Abstract: Following the release of the motion picture "Kon-Tiki" in August 2012, the Kon-Tiki museum decided to upgrade its main display: the story of the Kon-Tiki raft sailing from Peru to Polynesia in 1947. We also wanted to involve children in the story, an aspect sorely missed at the museum.

Fish, sea creatures and tiny animals are found on almost every page in the best seller by Thor Heyerdahl, about the Kon-Tiki voyage. Amongst these interesting characters we found a tiny adventurous crab - nicknamed "Johannes" by the crew - who we choose to be the main character of the story and to communicate with the children. "Johannes" had to be given a form and we needed to create both a personality and supporting characters, with reference to the true story.

The extremely limited space available for this exhibition proved to be the main challenge. Independent displays for children, or separate activity areas could not be developed. The resulting exhibition had to somehow connect different age-groups in one flat display. We decided to develop a story-line which could be followed simultaneously by both children and adults so that families could pass through the exhibition experience together. The design meant that they could all follow the same story at a similar pace, through age-appropriate material set at different levels of the display, with connecting points now and again as they proceeded through the exhibition.

The impressive visual design of the Kon-Tiki movie led us to seek collaboration with designers involved with the film project, Artworx. A few years earlier Qvisten animation studio had developed a TV series based on the character of young Thor Heyerdahl, and we wanted their help in developing the children's interface. This presentation tells the story of the development of this new exhibition at the Kon-Tik Museum, and also presents some feedback from our visitors.

Keywords: exhibition, children, design

#### Introduction

On April 28<sup>th</sup> 1947 a balsa raft left the port town of Callao outside Lima in Peru. When, after 101 days at sea, it stranded on the reef on Raroia atoll in the Tuamotu island groups the Kon-Tiki raft had become the prop in the greatest sea-adventure of its day. Since 1950, 17 million people have seen the raft on display at the Kon-Tiki Museum. In August 2012, a motion picture dramatizing the story behind the expedition was released. It was the most expensive motion picture made in Norway to date and presented a new and fantastic visual image of the raft at sea.



Fig. 1: Architectural model of the new permanent Kon-Tiki Museum built in 1956 (Courtesey of the Kon-Tiki Museum).

Earlier in 2012 the museum had discovered that the Kon-Tiki raft had to be restored. All ropes lashing the main logs together had to be replaced. The whole raft was to be taken apart and put back together again, by Olav Heyerdahl, the adventure grandson of Thor Heyerdahl. The timing with both restoration and a new movie was perfect, and the museum decided to upgrade its Kon-Tiki display. We decided on two main goals: first, we wanted to use the visual design of the new Kon-Tiki motion picture as inspiration; second, we wanted to involve children in the story.

Our decision to be inspired by the impressive visual design of the Kon-Tiki movie led us to seek collaboration with designers involved with the film project. Artworx, a small marketing and design firm that had developed a lot of the movie's marketing material seemed ideal. Our second goal, to involve children in the exhibition still had to be developed. A few years earlier Qvisten, an Oslo based animation studio that has made several animated children's movies had contacted the museum. They worked with developing a TV series based on the character of young Thor Heyerdahl and sought our help in providing ideas for the script. Now it was their turn to help us by developing ideas for a children's interface within the exhibition.

# The main design idea

The original Kon-Tiki Museum was a wooden building constructed in 1949. At the time no one believed that the Kon-Tiki raft could sustain enough interest for a permanent museum. However, with the evergrowing number of visitors a permanent museum building was constructed in 1956. In the season of 1984 visitor numbers peaked at 396,000. The Kon-Tiki Museum is a private foundation. Consequently the museum has to be run efficiently and exhibition space has always been restricted to a minimum.



Fig. 2: The Kon-Tiki hall as it appeared prior to 2007.

The Kon-Tiki raft is placed in the center of a square exhibition hall, level with the floor of the room. The front of the raft is facing the second museum hall housing the reed ship Ra II through open-walled architecture. Visitors are guided around the raft on narrow walk-ways with one side occupied by seats for tourists groups. This leaves only two wall-spaces for the exhibition with people moving by all the time. There is only between 2 to 2.5 meters from the wall to the glass railing surrounding the raft, and visitors have to view the exhibition at quite a close range.



Fig. 3: First version of the background graphics (Courtesey of Artworx, Cory Grier).

In the 2012 motion picture the Kon-Tiki raft was surrounded by a visually impressive ocean; our principle design idea was to convey this image to our visitors. The art-director of Artworx, Cory Grier, constructed a composite picture/artwork of the Pacific with a giant wave in the center of one of the walls. Mounted 70x100 cm glass plates containing pictures on top and text on the bottom, made up the main display, which was placed below the waterline of the artwork. A professional story-teller wrote the text in collaboration with museum staff, and summaries in six languages were provided. A conscious design choice was to have most pictures in black-and-white to give the exhibition a realistic and retro look.



Fig. 4: An artistic rendering of the final exhibition display (Courtesey of Artworx, Cory Grier).

# The children's interface

Our work with the children's interface for the new Kon-Tiki exhibition started with finding answers to some key questions:

- Should the children's interface be a separate exhibition or blended in to the general display?
- Which age-group should we target for the exhibition?
- Who should be the general voice for the exhibition?

The extremely limited space available for this exhibition proved the main challenge. Independent displays for children or separate activity areas could not be developed. As explained above, the Kon-Tiki room only has two tall walls for the exhibition with limited space between the walls and the visitors. In effect, the only realistic option was a flat display, two meters high, starting from the floor up. Only on the second wall could display cases be built to facilitate artifacts or interactive technology.

After some though discussions, we decided to develop one main display that occupied the space from 1-2 meters above the floor. This would be a traditional exhibition with individual stories framed by 70 by 100 cm panels of text with pictures sandwiched between two hung glass-plates. This left a space of 0-1 meter above the floor for a children's story. The main reason for adopting this plan was that we envisaged families experiencing the exhibition together. Adults and older children could read the text and watch the pictures; smaller children who could not reach up to read the main text would then be given an independent story they could follow. The two exhibitions connected at key points in the narrative, thus encouraging communication between adults, older children and younger children.

## Johannes: the main character

Finding a general voice for the children's exhibition was the easiest issue to address and was our starting point. One of the most graphic stories from the Kon-Tiki voyage was the crew's encounter with the largest fish in the ocean, a whale-shark. Since 1956 a whale-shark has been part of an underwater display in the museum basement, and a favorite with school children for five decades. The whale-shark was personified as "Tom" in a small children book produced by the museum. Today, Tom also visits the exhibits as a character in a special-made costume.

In light of this experience, an animal character seemed to be ideal as the lead voice drawing children into the Kon-Tiki story. However, we wanted a narrator that could follow the Kon-Tiki raft on the whole voyage and not only through the deep-ocean sailing. Fish, sea creatures and tiny animals are found on almost every page in the best seller on the Kon-Tiki voyage, written by Thor Heyerdahl. Several of these creatures were named by the crew. The most obvious candidate was Lorita, a colorful parrot given to the crew as a gift on leaving Callao. However, Lorita fell over board and was devoured by sharks. Not a fun story for kids.

An odd pair were the coach-roaches "Per" and "Lise". Per met an unfortunate end when he fell overboard. But Lise never could experience the underwater world. A colony of ants lived under the pillow of Erik Hesselberg, but for one reason or another they were never given pet names. The list of animals visiting or joining the Kon-Tiki expedition is long and diverse: dolphins, whales, porpoises, remoras, sardines, flying fish, yellow-fin tunas, dorados, squid, giant turtles, sword fish, sea stars,

clams, zebra-colored pilot fish, banana flies and fruit bugs. All these candidates either visited the raft for a short period only or lacked a personality that was to our liking. Choosing an animal that could experience both the underwater world of the ocean and who could interact with the people on the raft was our main criteria.



Fig. 5: First drafts of "Johannes" (Courtesey of Qvisten Animation, Khim Tengesdal).

On June 5<sup>th</sup> 1947 the following line is scribbled down in the diary: "Since we lost parrot our main pet has become a little brown crab with white design on back, that lives in little hole in one log near steersman's foot. When we bend down crab-named Johannes-runs out, and when he holds some biscuit crumbs, fish or canned meat between fingers Johannes comes and scratches it from us, then happily carries it to hole and starts eating by putting claws to mouth like a human. If the piece is too big Johannes puts it in hole first, then sits on top of it. Other crabs with different colours come out to look, but somehow Johannes has become our pet." Johannes seemed to have the perky personality of an adventurer. So, we decided to develop this tiny explorer into a character guiding children through the fantastic maritime story of the Kon-Tiki raft crossing the Pacific.



Fig. 6: Developing the character "Johannes" (Courtesey of Qvisten Animation, Khim Tengesdal).

Johannes is described as a brown or red-brown pelagic crab between a half and two inches. Our text writer, Holger Fangel, developed a character of an old Peruvian sénor with a big heart and a big ego to match. We decided quickly that Johannes had accidentally drifted past the Kon-Tiki raft on one of his own adventures when he decided to visit this strange vessel, made friends with the crew and shared their adventures, hardship and theory of South Americans colonizing the Pacific Islands,- an animal equal to Thor Heyerdahl. It was as much his expedition as it was anyone else's. In the end he met a nice female crab on Raroia and settled in this South Sea paradise. Some of the other animals

encountered in the book about the Kon-Tiki expedition were used as side-shows, so that the story may be developed into a children's book in the future.



Fig. 7: Mood-board of the final version of "Johannes", who has become a bit fatter (Courtesey of Qvisten Animation, Khim Tengesdal).

# Developing the display

The main debates on the design of the display centered on two connected questions: Should the story be told in a traditional continuous display or should we adopt a cartoon-styled narrative with a mosaic of individually colored panels? Should it be a traditional text-centered display or should we develop the exhibition exclusively for children who can not yet read?



Fig. 8: First draft of the children's display (Courtesey of Qvisten Animation, Khim Tengesdal).

The main argument for making a cartoon-based storyline for non-literate children was that the height of the center of the display would be lower than the average height of literate children. On the other hand, developing a cartoon would be more expensive and labor intensive, in that we needed to develop the story further and put much more resources into drawing. In the end a continuous design with illustrated episodes incorporating small pieces of texts, but with a somewhat longer introductory text was adopted. The main reasons for this were time and resources, although it was also embraced by the creative team.



Fig. 9: Final version of the children's display, wall one and two (Courtesey of Artworx, Cory Grier).

Two strategies were adopted to connect the children's exhibition with the main display. First, Johannes, the main narrator, was equipped with a camera. Pictures used to tell the main story were presented, in different versions, as snapshots taken by Johannes during "his expedition". Second, we

also had four connecting stories, where the same story was told in both exhibitions at the same physical location. Thus, adults and children could experience the same narrative and "exchange" information and viewpoints.

# Feedback

Aftenposten, one of Norway's leading newspapers, reviewed museum display in an article series during the summer of 2013. The Kon-Tiki Museum got a rather terrible review on how we had (not) adopted our exhibitions for children. Apparently, we did not have any activities or displays specially adapted to this group of visitors. Needless to say I confronted the desk and they said that they had not seen the children's display placed underneath our main exhibition of the Kon-Tiki expedition. It seemed that our choice of developing a display for children on the 0-1 m space beneath the main display had been flawed. However, the two journalists had also not seen our new 6.5 m long and 2 m high video screen created as part of the underwater-life-display in the basement underneath the Kon-Tiki raft. This is probably the largest continuous run video exhibition display in a Norwegian museum. My conclusion: the journalists had not spent enough much time in the museum. Their review, to say the least, was not very factual and objective. We had to rely on feedback from our regular visitors instead.

A customer satisfaction survey is conducted every two years at the museum. Customers rate each exhibition on a variety of factors: how the story is told; the lighting of the exhibition; range of artifacts; etc... on a scale of 1-5. The new Kon-Tiki exhibition, as a total experience, scored 0.8 points higher than previously and are repeatedly our most liked exhibition.

Personally, I can see that visitors spend more time around the Kon-Tiki than they used to. Partly because the raft itself is restored and made more visible; partly because the exhibition has almost doubled in size with more text and more artifacts; but also because families spend time talking to each other as they pass along the exhibition. It is particularly rewarding to see that parents (and many grand-parents) spend time with their youngest children explaining parts of the story to them. Sometimes we also see the older children reading out the story of the children's display to their younger siblings.

It is also very easy to conclude that spending more time passing along the Kon-Tiki exhibition is made possible because the youngest children are given something to explore on their own terms. They do not drag and hurry their parents along in the same manner as before we opened the new exhibition. Simply, it takes a longer time for the kids are more engaged. The parents can bring their children along, while they themselves get to read the story.



Fig. 10: "Johannes" with the lady-crab he met on Raroia (Courtesey of Qvisten Animation, Khim Tengesdal).

We have also received some negative feedback. The first point is that we should have more tactile elements in the children's display. These elements were planned, but have not yet been installed. The second point is that we have a lot of factual information about sea-life in the display, but some of these are put too close to the floor, making them hard, if not impossible, to read. In future upgrades we will angle the lower end of the children's display 10 cm out from the wall so it will become easier to experience all the drawings and information in this area.



Fig. 11: A view of the final exhibition (Courtesey of Artworx, Cory Grier).

# Challenges and opportunities faced by cultural heritage professionals in designing interactive exhibits

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#### http://www.mesch-project.eu

Abstract: Petrelli et al. (2013) propose a movement that would empower curators, artists and designers in the creation, installation, maintenance and alteration of exhibits that are meant to bring materiality and physical interaction to the forefront of visitors' experience, while simultaneously expressing the values of the cultural institution. While many cultural heritage professionals would welcome this ability to create and integrate interactive exhibits into the design of exhibitions, for the majority there is a significant technical knowledge gap and the tools required to create these exhibits are still out of reach. In order to understand what methods and technologies could be suitable, we first need to ascertain the existing challenges and opportunities faced by cultural heritage professionals in designing interactive exhibits. The research focuses specifically on the working perspective of cultural heritage sites.

Based on interviews with professionals from a range of cultural heritage institutions across Europe, we investigate the existing curatorial practices, revealing the challenges faced when creating interactive exhibits, as well as the difficulties in relation to access, authorship, participation, creativity and control of such exhibits. We examine two aspects of the cultural heritage professionals' work practices in relation to interactive exhibits: 1) the attitudes and perspectives of curators and designers highlighting the values, goals and aspirations that are considered when creating exhibitions, and 2) current resources and methods used to create and implement interactive digital exhibits indicating the advantages and disadvantages of these.

In conclusion, we outline the potential avenues that we are currently investigating that could aid cultural heritage professionals in the design and development of interactive exhibits. We discuss design implications to be considered in the creation of a hardware and software platform that would allow these professionals to bridge this knowledge gap.

Keywords: interactive exhibits, exhibition design, cultural heritage professionals, digital media, curatorial challenges

#### Introduction

Within museum and cultural heritage research there is a large body of work focusing on the visitor experience, behaviours and educational goals. However, few studies focus on the design process of interactive exhibits highlighting the failures of these exhibits (Parry 2010). The approach various museums, cultural sites and designers apply when creating interactive media is rarely discussed. Previous literature suggests that simply because we have the ability to use technology in museum exhibits, this does not mean we should be, indicating the presence of challenges around exactly what to do and how to implement the growing body of affordable technology resources available into desirable interactive exhibits (Bell 2002). This research aims to highlight what these challenges are and how they are dealt within the cultural heritage sector.

In terms of prior research that focuses on existing design practices when creating interactive museum installations, the Exploratorium has been largely acknowledged for its novel in-house trial and error design approach, spending 80 percent on research and development and 20 percent on the construction of an installation (Caulton 1998). Their process involves collaborative discussions throughout the process with people of various expertises (ibid.). However, other museums tend not to carry out prototyping during early stage exhibition development, especially using technology, as it is

often out of the realms of their in-house resources and funding and requires external expertise (ibid.) despite the recognised benefits.

There are recognised challenges when creating interactive exhibits, such as the struggle to create installations that consider technology thoughtfully in order to open up *"new connections for museum visitors"* (Bell 2002; Thomas & Mintz 1998). Furthermore, the challenges may be based mostly around the audience expectations and the quality of the experience (Parry 2010). Keeping up to date with the rapid rate of technology on offer and with user expectations is another significant challenge faced by museums and cultural heritage centres (Thomas & Mintz 1998).

Interactive exhibits can be disappointing for visitors due to factors such as confusing or lack of feedback, broken installations, usability problems, and confusing mapping of controls (Allen & Gutwill 2004, Bitgood 1991, Gammon 2009). These problems can stem from fundamental conceptual flaws, lack of formative evaluation and poor consideration of the maintenance and upkeep requirements.

Because of the lack of research specific to the interactive and digital design practice of cultural heritage professionals (CHP), we believe that questioning contemporary CHP on their attitudes towards and approaches to the design and implementation interactive exhibits is vital if we are to imagine a movement whereby curators and related professionals self-create, install, maintain and alter digital interactive exhibits. We strive to answer these questions in order to specifically understand CHP as potential users of technology that will aid them in the design of interactive exhibits.

In this paper, we describe an interview-based study with CHP and analyse two areas in relation to the design of interactive exhibits: 1) the attitudes and perspectives of curators and designers highlighting the motivations, expectations and aspirations that are considered when creating exhibitions, and 2) current resources and working methods used to create and implement interactive digital exhibits. In conclusion, we discuss some of the design implications to be considered in the creation of a hardware and software platform that would allow these professionals to bridge this knowledge gap.

# Study setup

The study has been conducted as part of a larger research investigation into contemporary curatorial practice within the context of the Material Encounters with Digital Cultural Heritage (meSch) project.<sup>1</sup> The overall objective of this study is to gain an understanding of the working methods of CHP in designing exhibitions and to establish what their key values are in designing interactive exhibitions. As part of the interviews, we questioned interviewees on a broad range of issues concerning exhibition-making, including design methods, co-operative relationships and technology.

The research explores a number of questions such as: What are the working methods of the CHP? Who is the main author in the planning and design of the exhibition? What are the challenges faced by CHP in translating concepts in the design of interactive exhibits? What technologies and environments are CHP familiar with? What are the motivations and expectations of CHP when in integrating technology into exhibitions?

# Methodology

Semi-structured interviews were conducted with CHP who have worked on the planning of specific exhibitions. The majority of interviews took place at the participants' working environment and most were on a one-to-one basis, although there was an occasion were two of the authors conducted a two-on-two interview with two professionals from the same cultural heritage institution. The interviews lasted between 40 and 90 minutes. The participants were encouraged to speak about a particular exhibition that they had helped to design. All of the cases concerned original exhibition designs - bar one case - which was an adaptation of a previous exhibition. The majority of those interviewed were long-term employees or members of the institution while a small number of the interviewees were on short-term contracts.

In total, we interviewed 16 CHP from 14 different cultural heritage institutions across Europe – eight from Ireland, three from the Netherlands, two from the UK, two from Germany and one from Italy. The participants had a variety of educational backgrounds and worked in different roles of their respective organizations, including curation, education, management, digital media and research. We aimed to

<sup>&</sup>lt;sup>1</sup> www.mesch-project.eu

sample a variety of museum types, the institution types include science and technology, local history, national museums, literary and archaeological collections.

Depending on the size of the institution, the resources available vary, ranging from institutions with a small number of staff - where staff members typically have multiple roles - to large institutions with dedicated technical staff. For the purpose of this study, we distinguish three types of institutions (see Table 1):

- *Museums with five or less members of staff* small museums with a restricted number of staff. Individual members of staff will typically have multiple roles, i.e. management and curation.
- Museums with between five and fifty members of staff medium sized museums.
- Museums with 50 or more members of staff large museums where staff typically have dedicated roles and sometimes multiple staff have a similar role, i.e. applied arts curator, fine arts curator etc.

For each of the CHP we interviewed, we noted their experience with the design of digital interactive exhibitions and identified three user groups (see Table 1):

- Individuals who organise regular digital interactive exhibitions.
- Individuals with experience of commissioning one-off digital interactive exhibitions.
- Individuals with no experience of designing digital interactive exhibitions.

For the purpose of this study, we will first focus on the first and second groups. The experience of the third group will also be discussed in order to highlight the challenges they must overcome if they are to design digital interactive exhibits in the future.

Participants	Interviewee role in the museum	Museum size	Country	Type of museum	Experience with designing interactive exhibitions
P1& P2	Deputy Director & ICT Manager	50 +	Netherlands	Science & Technology	Organises regular digital interactive exhibitions
P3	Digital Media Curator	5 - 50	UK	Science & Technology	Organises regular digital interactive exhibitions
P4	Exhibition Researcher	5 - 50	Ireland	Science & Technology	Organises regular interactive digital exhibitions
P5	Manager	5 - 50	Ireland	Science & Technology	Organises regular interactive digital exhibitions
P6	Assistant to Director	>5	Germany	Literary	No experience of designing digital interactive exhibitions, interested
P7	Curator	>5	Ireland	City Museum	No experience of designing digital interactive exhibitions, interested
P8	Curator	50 +	UK	National Museum	No experience of designing digital interactive exhibitions, no interest
P9	Curator	>5	Ireland	City Museum	Experience of commissioning one-off digital interactive exhibition. Interested
P10	Archival Assistant	>5	Ireland	City Museum	No experience of designing digital interactive exhibitions, interested
P11	Head of Education	>5	Ireland	History	Experience of commissioning one-off digital interactive exhibition. Interested
P12	Manager	>5	Germany	Literary / Historic house	No experience of designing digital interactive exhibitions, interested
P13	Manager	>5	Ireland	Literary	No experience of designing digital interactive exhibitions, interested
P14	Curator	5 - 50	Netherlands	Archaeology	Organises regular digital interactive exhibitions
P15	Curator	5 - 50	Italy	History	Experience of commissioning one-off digital interactive exhibition. Interested
P16	Exhibition Coordinator	>5	Ireland	History	No experience of designing digital interactive exhibitions, interested

Table 1. Interview participants

# Findings

The findings section is divided into two parts, reflecting the two research objectives. Firstly, we discuss the attitudes and perspectives of curators and designers, highlighting the values and aspirations that are considered when creating exhibitions. Secondly, we discuss the current working methods, design approaches and resources used to create and implement interactive digital exhibits, indicating their advantages and disadvantages.

#### 1. Attitudes and perspectives

Regardless of whether the CHP interviewed had regular experience of designing digital interactive exhibits, experience of commissioning one-off digital interactive exhibitions, or no experience of designing digital interactive exhibitions, each of the interviewees - bar one case - expressed a strong interest in incorporating digital interactive exhibits into their museum exhibitions. However, barriers of technical knowledge and ability persist.

I think it's tremendous what it [technology] can do; I think it's because I don't understand it well that I get nervous or frightened of it. But I think it's really important that it advances more and more into exhibitions and interpreting exhibitions. (P16)

In some cases, the CHP has an advanced appreciation for and understanding of the potential of digital interactive exhibits, recognising that they could be used to accommodate multiple visitors, to illustrate multiple narratives and to allow for the incorporation of dynamic content, which is immediate and updatable.

I would like to ... update that specific exhibit environment as a result of the timeline and have those data feeds come through to the exhibit environment as immediate information, whether it be apps or games or competitions or challenges around that. (P5)

I would be interested in going down the road of multi-touch gesture table. The content we deal with here would suit a surface environment very well and it would be suitable for the amount of visitors. (P5)

To use technologies to show different perspectives and to make the visitor more involved for example through personal stories. (P15)

However, the interviews also illustrated that some CHP have limited expectations of what form digital interactive exhibits can take and what they can achieve. Some are of the opinion that digital interactive exhibits are unable to replicate the real life qualities of objects.

I'll always be an advocate for the physical, I wouldn't just want interactive screens. The older objects have a soul, you can feel the history of them. (P10)

And of course these are the details, the weight, the feel that can't be translated into a digital format. (P8)

There are several strong motivations for integrating technology into exhibitions. For the smaller museums, the desire to include digital exhibits was driven by the perceived visitor expectation of being up-to-date. Evidence exists that the CHP also refer to other museums and exhibition ideas and see the inclusion of new interactive exhibitions as important for attracting and maintaining audiences. For one of the interviewees, the ability to generate publicity based on high-tech exhibits was an important factor.

Having new technology based exhibits, if anything, provides us with a great press release and gets visitors through the doors. (P9)

If we are perceived of as an organisation that is continually turning out new ideas, new exhibitions and that we are doing things that different museums would shy away from then it's a different proposition altogether. (P9)

Another reoccurring motivation in using technology is the desire to communicate invisible material or to subtlety augment the original sense of place so as to make visitors more aware of their surroundings.

Keeping away from taking from the essence of this place by using smart tech to develop the sensor lead data ... So it would be great to make this content visible so as to show the connectivity and changes dynamically and in a more responsive manner. (P5)

Despite these positive attitudes towards the potential of incorporating technology into museum exhibits, a common attitude that persists is that the inclusion of digital interactive exhibits may result in unintended and undesired outcomes such as the distraction of visitors.

It's one of those things, I don't want too many sparkly things because the show is the exhibition, I don't want to be upstaged by anything extra. (P9)

However, another interviewee acknowledged that it is possible to have digital interactive exhibits that do not result in distraction.

From my experience I thought this is really technology that I like... Because it's focusing on the object... It's technology that's helping you, it's one-to-one, and it's not distractive. (P14)

These findings demonstrate that there is a general overarching interest amongst the CHP in the incorporation of digital interactive exhibits into their exhibitions but there is a conflict in terms of understanding what is achievable with digital interactive exhibits. In addition, the interviews revealed a number of advantages and disadvantages connected to the use of technology ranging from positive expectations, i.e. helping to being seen as an up-to-date institution and being able to communicate intangible content to somewhat negative expectations, i.e. the fear of been upstaged by technical exhibits.

#### 2. Working methods, design approach and resources

Of the five interviews with institutions that regularly design and organise digital interactive exhibitions, three stated that they conceive of the exhibitions in-house and then involve external exhibition designers on the design, development and implementation. All of the museums maintained a close involvement with exhibition designers during the design process. But in the cases of P1, P2 and P3, the detail of the interpretation plans were particularly pronounced, whereby the interviewees defined the desired learning outcomes not only in terms of knowledge or skills, but also in terms of values and attitudes and in categories that relate to user experience, such as inspiration and enjoyment. In the case of P1 and P2, interpretation plans are continuously adjusted as the designs develop, ensuring that the exhibit remains coherent with the curators' aims. P4 stated that they adopted an alternative approach to the design and organisation of digital interactive exhibitions, exhibition concepts being conceived by a 'guest' curator and then individual interactive exhibitions being commissioned in accordance with the exhibition concept. This is a noted alternative team approach which is gaining popularity (Smithsonian Institution). In this case - and in contrast to P1, P2 and P3 - there is little dialogue between the museum and commissioned exhibition designers, and the work of designing exhibitions is not continuous.

They generally take people on based on their speciality, then they work on an exhibition for X amount of months and then they will probably not work on another exhibition. (P4)

Medium to large museums are more likely to, on occasion, build exhibitions collaboratively through a project consortium, an approach that P1 and P2 identified as becoming an increasingly common amongst science and technology museums. These types of 'shared' exhibitions come about through either of two approaches: either a specific exhibition is collectively designed and developed by a consortium of museum partners as experienced by P1 and P2, or an exhibition is designed and developed by a developed by a single museum and then repackaged for use at different museums as experienced by P4.

It is worth noting that only one of the interviewees stated that they have had formal training in exhibition design. In terms of skills and expertise in technology and digital media, there was a vast spectrum of knowledge amongst the interviewees. Generally, the skills and resources in these areas were higher in the science and technology-related museums, whereby a high number of staff would have a background in technology or science. One of the science museums also had a university research facility in the same building, that would aid the museum staff in the design and development of applications for the museum.

We would be proficient in designing robotic systems and the software interfaces that drive these systems. We are very lucky with the team we have in that they can code and devise any needed systems. (P5)

The same interviewee also expressed an interest in testing and prototyping digital interactive exhibits.

I would like the ability to test and create all of these variations of media types. (P5)

On the other end of this knowledge spectrum, there are CHP who lack technical expertise and who would therefore find it difficult to imagine what is possible to achieve in terms of digital exhibits.

The problem is it's difficult for us to imagine what technology could do. We need some suggestions. (P15)

Indeed the need for inspiration in terms of coming up with ideas for exhibitions was also suggested by a number of the interviewees who said that they tend to refer to other exhibitions for ideas.

I always look at other exhibitions for inspiration...it [the other exhibition] was just such a sumptuous experience, you walk into it, it was very beautifully done. (P8)

Common barriers for the interviewees against the inclusion of digital interactive exhibitions were lack of budget, lack of time and lack of human resources. For those interviewed with no experience of designing digital interactive exhibitions, there was a perception that the cost would have been too high. For example, one of the interviewees commented;

Yes, I would have liked to have seen technology play a larger role in the exhibition, but we didn't have the budget. I would have liked to have worked further with sounds, smells especially for younger audiences. (P10)

The implication that some digital interactive exhibits aren't built robustly enough to handle constant use was also encountered. Another interviewee with no experience of designing digital interactive exhibitions commented on the basis of her experience as a visitor:

Technology I find takes a lot of money and in most museums I've been to, if you go into the interactive area where the children have been, most of the machines are out of order so you need to have somebody constantly on site to maintain the technology. (P7)

In contrast, the experience of an interviewee who regularly designs digital interactive exhibitions is that while maintenance of interactive exhibits is required, they have the necessary resources to deal with it:

[We have] an in-house AV team that works on small prototyping and maintenance of interactive exhibits. The more interactive exhibits you have, the more maintenance required. (P1 & P2)

For smaller museums, however, the lack of human resources can be a problem:

As a museum, I would like to see us using more media, our problem is our structure I don't think we are set up for it. If you want it done properly I think you should have someone 24 hours. (P9)

In summary within our interview pool, there was a wide variety of working methods, design approaches, and organisational structures, depending on the institution. Formal training in exhibition design was the exception whilst the level of knowledge, skills and resources in digital media differed greatly, some institutions demonstrated an advanced level of technical expertise and expressed an interest in prototyping ideas where another institution with little technical expertise stated that they would struggle to picture what could be achievable with technology.

#### **Conclusion/discussion**

The findings illustrate the desire to use technology and an awareness of the advantages interactive exhibits could bring such as accommodating multiple users, appearing up to date in order to attract audiences, as well as the ability to communicate dynamic and intangible data. While the potential advantage of interactive exhibits in focusing the attention of the visitor onto an artefact was demonstrated, the results also highlighted several disadvantages of digital interactive exhibits as perceived by CHP, including high costs, maintenance issues, timely design and distraction to visitors.

Another concern that emerged was the inability to translate real life qualities of objects, possibly losing the elements of authenticity that Petrelli et al (2013) linked to valued material qualities of artefacts.

Reflecting on the findings and previous research there appears to be a lack of attention to initial and formative evaluation of interactive technologies, often a result of limited resources. Drawing from HCl design practices, there are numerous design methods, in particular user centred design and participatory design that could address the challenges faced by CHP. However, the findings highlight that when questioning the design process of CHP we must also consider the limitations in terms of resources that museums face, as is particularly the case for small museums.

The challenges experienced by some CHP at a conceptual level could be attributed to a lack of awareness of interactional possibilities that the vast array of new technologies hold (Thomas & Mintz 1998) as well as the inability to test out these concepts. This challenge could be addressed through the current DIY maker and digital fabrication (Fablab) movement which focuses on making low costs, rapid prototyping highly accessible to the general public, as it could help curators and designers to develop interactive exhibits. Enabling CHPs to gain a greater understanding of the interactional capabilities of technology, based on exploration of ideas through prototypes that examine potential users' interactions, behaviours and responses using hardware such as Microsoft.net gadgeteer<sup>2</sup> and Arduino.<sup>3</sup> We are currently exploring how these methods and low cost technologies used in the maker and DIY movement for prototyping and exploration of ideas could assist CHP in gaining a deeper understanding of the potential interactions and interactive installations that could be achieved with technology.

As part of the meSch project, we are working towards the design of an authoring environment to be used by CHP for the creation of tangible smart exhibits. Considering the tendency for CHP to refer to other exhibitions for ideas and inspiration for their own exhibits combined with this general lack of awareness of interactional possibilities for exhibitions, there is a strong argument for the inclusion of a community platform as part of the authoring environment. This community platform could allow CHP to share their experiences of designing exhibits, to upload video instructions detailing how they created their exhibit and to exchange examples and templates for the creation of exhibits.

Open Exhibits<sup>4</sup> offers a similar community of practice and collection of software aimed specifically at developing interactive digital exhibits in-house at museums. The initiative is representative of the currently changing approach to integrating and supporting technology in museums and it emphasises that with a better understanding of the problems, challenges, practices and expectations of CHP, we can provide practical solutions so as to support CHP in delivering and maintaining digital interactive exhibits in a more effective way than is currently being carried out.

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<sup>&</sup>lt;sup>2</sup> http://www.netmf.com/gadgeteer/

<sup>&</sup>lt;sup>3</sup> http://www.arduino.cc/

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# Design research into mobile museum mediation

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Abstract: Using mobile media, museums may transcend institutional settings to highlight the significance and meanings of cultural heritage: framing art and design in the urban sphere, shedding light on nature in the wild, or bringing historic sites to life. The possibilities are manifold, but not straightforward, as augmenting the everyday without the help of a museum context can be tricky, and may upset traditional understandings of the curatorial. This is, however, not simply a problem in need of a solution but also a challenge that may inspire constructive reflection and innovation in the museum community. The PhD research project "Mobile Mediation of Fashion by Museums" explores how aesthetic and ethnographic design methods can be used to develop mobile experiences and articulate museological matters of concern. Building on user perspectives, expressed in response to cultural probes, the project has generated a design game to support projection and discussion of possible concept scenarios and their implications. The game format was used in a series of workshops with Designmuseum Danmark, to ideate and consider new ways to appreciate Copenhagen fashion culture via mobile media. This paper describes the project's problem field, research methodology and process, in order to suggest how this approach could be used by museums confronting similar challenges.

Keywords: mobile, mediation, design research, design game, museology

#### Introduction: mobile mediation as a problem field and design challenge

As our daily lives and social interactions are increasingly permeated by our use of mobile phones, so our cultural experiences are also often filtered through the same media. Accordingly, museums must learn to engage with a networked audience through these channels, and adapt their communication strategies to include social media and mobile applications (Tallon & Froes 2011). One notable potential is the actualisation of museum matters outside the museum, by framing art and design in the urban sphere, shedding light on nature in the wild, or bringing historic sites to life.

The new opportunities for mediation<sup>1</sup> are manifold, but not straightforward. Aligning inclusion and interaction with curatorial goals and standards may prove difficult, and thus expose conflicts of interest and diverging ideas and ideals for the museum. Similarly, inspiring an appreciation of the cultural significance of everyday objects without the help of the museum context can be challenging, and while museums exert themselves to offer digital experiences and invite dialogue, the public is seemingly less than keen to participate (Lynch 2013; Katz et al. 2011). But as importantly, innovative mediation strategies, and the movement towards a distributed, medialised or community oriented 'post-museum' practice, simultaneously changes and reflects changes in the way we understand museums (Proctor 2011; Rudloff 2013; Hooper-Greenhill 2000).

Developing solutions that appeal to the public and meet museum objectives is therefore only part of the challenge. Addressing the matters of concern relating to the issue, as suggested by Latour (2004) is also important, if we want to understand and consciously build the future of museums.

This understanding guides the PhD research presented in this paper. Looking to explore a field of possibilities rather than current museum media usage, the project uses design as a tool for research. By exploring solutions and asking questions, research through design can produce new insights into the scope, limits and pitfalls of a field, and how they reflect on the context. Used in this way, design methodology can add another dimension to analysis in the humanities, as well as inspiring and assisting constructive reflection in the museum community.

Whereas ethographic methods – semi-structured interviews and workshop/focus groups – have also been employed in the project, the designerly methods developed in the project and the insights gained by these methods, is the main focus of this project presentation.

<sup>&</sup>lt;sup>1</sup> The term 'mediation' is used, in accordance with ICOM's Key concepts of museology, as a translation for the widely used Scandinavian term "formidling" (Germ. Vermittlung), i.e. refering to "a whole range of actions carried out in a museal context in order to build bridges between that which is exhibited (seeing) and the meanings that these objects and sites may carry (knowledge)" (Desvallées & Mairesse 2010, p.47).

## **Research design**

The PhD project 'Mobile Mediation of Fashion by Museums' addresses the growing interest in mobile/social media as tools for museum mediation, by examining their potential as well as the implication for museums. The objective of the project is thus: a) to explore the field of possibilities for mediating culture outside the museum with mobile media, through the ideation of exemplary concepts for the fashion field; b) to examine how this type of mediation corresponds to the (design) museum's praxis, self-image and curatorial/educational objectives; and c) to discuss the implications in a museological and cultural context. Methodologically, the project explores how aesthetic and ethnographic design methods can be used to develop mobile experiences and articulate museological matters of concern.



Figure 1: Project diagram.

The project's three-stage research process, designed to draw out relevant problems in the research field for subsequent analysis and discussion, is illustrated in figure 1. Stage I focused on generating inspiration and gaining insight into the perspectives of prospective users through a combination of individual semi-structured interviews, cultural probes and a workshop with user informants. Stage II involved explorative design work carried out by the researcher, seeking to ideate relevant concepts for mediation as well as augmenting the understanding of the field and uncovering potential problems. In stage III, the concept elements served as conversation pieces in a set of workshops with museum professionals, aimed at eliciting their views and assumptions regarding mobile mediation.

The issues highlighted in these workshops will inform the continued analysis and theoretical discussions that are the primary objective of this academic research project, i.e. a contribution to the field of museology. Still, the design research methodology developed in the project could also be applied to a practical museum setting, to support ideation of concepts for mobile mediation as well as institutional reflection on the implications of a chosen strategy for mediation.

## Stage I: Inspiration / cultural probe

Although data on user behaviour can be useful, the empathy required in design thinking is not fuelled by knowledge of an average public. Instead, individual perspectives may provide a better understanding of real user needs and of the problems and possible solutions inherent in the field (Silvers et al. 2013). Understanding the involvement of prospective user informants as a tool for designerly insights rather than for production of ethnographic data about museum target groups, demographic representation or generalisable results were therefore not of interest to this project. Stage I was completed with the participation of eight informants: all female, aged 20-41, with a self-proclaimed interest in fashion and new media. All eight informants were interviewed individually, six responded to the cultural probe and four participated in the workshop. An interest in, and experience with, the problem field was chosen as the guiding principle for sampling, as expressed in an open call for participation<sup>2</sup> distributed via social media networks. Concordantly, the assemblage of an outwardly homogenous group was regarded as an asset, letting inward differences in views and perspectives stand out more clearly.

<sup>&</sup>lt;sup>2</sup> http://blatryk.wordpress.com/2012/06/11/mode-medier-museer/

The eight activities in the cultural probe, sought to explore connections between fashion, media, urban and popular culture, and everyday life, as experienced and expressed by the informants. Following Gaver's suggested 'probology' approach (2004), valuing uncertainty and subjectivity, the probe (figure  $2^3$ ) was designed to inspire creativity and aesthetic pleasure, and asked for personal notions rather than factual documentation. The returns (figure 3) were accordingly playful and moot, defying objective analysis.



Figure 2: Cultural probe.

Figure 3: Probe returns.

Still, the material and the interactions with prospective users pinpointed some of the challenges and contradictions inherent in the current museum field. The probe returns thus revealed a preference for analogue over digital activities, even for this media savvy group, and the desire to invite participation to shed light on stories not told by the dominant narrators of fashion was matched by equal concerns regarding how to filter contributions in order to secure a high quality of content. Similarly, a curatorial narrative was regarded as an essential contribution from museums in the overwhelming stream of content, viewpoints and sources found online. In this way, the findings mirrored subject matters uncovered in the theoretical research, whilst adding the ambiguity of real life perspectives, so crucial to design. These perspectives were later condensed into personas, used in the workshops in stage III.

# Stage II: Exploration / design journal

The second stage of research focused on understanding the problem field through ideation of potential concepts for mobile mediation of urban fashion. Using a design journal method, borrowed from the practice of fashion design, questions and ideas – ensuing from readings, material from stage I, and experiences from museums onsite and online – were expressed in visual collages and were complemented by written musings, notes and comments (figures 4-5).



Figure 4: Journal page

Figure 5: Journal page

<sup>&</sup>lt;sup>3</sup> For a detailed description of each probe activity, please visit http://blatryk.wordpress.com/2012/06/29/cultural-probe-for-fashion-media-and-museum-mediation/

As argued by design researcher Martin Ludvigen, "thinking aesthetically about an interactive artifact is to be conscious about its entire composition over time and the effect it has on the context and users" (2006, p.93). In a very concrete manner, the collage format thus supported the (visual) articulation of complex fields as an interplay of contexts, artifacts, technologies, problems and propositions. Also, formulating questions and suggesting possible concepts visually, rather than in writing, allowed for more open-ended thinking, where problems were revisited, reconsidered and added to rather than defined and closed.

Zooming in on the specific challenges regarding mediation of fashion, as a cultural form that has no place and is in perpetual flux, this part of the process uncovered a variety of issues. The problems identified included how to trigger a museum experience in the public sphere; the ethics of coaxing user behavior e.g. by inviting street style photography; questions of aggregation and self-representation; understandings of cultural versus commercial objects; and the question of whether urban style should fall within the museum's remit. The process also resulted in a selection of potential concepts, and a shortlist of paradigm headings: *Intervention* (offering a museum perspective in new contexts); *Toolbox* (augmenting observation, building user competences rather than providing information); *Exchange* (knowledge sharing between institutions and the public, either by aggregation or calls for participation); *Reflection* (inspiring personal reflection) and *Synergy* (creating synergy in distributed mediation).

## Stage III: Discussion / design game

As described above, the objective was not to generate solutions. Instead, taking inspiration from the critical design tradition and adopting Mazé & Redström's ambition "not to converge upon a single problem or solution, nor to provide a roadmap to a particular preferred future, but to materialize a territory of possible viewpoints as a basis for curating - and catalyzing - a conversation in the here and now" (2008, p.66), the intention was to outline ambiguous concepts that would inspire a nuanced debate in the workshops for curators and communicators from Designmuseum Danmark.

To strike a balance between the need for open-endedness – considering both the ethos of critical design and a general rule of thumb for participatory design processes, stating that a rough sketch is a better starting point for criticism and co-creation than a polished prototype – and the inspirational and rhetorical strength of aesthetic arguments, the concepts were broken down into constitutive elements. Each element was represented with an image and printed onto card, forming together a kind of exploratory design game (cf. Brandt 2006). The combination and interchanging of concept elements into a variety of scenarios thus served to structure and trigger the workshop debates.



Figure 6: Design game/concept element cards

An example scenario, used in the workshop and illustrated in figure 6, could be: fashion item/icon, (as subject for mediation, here exemplified by Danish fashion brand Nørgaard's classic stripy RIP 101 T-shirt, seen to the left) + shop (purchase as trigger situation) + QR code (as placed on sales tag), leading to a discussion about the content or activity behind QR code (prompted by various new

concept cards, as seen on the right). Breaking down the concept like this allowed for discussions on the overall idea of museum interventions into a commercial setting, and potential content or activities. This process also made the relative importance of the constituent elements clear. Replacing the subject of mediation with another fashion brand, for instance, set off a debate about collection policies, museum values and the museum's brand, but also inspired ideas that linked curation, mediation and communication strategies.

#### Perspective

The workshops have thus not only generated empirical material for the academic research project, but also established an arena for fruitful discussion among the professional participants. In this manner, this low-key approach may inspire other museums facing similar challenges to develop their own games tailored to their specific subject areas and educational objectives. Undertaking the fairly labour intensive preparations as an in-house task, rather than relying on suggestions from external consultants, who may not fully understand the museum context, could also be time well spent. The knowledge, passion and perhaps valid resistance of the staff could give crucial clues to visionary concepts as well as their pragmatic realisability, saving precious resources in the long run. Using design methodology as a tool for creative and critical thinking could then provide a better basis for ideation of, and reflection on, the museum's (mobile) mediation strategies.

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# Designing interactive exhibitions based on innovative narrations guided by architectural space and digital technologies

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Abstract: Although museums started to employ varying interaction modes using advanced networking and displaying technologies to improve their roles in conveying information through participation, the analysis of the latest interactive exhibitions reflected an insufficiency to create compact and unique intelligent environments for exhibiting. However, developing the narrations of exhibitions on the basis of the physical qualities of the space and advanced technologies for interaction will increase the potential to stage varying interactive experiences. This paper searches for alternative solutions to generate innovative narrations to bring novelty to the design of interactive exhibitions and contribute to the interpretative processes of museums. In parallel with our aim, 55 conceptual design projects created for interactive exhibiting in the Spatial Interaction Studio Design Course in the Department of Communication Design of a well-established university between the years 2009-2012 were analyzed. The findings show that the innovative narrations were significant for making use of architectural qualities of space or supporting the physical space with the use of an additional mobile or wearable tool to link the performed experiences within the design, which enhanced the entertaining, informative and explorative aspects of the exhibitions.

Keywords: interactive exhibiting, narration, innovation, architectural space, digital technologies

#### 1. Introduction

As traditional forms of art started to be replaced by process based and participatory installations, museums and galleries begun to make use of the rich sources of networking and displaying technologies (Bullivant, Responsive Environments, 2006). These improvements in technology brought alternative modes of communication. Visitors had the opportunity to interact with artworks in various ways and museums and galleries developed different exhibiting strategies, in order to maintain the permanence of art, knowledge and cultural heritage (Lorenc, Skolnick, & Berger, 2006).

The initial point of integration of the concept of participation in exhibition design started with "handson" exhibitions in the 1960s where visitors started to learn by the experience. The evolving virtual exhibitions also gained popularity for providing some kind of interactivity on the Internet. However this had not decreased the interest in the physical and live experience of an exhibition and eventually a new visitor profile was introduced, defined as the kinaesthetic learner (Hughes, 2010). Nevertheless, recent studies show us that the architectural gualities of space had not been taken into account for the design of varying interactive narrative experiences, ranging from video games to participatory art installations. Moreover, in terms of exhibiting, it was recognized that the interactive exhibitions focused more on the adaptation of technology, rather than using technology as a means to convey the message by connecting user, technology and the content of the exhibition (Bullivant, 4D Social Interactive Design Environments, 2007) (Caulton, 1998). As a matter of fact, it is possible to say that most of the analysed exhibitions that made use of digital technologies can be perceived as sets of interactive experiences placed one after the other in a physical space. The audience's curiosity to interact with the device takes precedence over their understanding of the concept of the exhibition and the story behind it (Simone, 2010). We believe that proper use of the dynamics of the architectural space combined with participatory digital technologies may enhance the narration and bring innovation to the concept of interactive exhibiting.

Considering the fact that the today's artwork is defined as the whole process that involves the participant interacting with the art object (Buskirk, 2005), we believe that the narration of any exhibition design needs to integrate the qualities of the architectural space and be a guide for the selection of the digital tools to perform the interactive experiences. On the basis of these issues, we examined the impact of architectural space and digital tools on the narration of interactive exhibitions and investigated if innovation brought by narrative means may be used as a strategy to transform these physical spaces into intelligent environments. In parallel with this research, we tried various approaches to, and different versions of, space and digital technologies in order to develop narrations for the design of conceptual interactive exhibitions. We then analysed the design works to see the outcomes and reach for conclusions.

# 2. The relationship between narration, architectural space and digital technologies in the frame of interactive exhibiting

In order to develop innovative narrations that would transform museum and galley spaces into interactive environments, we needed to explore and define the relationship between the narration, architectural space and digital tools. Through this we could see how physical space and interactive tools were able to enhance the innovation in the narration of an interactive exhibition.

Being an immersive and participatory area, interactive exhibiting addresses the concept of visitors becoming actors, perceiving and navigating in the narration by interacting with tools, works and applications (Porteous, Cavazza, & Charles, 2010). Being one of several strategies leading visitors with an interest in exhibitions, narrations are the main instruments, which structure our perception and communication on the basis of making meaning (Bruner, 1990). The language of narration is very significant to the story and the design of the setting becomes an important tool to enhance and reveal the text and the story behind it (Lorenc, Skolnick, & Berger, 2006). However, spatial aspects start to appear, as the story represented by text becomes a visible scene when describing activity and communication between people. By itself, space is neutral and vacant, and it can only attain its full potential when action is taking place (Parker, Craig, & Block, 2008). So, space becomes a meeting point for the potential visitors and actors for the creation of interaction.

Interactive exhibiting can be defined as the idea of communicating a story in three-dimensional space using participatory digital technology that links varying interactive actions (Howard, 2002). The design of interactive experiences combined within a narration is sustained by the architectural quality of the space (Ozcan, 2002), whereas the concept of interactivity defines the limits and parameters of the navigational actions required for the user experience (Kolko, 2007). So the narration will both conduct the exhibition design and serve to define the constraints and the active intent of the experiences (Locker, 2011), which in turn will define the set of operations and actions related to the experience (McCulloughm, 2004). Mediation of tools with activities, combined with visual and audio elements to support the narrative expression, will be embedded in the physical space giving visitors the chance to become active participants (Hughes, 2010). So, the visitors' primary form of communication with the exhibition can be viewed as navigating in the narration, which is structured upon the organization of the spaces of information supported by digital tools (Saffer, 2007).

While it is possible to say that any narration cannot be presented without a suitable setting, each architectural space has its own dynamic, which can be described as its geometry and characteristics. The vertical, horizontal and diagonal measurements describe the geometrical aspects of a space, helping us to visualize it. Characteristic qualities include a space's "atmosphere", which is important and influential to the experience of the audience and the actors. Each space has its own individual characteristic derived from the materials used, the architectural elements, the lighting etc... (Parker, Craig, & Block, 2008) (Dade-Robertson, 2011).

In terms of interactive exhibiting, this research questions how narrations of interactive exhibitions benefit from the different geometries and characteristics of the architectural space. Moreover, although the selection and combination of participatory digital technologies in parallel with the narration brings a level of interactivity directly to the exhibition design, are there any other solutions brought by the use of these technologies, that can improve and make the narration more innovative?

In parallel with the above identifications and discussions, we tried to propose a general framework illustrating connections between architectural space, digital tools and narration. Using these definitions, we tried to develop narrations for conceptual interactive exhibition designs for varying forms of architectural spaces and different technological tools to obtain findings, which might be adaptable for the designs both for virtual and physical environments.

## 3. Methodology

This research looked for various ways to develop narrations for exhibition as a three-dimensional image, including the planning and the layout of the actors and objects in a setting to match the story (Parker, Craig, & Block, 2008). With the aim of developing innovative narrations for interactive exhibitions, the method for this research was configured on the basis of working on different architectural spaces with varying geometries and characteristics. The themes and stories developed

for the narration were expected to resonate with the architectural qualities of the space while providing a scene for the interactive experiences to take place.

In order to obtain alternative solutions for design, a studio design course based on spatial interaction was planned within the Department of Communication Design of a well-established university that would focus on developing conceptual interactive exhibition designs. Two different exhibition areas were selected as case studies, and students chose either one of them to create conceptual interactive exhibitions. This course was carried out for 8 semesters between the years 2009 and 2012 with an average of 15 students each semester. These students had no prior experience of architecture but were well trained in creating interaction designs using different mediums. The following design briefs were defined:

#### 1. Design brief based on a single story linear space

The students were expected to design interactive exhibitions for a linear space. A corridor of the ground floor of a building, having two entrances, a length of 35 meters, a width of 2.8 meters and a height of 6.5 meters was chosen as the first working site (Figure 1). The students were encouraged to make use of the height of the space within their projects as the space would be able to house it. The choice of audience profile was left to the students to decide in relation to the theme.





2. Design brief based on a multi-story square shaped building

This brief focused on creating designs for a 3-story building, with two entrances from different levels, an area of 16 meters by 16 meters per floor and 2.5 meters floor height for each level (Figure 2). The students were advised to make use of the total floor height, including the possibility of adding or deleting a floor. Students would be able to select the audience profile as in the previous brief.

Figure 2: Plan of the multi story square planned building



For both design briefs, the choice of the narration was up to the student's preference, but the choice relates to his or her inspiration from, and attraction to, the spatial data. Within the process of

developing the narration, the students also carried out research into digital tools and media used in physical spaces in order to integrate suitable technologies with the theme and architectural space. The works were examined on the basis of the innovation brought by analysed design projects.

# 4. Evaluation of the works

For 8 semesters, 55 design projects were developed and examined to find innovative narrations brought by the use of the qualities of architectural space and digital tools. The general outcomes reflected the fact that all of the students integrated digital tools in parallel with the interactive experiences and the narrations. Most of the students perceived the spatial data to organize the activities, while some of them failed to develop narrations to match the qualities of the exhibition area.

In parallel with the aims and objectives of this research, the outcomes can be grouped under two topics:

#### 4.1. Innovation by the use of the architectural qualities of space to shape the narration

The successful design projects of this group formed their narration to match the perceptual aspects provided by the geometry and characteristics of the space. In parallel with this approach, the long corridor was inspirational to the development of narratives that were composed of a linear sequence of events and experiences.



Figure 3: An example of a conceptual exhibition design for the linear space

Selecting a theme that involved a linear sequence of objects, events, sequences or experiences and shaping and adapting the narration to the architectural space with proper digital tools created a unity within the space. This was observed as an appropriate strategy for design. The suitable themes centralized around historical events, timelines, planetary configuration of space and geographical layouts. With the analysis of the works, we recognized that the linear form of the space limited the choice of technological tools and guided most of the students to make use of screens and displays for their designs. Figure 3 shows the conceptual exhibition design named "Off Limits", by Doruk Saglam. In this exemplary work the exhibition area is organized in accordance with the planetary sequence. The aim is for the users to experience the different qualities and conditions of the sun, planets and space. The developed interactions were based on the use of multi-touch surfaces, augmented reality, projections and static visuals.
In terms of the multi-story space, we recognized that the students struggled with the form and the nonlinear configuration of the architectural space, which required different spatial solutions. However, the successful designs showed innovation through much more creative and experimental themes and narrations. The students solved the design problem of organizing the multi-story space by structuring the narration in parts or episodes (generally 3 parts), where each part would fit one floor. In each floor they placed different digital tools and were able to make use of a variety of technological platforms. Non-linear navigation can be maintained within this spatial geometry, but it was difficult to preserve the unity of the exhibition, as the whole experience is divided into 3 parts.





The high spatial quality and diversity of the selected interactive tools maintained by the narrations were benefits of working in a multi-story space. This can be observed from the conceptual design named "Stories of Childhood" by Öykü Çataltepe, Figure 4. The narration focuses on visitors experiencing varying imaginative perceptions brought by the stories. Nonlinear navigation provides the opportunity to make use of different stories - to be grouped according to their similarities.

## 4.2. Innovation by the integration of personal digital tools within the narration

This group of projects was recognized for their approach to connect the performed experiences with an additional mobile or wearable tool. As these tools were planned to carry information concerning the progress of the visitor in the exhibition, they not only guided the navigational aspects within the space but also gave the opportunity to privatize the experiences of each visitor. Besides providing connection to social media when needed, these tools were also beneficial in archiving each visitor's experience and in providing the visitor with a permanent reminder of his or her experience.



Figure 5: An example of a conceptual exhibition design for linear space

Figure 6: An example for conceptual exhibition design for the linear space



The narration guided the design and the choice of tools. Tablets, eyeglasses, gloves, headphones, flashlights, helmets, memory sticks and cards were among the tool choices integrated into the design projects. The design project in Figure 5 by Dilara Dagli, uses both a watch and a set of headphones for the realization of the diving experience. The watch was planned to control the video displays on the walls and the headphones were devised to control the proximity between other people and to provide a sensation of pressure within the process. Likewise, the design project in Figure 6 by Yasemin Yildirim, made use of a flashlight to collect and disseminate information from varying sources in the "Media House" and to connect to social media. As seen from these examples, this strategy for design enhanced the individual experience and gave the visitor more freedom for navigation.

# 5. Conclusion

As an emerging concept, interactive exhibiting has great potential for staging participative experiences through the use of digital technologies, providing environments for different readings of the meanings of the exhibited artworks. Narrations, being one of the main instruments upon which we build our experiences, play an important role for finding meaning for the visitors to connect and perceive. While all narrations take place in a setting, we believed that making use of the spatial data and digital technologies would be an efficient strategy to devise narrations, bringing innovation to the process of interactive exhibition design. This study searched for relationships between spatial data, digital technologies and narration on the basis of interactive exhibiting and looked for clues for the appropriate use of the dynamics of architectural space and digital tools to develop innovative narrations.

In parallel with these aims, a spatial interaction studio design course was planned and realized between the years 2009 and 2012. This course focused on the development of innovative interactive exhibition design. 55 conceptual interactive exhibition design projects supported by various digital tools and embedded technology were developed for two different architectural spaces: a linear single-story space and a square planned multi-story space. These designs were then analysed in terms of bringing innovation to exhibition design by the narration.

Generally, it is possible to say that while some of the designs could not go beyond using the traditional approach for exhibiting, they were still fruitful for their generous use of visual data, for the integration of digital tools to create a participative experience and for the spatial organization of the activities. Successful works can be placed in two groups: (a) ones having narrations which were inspired by the form of the architectural space, and (b) ones that connected the performed interactive experiences by using an additional digital tool invented especially for the narrative.

To conclude, the following issues should be considered in the design of interactive exhibitions:

- It is understood that interactive exhibiting is more than just placing interactive tools or technologies within the physical space. Innovative solutions arise when the narration is planned and structured with respect to the qualities of the architectural space. Narration can also guide the selection of digital tools.
- In terms of the use of architectural space, it is recognized that every spatial condition brings its own circumstances, which in turn effect the choice and the structure of the narration. A sequenced narrative structure matches a linear architectural space well, whereas a networking or an episodic narrative structure is more suitable for a multi-story space.
- Interactive exhibiting can benefit from the integration of a mobile or wearable digital tool
  related to the narration. These tools are recognized to maintain the unity of the space while
  enhancing the adventurous, informative and experimental aspects of the exhibition, as they
  connect each performed interactive experience and provide guidance for navigation within the
  exhibition. Moreover, visitors can actually influence the narration and their own navigation with
  their performances guided by the technical competencies of these personal tools.

From the exemplary works and outcomes, it is possible to understand that the area of interactive exhibiting has huge potential for innovative solutions. Moreover, this area can show the way for new inventions for networking and displaying technologies, as these cases arise from narrations. As interactive tools and technologies continue to develop and become more advanced, the appropriate use of spatial data and the refined use of digital tools will gain more importance, enabling the development of unique designs. We believe that the area of interactive exhibiting will benefit more from innovative approaches for design with the original combinations of narrations, architectural space and digital technologies, where the concept of participation drives the design.

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# Discussions on inclusive, participative and open museums

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Abstract: This article discusses how museum professionals are shifting their professional practices of public engagement from social inclusion, accessibility and participation towards openness. Against this background we situate and present a part of our on-going research in the AvoinGLAM initiative. More specifically we discuss a series of workshops conducted by the authors. The key objective of these workshops was to collectively develop strategies on how to open content<sup>1</sup> and data held by Finnish cultural institutions, and how to open up professional processes for the general public. In the workshop, the participants from cultural heritage and memory institutions performed predefined group work. For example, they mapped possibilities and challenges for engaging various audiences and participatory approaches. The main questions that we address in this article are: How to motivate museums towards openness? What is the contribution that this discussion on openness can bring to museums?

Keywords: participation, open culture, social inclusion, design, museums

# Introduction

Audience inclusion in cultural heritage institutions has been an important focus for a long time (Research Center for Museums and Galleries, 2000). Many institutions have attempted to make their content available to people with different needs (Sandell 2007) and from different cultural backgrounds (Karp & Lavine 1991). There are a number of mobile libraries and museums that visit hospitals, senior's homes and prisons.<sup>2</sup> Many networks, conferences and publications have enriched discussions on inclusion and accessibility.<sup>3</sup> Museum professionals know a lot about physical accessibility issues related to their collections and exhibitions, and this knowledge has been developed into specific guidelines and policies adopted by many museums.<sup>4</sup> As collections are being increasingly digitized, and museums are moving their offerings and services to technology platforms on the Internet, there is a growing need to bring issues on digital accessibility to the museum agenda (Lisney et al. 2013).

Emphasis on participatory practices dominated discussions about museums in the last decade.<sup>5</sup> This was supported and sustained by the introduction of new technologies in the cultural heritage sector and efforts towards digitalization. New digital tools provided by the museums gave communities of visitors a possibility to e.g. tag, bookmark and comment on the materials that are exhibited in both the physical space in the museum and online. There are also other means and strategies used to engage the public and stimulate participation in the GLAM (galleries, libraries, archives and museums) sector. In libraries, archives and museums there are interesting efforts being made making it easier to classify and recommend books.<sup>6</sup> Visitors are encouraged to take part in these activities that previously were done by organization's own staff members. Through these participatory practices visitors are in contact with the collection before, during and after the visit. Their involvement with the organization is taken into consideration in order to enrich the collection, and as a source of inspiration for future initiatives. The focus in these cases is mostly on how people can participate in the current practices of the institutions and share their knowledge or experiences on the cultural heritage content. However, by concentrating on these practices, we easily overlook the fact that this content is already selected, curated and contextualized by professionals in the cultural sector. The entire collection is rarely, if ever open to participatory endeavors. In addition, each project and institution in which these practices have been encouraged has set strict limitations on what can be done with the curated material. Creative interpretations and appropriations performed by the museum audience are framed into participatory practices addressed to general public.

Participatory approaches have opened alternative possibilities for visitors and special groups to interact with museum collections. In this way these approaches have paved the way for open

<sup>&</sup>lt;sup>1</sup> Open Knowledge Foundation's definition of open content is: "a piece of data or content is open if *anyone* is *free to use, reuse, and redistribute* it" [emphasis Salgado & Marttila]. For a full description of the definition see http://opendefinition.org/okd/.

<sup>&</sup>lt;sup>2</sup> See e.g. Arts & Audiences, 2012.

<sup>&</sup>lt;sup>3</sup> See e.g. Museums and Social Issues. and the International Journal of the Inclusive Museum.

<sup>&</sup>lt;sup>4</sup> See e.g. Smithsonian museum's accessibility program http://www.si.edu/accessibility.

<sup>&</sup>lt;sup>5</sup> See for e.g. Simon, 2009.

<sup>&</sup>lt;sup>6</sup> See e.g. Yin-Ling & Arroyo, 2012 or Tran, 2009.

strategies in which the audience is invited to interact with the museum collection using alternative means. Museums using open strategies invite professionals to be part in the decision making process that influence the core museum actions. These professionals can design products and services based on the collection that facilitate and invite new audiences. This includes the creation of interpretation materials such as mobile applications that may allow new audiences to engage with museum collections. The collection is completely open for interpretations, not only by the museum personnel but also by external collaborators in their role of professionals.

This article discusses how to embrace approaches on social inclusion, accessibility, participation and openness in the museum in order to better understand benefits of opening museum collections, collaborative processes and professional museum practices. We build both on theory and practice-based research. The empirical material discussed is obtained from a series of workshops organized by the authors in the context of the AvoinGLAM initiative. The key objective of these collaborative workshops was to collectively develop strategies to open content and data held by Finnish cultural institutes, and discuss how to open up professional processes and practices for the general public.

# **Research methods**

AvoinGLAM ("Avoin" means "open" in Finnish and "GLAM" stands for Galleries, Libraries, Archives and Museums) is a network of people and organizations with the aim of opening up content and data held by the Finnish memory institutions. The AvoinGLAM initiative aims to establish more open and transparent organizational culture, facilitate and support for artists, designers and practitioners to use and re-use open cultural content and data. This initiative builds upon the international OpenGLAM<sup>7</sup> initiative set up by Open Knowledge Foundation, and shares their fundamental mission and approach on building an open culture.

The AvoinGLAM initiative was originally launched in connection with the Open Knowledge Festival 2012. It was later restructured as a working group under Open Knowledge Finland association (Marttila, forthcoming). Under the initiative, various activities have been organized including talks, seminars and workshops in Finland. This paper reviews four collaborative workshops conducted and facilitated by the authors in different cities in Finland: Helsinki, Forssa, Tampere and Pori. The overall aim of these workshops was to promote practices and tools related to openness in cultural heritage and memory institutions. We seeked to understand and collaboratively map the status quo in Finnish cultural institutions, and bring together actors to share experiences and good practices, thus providing a platform to learn from each other and build a vital network.

In the workshops, participants from cultural heritage and memory institutions performed predefined group work, including collaboratively mapped possibilities and challenges of sharing authorship, engaging the public, and releasing content with more open terms of use. The empirical material obtained from the four workshops consists of: predefined and prepared assignments that were performed and discussed by the participants; records of discussions and presentations of assignments; and notes by the workshop facilitators. Two of the workshops, in Helsinki and Forssa, were scheduled for a whole day, giving more emphasis on an introductory lecture and a general discussion. Two other workshops, in Tampere and Pori, were shorter and lasted approximately half a day. In the latter workshops, the majority coming from the GLAM sector.

All of the workshops followed the same structure: a general lecture on openness in terms of meaning and levels, along with example of projects, group work in small groups based on predefined assignments, group presentations and final discussion. The themes of the assignments were: 1) mapping the current situation in cultural organizations; 2) the roles of cultural organizations in society; 3) how to build an accessible GLAM organization? 4) participatory approaches and public engagement methods in GLAM organization – current practices and envisioning the future; and 5) the principles of openness in GLAM organizations. Small groups of participants performed the assignments and discussed the issues presented above. After three to five rounds of group work, participants presented their outcomes, and summarized the key points of their discussions. Every workshop ended with a general discussion based on the group's presentations, including questions by the participants.

<sup>&</sup>lt;sup>7</sup> OpenGLAM is an initiative launched in December 2011 by Open Knowledge Foundation. For more information see http://openglam.org.

The empirical data was analyzed without predefined hypotheses or preconceived theories. The data from each workshop was categorized based on assignments; emphasis was given to themes and topics that occurred in many responses. After reviewing the outcomes of the workshop assignments, three key topics and developments ensued that are relevant to the museum domain: social inclusion and accessibility, participatory approaches and open practices.

In the following part of this paper these themes are elaborated through the empirical findings, however at the same time we aim to situate and contextualize the themes in the current discussion in museum studies.

# Overview of the approaches and analysis

# 1. Social inclusion and accessibility

There are many strategies to build an inclusive and accessible museum (Sandell 2002 & 2007). Most of them put an emphasis on who is invited to engage with the exhibitions both online and on site. In Finland, efforts are directed towards inviting people with special needs, people of different ages and people from different social backgrounds. In addition, a manual on how to build accessible exhibitions was published in Finland (Teräsvirta 2007). Various museums have produced and published guidelines and policies on their accessibility program.<sup>8</sup>

In context of our workshops, accessibility in relation to museum collections was discussed especially in the assignment on "how to build an accessible GLAM organization?" In this task participants were asked to identify the communities with whom their organization is involved and interacting with, and name the activities that made these communities engage with the cultural organizations. In the assignment we asked the participants to place the communities in a big outer circle, and name and place the participatory activities in smaller consecutive circles. Communities or actors identified in this task by the participants encompassed a wide range of user groups, including refugees, immigrants, social discriminated people, students at different levels of education, artists, researchers, volunteers, virtual visitors, public sector, non-users, authorities near the museum community using different strategies. For example, in the Modern Art Museum in Pori they have sessions for babies to paint. These events are called 'Color Baths' and babies use eatable materials for painting. In this case, the museum is making a special invitation to babies to have contact with the artistic practice of painting.

Mapping these activities and/or projects in the workshops creates the possibility for participants to trace the link between accessible endeavors in which they have been involved, and the open approach. In addition, reflecting on these matters made the participants face their own contradictions and preconceptions related to openness.

In the workshop in Tampere, the participants acknowledged a need to have new professionals in museums with expertize on digitalization, intellectual property issues and technology. This expertise might increase the knowledge of the community on (currently) foreign issues (e.g. open data and copyright issues).

'Open' is sometimes perceived in relation to technical and copyrights challenges, not in terms of the possibility for audience engagement and interaction with cultural heritage content. The task of mapping organizations' actions in relation to actors for a accessible GLAM made participants consider open approaches as a possibility to engage with new audiences, such as volunteers and developers. In addition, participants in the assignment developed strategies on how to be more accessible. These included communication and collaboration activities, providing access to collections and catalogues, the use of social media and new tools for new audiences. Creating access was understood as being not only about inviting groups with special needs but also about widening the community that could be interested in collections, and motivating these newcomers through open practices.

# 2. Participatory approaches

In recent years there have been many initiatives in which museums facilitate the participation of the audience: as special groups invited to bring their own personal objects to the museum;<sup>9</sup> to curate

<sup>&</sup>lt;sup>8</sup> See e.g. Smithonian Accessibility Program, 2013.

<sup>&</sup>lt;sup>9</sup> See e.g. Helinä Rautavaara Museum 2008 & Simon 2007.

exhibitions from the museum collection;<sup>10</sup> to be part of the design process from the beginning;<sup>11</sup> or to comment on the exhibited material.<sup>12</sup> With the widespread use of participatory practices and the consequence validation of audience participation, visitors' contributions started to be part of the museum concept. Social media and digital tools have exaggerated this effect because they have made it possible for museums to direct their call for contributions to different groups of people using different media formats and services. Making the audience's comments and materials sharable is easier once it can be part of the museum's online presence. Co-creation of heritage happens mainly in online platforms and in workshops, however, in the exhibition spaces this co-creation is rarely exhibited.

In the workshops, certain cases came up as models of co-creation of cultural heritage material. For example a group of volunteers interested in history and wanting to contribute to museum work are taking part in the core activities in the Worker's Museum in Tampere. This group of people work on activities related to their own interests and they take part in activities related to the collection, including: listing, photographing, documenting, scripting the exhibition, building and design, plan and production of events (Työväenmuseo 2013). Solmu created by Mediamuseo Rupriikki provides another example. Here they ask citizens to comment and/or add material to their existing database of videos, photographs and texts (Museosolmu, year unknown). Participants' own cases demonstrated that participatory approaches are desired, and motivated through creating practices to collaborate with different communities that are interested in the collection. The concerns in relation to these participatory approaches relate mostly to the issue of the sustainability of projects. Projects are generally limited in time and once the funding is over, it is hard to continue.

Open strategies for participation include letting the museum community take part in the core activities of the museum, including work on the collection, organizing events, choosing the exhibition topic, design, selection of material to be included and making the interpretation and communication materials for the exhibition. This can only be done with special invitation to external collaborators such as associations and communities with special interests related to the museum collection. Creating trust within the museum community is fundamental to a more fruitful collaboration where there are less concerns on the possible outcomes. This only happens with time and commitment to reinforcing open practices.

# 3. Open practices

Holistic participation in exhibition formation or enrichment of the collection is unfortunately far from the norm. The term 'museum community' is generally understood as the community to which the museum belongs. Museum studies typically show a clear division between museum personnel and audiences (e.g. Golding & Modest 2013). In this paper, when we refer to 'museum community' we refer to 'museum personnel and audience'. Through our work in the context of museums we have understood the importance of the inclusion of other members of the museum community such as museum personnel, artists and/or designers that have pieces in the exhibitions, museum friends, associations, online visitors and others interested in the museum collection such as hobbyists. All these groups can be invited to take part in defining museum actions and strategies.

When museums release open content, they do not imply special invitations to interact with their collection. People can engage by creating services, products or interpretations based on the collection without asking permission. If museums facilitate the engagement of people with their content, they could learn about developers, designers and newcomers interested in museums' collection. Understanding that each partnership demands other types of calls and ways to contribute is part of the work for supporting open practices that could lead to new forms of collaboration. Museums could be part of facilitating open practices by creating open calls to work with their collection. These calls have different formats such as: memory sessions, wiki marathons, hackathons<sup>13</sup> and wiki workshops (edit-athons).

<sup>&</sup>lt;sup>10</sup> See e.g. Bath & North East Somerset 2003.

<sup>&</sup>lt;sup>11</sup> See e.g. Taxen 2004.

 <sup>&</sup>lt;sup>12</sup> See e.g. Mc. Lean & Pollock 2007; Salgado 2009a.
 <sup>13</sup> A "hackathon" (also known as a "hack day", "hackfest" or "codefest") is an event in which computer programmers, designers, managers and the public collaborate intensively on creating a software project. Occasionally, there is a hardware component as well. Hackathons typically last between a day and a week in length. Some hackathons are intended simply for educational or social purposes, although in many cases the goal is to create usable software. Hackathons tend to have a specific focus. Some hakathons were hosted in museums and libraries and relate to creating material on their content (source: Wikipedia).

Participants referred to networks and collaborative projects of different scales - such as Europeana,<sup>14</sup> FINNA,<sup>15</sup> Museoraitti,<sup>16</sup> Virtuaalipolku,<sup>17</sup> Kuulto,<sup>18</sup> and Solmu<sup>19</sup> - as fundamental for reaching external collaborators and motivating them to share the collection and release some of the content through open licenses. In this context museum professionals are worried, and have some resistance. One participant in the workshops put it this way: "we are reluctant to open the collection to the public because we do not have all the information related to the collection. The information has some gaps. We do not want to share these inaccuracies".<sup>20</sup> For conservation experts, thinking how to share their content is a new practice: "in a sense we think that our responsibility is to conserve, so if we offer the whole collection to the public, what remains for us? This is a bit of an exaggerated way of saying this, but it is like this".

Issues related to open practices, content and data are a challenge: "we are afraid that we are not using the copyright laws correctly, so we prefer not to take risks. The fear takes over from the possible benefits that sharing the collection might have". This ongoing conversation on openness that took place in the workshops reassures an increasing acknowledgement on the challenges related to the process of releasing content with more open terms and conditions.

In the future, there could be ways to track all the possible uses of this content. Museums' involvement in the creation of open practices is vital to co-design these opportunities. In relation to this, a participant in one of our workshop stated: "if we open the collection, we want to be sure that some of the created material related to our collection comes back to us, that we can enrich the collection whilst opening". Museums can open their content, but the collection might not benefit in terms of its enrichment, but in respect to its visibility. Collections will be seen, used, interpreted and recreated in unexpected ways. This is an open approach that involves certain risks and a trust towards the future uses that people could invent for the collection.

# Findings from the workshops

In the previous sections of this paper we reviewed our empirical material, and identified and discussed themes relevant to the contemporary museum studies discourse on museum practices. From the research material coming from the workshops, we understood that discourses about an inclusive, participative and open museum are part of the everyday life of cultural organizations. In this section we build a path from accessible, to open, in order to weave a better understanding on present challenges in the sector.

**An inclusive museum** can be thought as a museum that opens to collaborations and partnerships. Inspired by these different audiences, museum professionals enhance their exhibitions and also their way of engaging with different communities. By opening content, new audiences will connect with it. This can be a source for enriching practices and collection, and reinforce the commitment to the audience.

**A participative museum** provides the audience with new ways of engaging with their collections by taking part in selecting, commenting, voting, and bookmarking materials from the exhibitions. Through this committed engagement with the different groups of people interested in their collections, museums are able to develop a sense of trust that allows them to enrich their collections.

**An open museum** is an idea that departs from sharing content and data in cultural organizations and could develop alternative practices that do not require organization consent. Products, services and new interpretations of the collection will come once alternative ways of using open content are created.

The open museum is not a recent phenomenon.<sup>21</sup> However, participants in the workshops realized that this is the right moment of this discussion in Finland because they appreciate the benefits of the open approaches and they are increasingly taking part in projects, which involve sharing the collection using open licenses.

<sup>19</sup> http://www.museosolmu.fi/

<sup>&</sup>lt;sup>14</sup> http://www.europeana.eu/

<sup>&</sup>lt;sup>15</sup> https://www.finna.fi/?lng=en-gb

<sup>&</sup>lt;sup>16</sup> http://www.museoraitti.fi/

<sup>&</sup>lt;sup>17</sup> http://www.virtuaalipolku.fi/index.php?option=com\_content&view=article&id=219

<sup>&</sup>lt;sup>18</sup> https://www.jyu.fi/ytk/laitokset/yfi/oppiaineet/kup/tutkimus/tutkprojhank/kuulto

<sup>&</sup>lt;sup>20</sup> Free translations made by the authors.

<sup>&</sup>lt;sup>21</sup> See e.g. Kelly, et al. 2008 and Salgado 2009b.

The workshops were instances of dialogue between participants, and provided a rich body of material for further analysis. The workshops, like pulleys, facilitated collaboration between participants and provided a possibility to arrive at a common understanding and interpretation in relation to openness. They also facilitated network building.

It is no longer the cultural heritage institution that coordinates the participatory practices, but immaterial property is made available publicly. In these conditions some ethical concerns appear: Who is responsible for the use of this content? How can cultural institutions ensure that the inclusion and participation related to their content happens under their own rules and conditions? What if what is created goes against the vision and mission of the institution? What are the ethical and moral considerations of being open?

Similar questions were posed once we gave the audience the opportunity to participate and provide content material to the exhibitions. The result in these cases was surprisingly positive. People were eager to enrich the material in many ways. Vandalism or negative interventions are seldom part of these endeavors.<sup>22</sup> Therefore, we believe that in the case of opening the content and data, we will see similarly positive results. People eager to volunteer and to create materials on the basis of a cultural organization's collection, will respect this content because the aim is to contribute to reinforce open approaches.

Many participatory initiatives happen as an initiative of educators in the museum context. Educators have been historically the ones nurturing the dialogue with the audiences, by providing different approaches through which visitors are involved with materials in exhibitions. In relation to our study, archivists and researchers could have a meaningful role in supporting the process towards open approaches.

Nurturing trust with the museum community, with external collaborators that could be interested in using the museum collection in unexpected ways is a fundamental part of museum actions towards openness. Museums can build this trust by encouraging external collaborators to engage with their collections and create from them. Wide spread participatory approaches using open strategies for collaboration is the basis of nurturing trust with the museum community and moving towards openness.

# Conclusions and implications for future study

This paper offers a preliminary analysis of four workshops that took place in Finland during 2012/13. There is a need to continue the dialogue related to these issues and future analysis of the material gathered will be undertaken. Workshops in the future could to be complemented with clinics in which consultation on how to move projects one step towards openness is given. The workshops we conducted provided a possibility to map projects, activities and actors. They were successful in involving new players in the museum, providing a space to co-create a common vocabulary in Finnish, and providing arguments to negotiate with resistant players within the organizations.

In this paper we only provide a narrow analysis that traces links within already existing discussions in the museum: social inclusion and accessibility, participation and openness. Drawing on the wellestablished discourses on social inclusion, accessibility and participation it will be possible to build the open museum.

Openness in cultural memory institutions could make a significant contribution in the sector because it entails new invitations to different actors within the museum community. Previously, when accessibility and participation were the main paradigms in cultural organizations, educators and curators had a key role in designing and implementing access and participation. In this shift towards openness conservators, experts in digitalization and researchers are also gate openers within the museum. In addition, it encourages the involvement of external collaborators in their role as professionals. In the case of open practices, the audience is not only taking part in commenting, tagging and bookmarking, but also in the production and design of visualizations, products and services based on the museum collection. This time the audience takes part in their role as experts that can design, publish and make invitations facilitating other groups to engage with the collection. This changes the perspective and raises new challenges for collaborations with an unknown community of people that is interesting in designing products and services based on museum collections. In order to see the potential of this

<sup>22</sup> See e.g. Salgado, 2009a

community, museums need to create new spaces, networks and ways of working together, such as *hackathons* in which designers, museum professionals, practitioners and the community collide.

Museums could be motivated towards openness by nurturing trust with external collaborators and by setting strategies together with other cultural organizations. Museums professionals' knowledge and know-how on social inclusion, accessibility and participatory approaches make a fertile land to motivate open approaches. Our workshops in the context of the AvoinGLAM initiative have provided inspiration to build this conversation and start thinking of future strategies.

Recently there have been many initiatives in which museums release digital collections with open licenses, people are able to adapt and edit the content that museums provide. In Finland the publication of metadata packages and APIs by museums (e.g. Finnish National Gallery 2013) that allow developers to create their own applications based on museum content is changing rules and practices. In these cases, people participate, and design and develop visualizations, services and apps utilizing a dynamic database. Once the data is released the possible uses or outcomes of this content are open to people's own skills and interpretations. The content and data could even be used against the goals and mission of the cultural organization. Openness gives space to the surprising and asks ethical questions concerning the future uses of our cultural heritage.

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# Dos and don'ts on Facebook across museums

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https://www.facebook.com/smk https://www.facebook.com/nationalmuseet https://www.facebook.com/experimentarium

Abstract: Few museums on Facebook succeed in generating engaging content that creates awareness. We often choose to promote events and exhibitions rather than engage in conversations. However, success on Facebook is not achieved using the social medium as just another marketing platform.

Based on a comparative analysis of three very different museums, all with different audiences and communicative purposes, we present a best practice for museums on Facebook.

Analysing the Facebook pages of an art museum (SMK – the National Gallery of Denmark), a history museum (the National Museum of Denmark) and a scientific museum (Experimentarium), it becomes possible to sum up dos and don'ts for museums in general on Facebook. The paper will provide useful advice for the everyday work with Facebook, such as when to post an update, how to make an engaging post and how to acquire the attention of an ever more demanding audience.

For all three museums, being on Facebook is about engaging the audience around quality content, that interests them – and in the end let the audience themselves communicate our culture, heritage and the knowledge generated by museums, out to an even larger audience.

Keywords: Facebook, engaging content, dos and don'ts, comparing museum types, social media

# **Defining Facebook**

There are different opinions and definitions on what constitutes a social network site. In this paper, Facebook is understood as a social network site such as described by boyd and Ellison in their newly revised definition:

A social network site is a networked communication platform in which participants 1) have uniquely identifiable profiles that consist of user-supplied content, content provided by other users, and/or system-provided data; 2) can publicly articulate connections that can be viewed and traversed by others; and 3) can consume, produce, and/or interact with streams of user-generated content provided by their connections on the site. (boyd & Ellison 2013)

According to danah boyd, we primarily use the internet as a mean of obtaining information and as a way of communicating (2008, 1). As Bjarki Valtysson concluded after interviewing young Danes on their use of Facebook, the social network site is particularly used as a mean of communication: "*All of them mention communication as being the prime reason for being on Facebook, particularly maintaining friendships (none of them mention acquiring friendships), organising practical matters, networking, and to look at pictures*" (2012, 86). In accordance with Valtysson, Jakob Linaa Jensen emphasizes the use of Facebook as a platform for social network creation (sociality), but also underscores how Facebook is used for personal presentation (identity) (2009, 98). Hence, getting a Facebook page as a museum means entering a social space used mainly for communication and the creation of identity.

# The three museums and their Facebook presences

SMK is the National Gallery of Art in Denmark, the National Museum of Denmark is Denmark's biggest cultural history museum (a conglomerate of several museums and ships) and Experimentarium is a scientific museum known for its interactive exhibitions.

SMK has 18,573 fans, the National Museum has 11,081 and Experimentarium 7,712 (based on 9 October 2013).

The three museums have different traditions, target groups and business models, but all three joined Facebook in 2008 and have since experimented with their presence on this social network site.

When comparing the three Facebook pages, one of the common traits is that all fans of the pages check their Facebook profiles fairly regularly, distributed throughout the day. However, most fans are logged in on Facebook at 9 p.m., thereby becoming the best time to schedule posts.



Facebook Insights. The graph is the exact same shape as for the National Museum and Experimentarium, even though the fans do not share demographics such as age.

While the three museums are comparatively even in this aspect, they differ considerably when it comes to which type of updates work best for them. For Experimentarium, text-updates perform better than updates that include images and links. In contrast to this, both the National Museum of Denmark and SMK perform best with updates with images followed by links.







Facebook Insights: Photo and link posts are performing the best at the National Museum's page.



Facebook Insights: Photos is the type of post performing the best at SMK's page.

However it is not enough simply to say "just make a text-update or use a picture, then you will have a great status update!", especially not, when what works best for the three museums is so different. We have therefore analysed more deeply, what content works on Facebook across the three museums.

#### How did we compare presences on Facebook?

To analyse the three Facebook pages we gathered all the updates from 1<sup>st</sup> October 2012 to 30<sup>th</sup> September 2013 through Facebook Insights. With Facebook Insights we pulled a list from each museum with the posts throughout the year, which showed the content of every update. After this we systematically went through all the posts and gathered them in overall categories ending up with the following categories:

- About us (news about the museum or employees)
- **Topic** (a relevant topic for the museum)
- Crowdsourcing and dialogue (questions, ideas to an exhibition etc. )
- Exhibition and event (experiences taking place at the museum)
- Fun and entertainment (humour)
- Season and celebration (can be planned ahead, e.g. celebrating Christmas)
- **News** (real news, discoveries, findings)
- **Trending topics** (unpredictable, can't be scheduled, what the world outside the museum is talking about)



Fig. 5. An overview showing which categories each museum has posted in the last year.

All three museums use the categories "About us", "Topic" and "Exhibition & Event" a lot.

To compare which categories perform the best, we compared them on three parameters from Facebook Insights:

- 1. **Reach** (how many people have seen this post)
- 2. Click on posts (invisible interaction)
- 3. Like/comment/share (visible interaction)

The average reach, clicks and likes/comments/shares are shown in the table below. This has been calculated based on the pages' current number of fans (9 October 2013), even though the fan bases for all three museums have increased during the last year. Reach is the amount of people seeing your post in their newsfeed. Updates by Facebook-pages in average reach 16 percent of the fan base (Lemberg 2013). One's average can be increased by either getting the fans to interact with the updates (whether that be visible or invisible interaction), or by advertising. The average reach is affected by the amount of advertisement bought on Facebook. Both Experimentarium and the National Museum bought Facebook advertisement throughout the year, while SMK started advertising on Facebook only in September 2013.

Category	Experimentarium	National Museum of Denmark	SMK
About us	32,00%	32%	19%
Торіс	31%	33%	25%
Crowdsourcing & dialogue	39%	29%	17%
Exhibition & event	33%	40%	22%
Fun & entertainment	30%	45%	31%
Season & celebration	47%	58%	32%
News	42%	60%	0,2%
Trending topic	44%	30%	0

Table 1.	Average	reach ir	percent	within	each	category
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Table 2. Average click on post in percent within each category

Category	Experimentarium	National Museum of Denmark	SMK
About us	5%	6%	14%
Торіс	3%	8%	7%

Crowdsourcing & dialogue	4%	20%	7%
Exhibition & event	5%	5%	7%
Fun & entertainment	4%	10%	6%
Season & celebration	1%	6%	7%
News	2%	8%	185%
Trending topic	2%	8%	0

#### Table 3. Average like/share/comment in percent within each category

Category	Experimentarium	National Museum of Denmark	SMK
About us	1%	10%	4%
Торіс	1%	3%	21%
Crowdsourcing & dialogue	1%	5%	4%
Exhibition & event	1%	4%	13%
Fun & entertainment	2%	3%	19%
Season & celebration	1%	5%	19%
News	1%	5%	109%
Trending topic	1%	4%	0

When comparing how well updates in the different categories do, it particularly jumps off the pages that updates in the category 'Season & celebration' get the highest average reach for all three museums. Experimentarium and the National Museum also have a common high average reach in the category 'News'. In the parameters 'Click on post' and 'Like/Comment/Share', we cannot draw a common line between the categories.

We then have to look at the specific content of the updates for each museum. To compare posts across museum types, we have chosen the three posts with the best and the worst performance from all three museums on the three parameters above. That gave us 18 posts for each parameter, 9 that performed extraordinarily well and 9 that performed unusually badly.

# Comparing posts: likes, comments & shares

#### Let's celebrate and have fun!

When we compare which three posts have the biggest engagement in likes, shares and comments, the posts with pictures without a link are the most popular. Furthermore, photo albums on Facebook have a high engagement. The more pictures in the album, the more content is there to engage with. Photo albums give each fan the possibility to like, share or comment more than one time in a single status update, and therefore photo albums are represented a couple of times in the nine compared posts.

It is often advised to keep updates short (between 100 and 250 characters) (Claveria, 2012; Cormier, 2013). We were therefore surprised to see that most of the updates are followed with a section of long text.

Three of the updates are in the category 'About us', which indicates that as long as the internal news is strong enough, the fans will interact. We will later return to updates about internal news. But the biggest trend we see for getting engagement is when there is some good news to share. It can be a celebration or a new finding for the museum. For example, Experimentarium had many likes and comments with congratulations when they celebrated the anniversary of the Director Asger Høeg, and the National Museum gets great response when they celebrate a National Day such as the annual celebration of the liberation of the country from German forces on the 5<sup>th</sup> of May 1945 (Fig. 6).

Hence, one of the updates with most likes, comments and shares was made by the National Museum on the 5<sup>th</sup> May 2013 commemorating the celebration. It should be mentioned, that the Museum of Danish Resistance 1940-1945 (which is a part of the National Museum of Denmark) had burnt down a week before this day, so that the topic and the Facebook page already had great awareness. We can therefore conclude, that fans will interact if they feel empathy with great news, or we share a celebration nationally – especially if it is written in a happy tone.



#### Fig. 6. Post from the National Museum of Denmark

Here the National Museum made an update about the liberation of Denmark after World War II in 1945, which was 68 years ago on 5th May 2013. The picture is the main message here. The photo is unusual because most of the images from World War II are in black and white.

In addition, we see that pictures with humans have an impact. When talking about likes, comments and shares, humour and entertainment have high ratings. When something is fun, you don't have to take it seriously, which can make it easier to like or share it with your friends.

So if you hit the right kind of humour in your fan base, you can get far, because fans generally want to share the fun. We can also see that when you do not hit the humour, the post really performs badly.

Exp Gør af på grind	rimentarium let ondt at føde et barn? Det prøver et par hollandske fyre at finde ud egen krop igennem elektroder på mavemusklerne. Se her hvor længe ne varer!	e
24. ja	Proefkonijnen - Dennis en Valerio krijg         weeën (with English subtitles)         Press 'enable CC', next to 'enable notes' in order to view E         subtitles. Dennis and Valerio are getting electrodes attache         their stomaches. The ele         YOUTUBE.COM	gen nglish ed to
I S	nes godt om 🖷 Kommentar i I Del	
44 S	nes godt om-tilkendegivelser 3 kommentarer 20 delinger	

Fig. 7. Post from Experimentarium

Here Experimentarium has shared a video, where two young boys agree to be part of an experiment to feel the pain of giving birth on their own bodies. That produced a lot of reaction.

Compared to Mark Hughes' 'six buttons of buzz' (2005, 29) the update in Fig. 7 hits the buttons 'taboo', 'unusual' and 'hilarious', because giving birth is not an everyday topic and is normally a personal subject, but also something most people recognize as painful. Furthermore, such experiments are not seen on an everyday basis, which makes it unusual.

#### How to make an engaging status update:

- Use pictures without a link
- Make an album of pictures which get fans to engage further
- Deliver some great news that fans feel empathic with or celebrate themselves
- Use humour in a relevant context

#### Why so serious?

When we look at the updates with the lowest engagement in likes, shares and comments, there are usually no pictures, but only a link. The fan has to click on the link to find out if he or she is interested in the content.

The status updates in this parameter have in common that the content is about heavy topics. Experimentarium writes about a lecture on alcohol and a live phone call between two astronauts, SMK writes about a new contemporary art exhibition consisting of a film full of decay and attacks on nature and an article about the Minister of Culture.

#### Fig. 8. Post from the National Museum of Denmark

~	Nationalmuseet via Henrik Schilling Vores inspektør Lars Christensen sætter lærer-lo perspektiv (begynder 2:45 inde i klippet)	∽ ockouten ind i et historisk		
	>DR2 Dagen - med Illeborg og Ingemann - 02. apr. 2013   DR2   DR Nyhedsshow med Jakob Illeborg og Frederikke Ingemann. På alle hverdage går de to værter i dybden med nyheder, tendenser og kultur fra hele verden - og Danmark.			
	2 April 🏶			
	🖬 Like 🖷 Comment 🌧 Share	17 Likes 3 Shares		
	3,318 people saw this post	👎 Boost Post 🔻		

Here the National Museum links to a TV debate concerning a teacher lockout in a historical perspective. The post demands too much of the fans (watching a long TV show). It may have been better to write some of the points from the TV show and then add an image.

The status update has to be informative and relevant on its own, so the fan gets value without having to go to another website. The rule is to explain the link's content without just linking to it. Some of the updates mostly belong on the intranet of the museum, because it is more an in-house news. If it reminds us of a press release about a cooperation of some sort, it is too boring to post on Facebook.

#### How not to make an engaging status update

- Never write a post, which can't stand alone e.g. requires additional information
- Avoid heavy topics

# Comparing posts: clicks on post

#### Click to see all the details

Clicks on a post can occur for different reasons: There can be clicks on an image, a link, a 'read more' link, or to go back to the museum's Facebook page.

But what do our most clicked posts have in common? Most of the posts that perform well are posts with images. The images are the main message in the posts, and the posts are often about details in the images, that implicitly encourage people to click on the image to see the details closer. It can be SMK's image with details of small naked men in flowers, National Museum's ask for help with unknown churches or Experimentarium's image of the Crown Prince of Denmark.



#### Fig. 9. Post from the National Museum of Denmark

Here the National Museum asks the fans to help solve a problem: Which church is this? The fans will have to look closer on the image to see the details and maybe solve a real problem for the National Museum.

It is also noteworthy that some of the posts are photo albums, which easily get more clicks, as one person can click several times on the same post.

#### How to get more clicks

- · Post images (or albums) with interesting details
- Get people to solve a problem using the image

### Facebook or the intranet?

Again and again we forget, that we (as excited employees) are not the Facebook page's target group. We are so thrilled about good reviews of our exhibitions, or curators getting headhunted to bigger museums, but our fans do not care. And we keep forgetting that.

The thing our posts have in common are the messages about something that we really care about, but which should have been posted on the intranet, for example about one of our special exhibitions travelling to another museum. Yes, that is big, but why should people care, when most of them live just around the corner from our museum. They, of course, want to see the exhibition, while it is at our museum. It is the same problem when we forget who the fans are and post something we do not know where else to post: we need volunteers, we have a new Facebook page for one of our other museums etc.. The problem here is that we irritate our fans by posting irrelevant content, and we never get the message through to the target group. That is a lose-lose-situation. What could have helped reaching the target group was using advertising on Facebook thereby targeting only the people who might be interested in just this.

The posts people do not click on also have something in common: They do not have an image in the link. They are just plain links, so they visually do not take up much space in the feed, and they are not visually appealing. That does not work.

The last thing that will stop people from clicking is a post that demands too much of the fans. For example, asking difficult questions or writing about subjects that are too heavy. We have to remember, that people are also on Facebook to spend some time while travelling on the bus, waiting in line etc., they will not start watching a one hour TV program in a supermarket.

SMK_	Fig. 10. FOSt ITOTTI SMK		
an a later of local	Så er Matisse-udstillingen åbnet på Metropolitan Museum of Art hvis du er så heldig at skulle til New York 🙂		
	Matisse. Paires et séries - du 7 mars au 18 juin 2012 « Je me suis inventé en considérant d'abord mes premières oeuvres. Elles trompent rarement. J'y ai trouvé une chose toujours semblable que je crus à première vue une répétition mettant de la monotonie dans mes tableaux. C'était la manifestation de ma personnaité angeme la même quele que fivesent le		
	BY DAILYMOTION.COM   DAILYMOTION FRANCE		
	🖆 Like 👎 Comment 🌧 Share	34 Likes	
	2,268 people saw this post Boo	st Post 🔻	

Here SMK posts the message about one of their exhibitions moving to Metropolitan Museum of Art. An example of a post that makes employees proud, but does not interest the fans. It should maybe just have been posted on the intranet, where colleagues would have been thrilled.

### How not to get people to click

- Posts that should have been posted on our intranet and which are written from the point of view of the sender rather than the receiver
- Posts that demands too much of the fans
- Posts with links, but no image

# **Comparing posts: Reach**

#### I will never leave Facebook

When we compared posts on *Reach* it was quite significant, that the category 'Topic' performed better than the other category. Four out of nine posts are categorized in 'Topic', and relate to the different museums' subjects: art, science or history. But they do not relate to our museums, or museums in general at all.

We suggest that this is because very few people are dedicated to a physical building, but a lot of people are dedicated to subjects related to history, science and art. Our fans associate us with those subjects in a serious way. So when you post something related to their interest in a subject where you are considered a reliable source, they are likely to either click on it, share, like or comment on it. And by that, they share it with their network, giving the post a broader reach. People associate National Museum with Danish Prehistory and archaeology, SMK with Danish Golden Age and Experimentarium with hands-on experiments and everyday science. Therefore when posting not only something regarding history, but more specifically Danish Prehistory and archaeology, it reach the fans of the National Museum the best.

It is worth noting that even though we have many posts in the categories 'About us' and 'Exhibitions & events', none of them get into the top 3 of the best performances. In a few cases posts in these

categories work but else such posts ought to be avoided. Having a keen eye for when posts in these two categories will work and having the courage not to post the rest is an important lesson that your fans are the best to teach you: Do they like the post? Or click on the link? If not, then don't post it. Posts that don't get the fans to interact will damage your average reach meaning that it'll be harder for your great posts to achieve a high reach.

As for the other parameters, posts with images perform better than other types of posts. The thing that these posts have in common is, that what is written on Facebook is enough for the fan to interact with. There is no need to click outside Facebook to 'get more information', see a video, hear a podcast, read an article etc.. The fan can decide whether or not to interact just from seeing the post. The post is enough in itself. That is an important factor related to Facebook. We keep on posting things with links to other websites and more content, but we do get the message across to more people when we choose to go all in on our Facebook presence and avoid trying to drag people away from what they were doing (probably browsing through their news feed, where most posts are seen). So when we accept that people want to stay within Facebook, and adjust our posts to that reality, we get a better reach.



SMK posts an image related to their subject and close to the time period that people associate with SMK. The picture is painted by a famous Danish painter, and the message is about his birthday. A happy message, with a painting that a lot of people love. That works.

#### How to get great reach

- Post an image related to your subject, not your museum building
- Write a text that is good enough, so people get all the information they need on Facebook

#### Fig. 11. A post from SMK

# We heard it the first time!

If we look at the parameter 'Reach', the worst status updates have the most consistent type of updates. 7 out of 9 of our update under this parameter is an update, where we have shared others' or our own former update, so it has two updates in one.

X	Experimentarium delte et billede. Du kan stadig nå at melde dig til foredraget om Diagnose på en chip - helt gratis! Send en mail til foredrag@experimentarium.dk eller klik på linket nedenfor	~
	Experimentarium 3. januar Kom til gratis foredrag om diagnose på en chip den 15. januar og hør, hvordan man med blot en enkelt dråbe blod snart kan diagnosticere kræft, måske endda inden den udvikler sig til en svulst. Se mere her http://bit.ly/UPzPwg	
	10. januar @	
	🖆 Synes godt om 📮 Kommentar 🌧 Del	
	10 Synes godt om-tilkendegivelser 4 kommentarer	
	506 personer har set dette opslag Boost opslag	•

Fig. 12. A post from Experimentarium

As you see here from Experimentarium, it is a double update about the same thing giving too much information. Some fans have probably already seen the post the first time. Other times for instance the National Museum has decided to share another museum's update with the same confusing result as the above.

'Behind the scene'-pictures (for instance showing how an exhibition is built from the ground) does not work. Within the museums we tend to think that the public must be interested in following our work and in some cases it definitely works, e.g. open conservation studios within the museum, but this is not the case on Facebook. Only when the post could both fit within the category 'behind the scenes' **and** 'fun' **or** 'news', is it relevant on Facebook.

The topic also has to be relevant to the museum. For instance, a post on the Eurovision Contest didn't work for the National Museum, because it was out of their topic area. Furthermore, fun content is not always fun for everyone, so you have to make your own judgement about what kind of humour your fans have.

#### How not to get great reach

- Share a former post or another Facebook page's post
- Post an update with an irrelevant topic for your museum

After comparing these very different museums, we can now say that we actually have something in common. Not so much as physical museums, but in our Facebook presences and in our communication with our fans.

Compared to Mark Hudges' 'six buttons of buzz' (Hughes 2005, 29), we now have more concrete advice regarding what makes a good update on Facebook across museum types:

- Always use images
- Engage your fans (ask them a meaningful question, solve a problem etc.)
- Make sure your update has enough information, so you do not have to send your fans away from Facebook to understand the content
- Update about a relevant topic for the specific museum (it does not have to be news or a trendy topic, but this can be helpful)
- A funny or entertaining update about a relevant topic for the specific museum
- · Avoid reposting other Facebook posts, so you get a two-in-one update

As a final example we will show an update from Experimentarium, which contains most of the things that work.



Fig. 13. A post from Experimentarium

A post from Experimentarium with a lot of the factors that make a good post. It is funny and extraordinary, it is related to the museum's topic (and as a bonus also to the exhibition 'Inventions') and it is real news.

The update has a picture and you understand the content without having to click on the link and read further. It is a relevant topic for Experimentarium, because they have an exhibition about inventions, which this is. And it is definitely a fun update, which 88 people were willing to share. That is so far the most engaging update Experimentarium have ever had.

So good luck with the posting, we still try to make the updates containing everything on the list. And we have not succeeded yet.

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# Experience and re-experience without boundaries in time and space: the extension of a practical tool

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Abstract: "...you feel like you're in the exhibit. It's surreal. It's awesome. It's the future", an American architect this summer blogs when, in the CAD<sup>1</sup> model he downloaded from the museum's website, virtually having visited the Carl Larsson exhibition on show in Stockholm.<sup>2</sup> This quotation expressively highlights the topic of this paper in which the focus is on questions concerning adding value in curatorial practice, especially concerning public and museological aspects, when using 3D modeling as a tool. The aim is also to discuss the analytical implications in the light of the Digital history field. How could an architectural CAD program improve the installation planning process? How could this practical tool be used for museological analysis and research and what kind of representational aspects will then be highlighted; would it enable visual experience in virtual space? These rather diverse questions, the first offspring from the curatorial practical and pragmatic everyday work at a large art museum, and the second and third from a museological and digital history analytical perspective, will function as departure for reflections on digital tools in contemporary museum work and museum studies. The main concern is on the spatial and visual aspects connected to visualizations of exhibitions and questions interrelated to this topic, leaving all questions concerning the ongoing digitalization of the collections and other main documents aside.

Keywords: 3D modeling, curatorial practice, museology, visualization, representation, experience visuals

# Background

3D digital visualizations are since the last two decades of the twentieth century a well established tool within architectural circles but not at all broadly disseminated in the museum world. The museum sector seems to prefer traditional physical exhibition design drawings and physical 3D models and at Nationalmuseum in Stockholm, Sweden the use of CAD has often been forgoing by traditional methods. This situation could be explained by the fact that most museums, even the national institutions, lack internal competence in the digital field and some exhibition designers seems to still prefer pen and paper. Ten years ago, and still ongoing, the museum directors at Nationalmuseum discussed different ways of improve the exhibition planning process in order to reduce the time needed for installation. The arguments were for the benefit of the public and economical reasons and from this management requests some members of the technical staff took an initiative to investigate if the use of 3D modeling could improve efficiency and support for the art handlers.

In the beginning, in year 2003, this method was used as a compliment to the exhibition drawings, giving possibilities for curatorial changes in details before the installation began and still being able to through the CAD produce very accurate installation plans to the art handlers. The CAD programming was added quite late in the overall process, when the design of the display first had been presented by the exhibition designer and accepted by the curator. Then the CAD work began with adding the image files, following the sketches and sometimes the physical model done by the exhibition designer, consisting exact measures of the objects and their spatial relations in the galleries. It was not obvious for the curators in what way they could benefit of using the digital tool or why it should be used by them at all. Could it really replace the good old physical model and story line was a common question, but even though they did not actively use the digital model during the planning process, they had to approve the display in the CAD model before it was sent to the art handlers. They in turn were impressed; now they got clear and detailed drawings that had passed the curatorial board and been

<sup>&</sup>lt;sup>1</sup> CAD, Computer Aided Design

<sup>&</sup>lt;sup>2</sup> http://www.shoegnome.com/2013/07/16/tour-of-exhibition-via-bimx/, http://www.nationalmuseum.se/sv/English-

startpage/Exhibitions/Past-exhibitions-/Carl-Larsson--Friends-and-Enemies/A-Tour-of-the-Exhibition-in-3D/

approved, which were of great help in the overall planning and reduced last minutes changes when in the middle of installation. It soon became obvious that the installation process had become more efficient. The time needed for preparation and installation had been reduced with days up to a week.



Image 1: CAD image from the Carl Larsson exhibition at The Royal Academy of Art 2013

Ten years have passed and this method, which awoke from pure curiosity and a will to explore the possibilities of using new technology for improving visualization of the exhibition display, is implemented as a routine in the exhibition planning process. By now it is not only a practical tool for art handling, it has also slowly grown to be a curatorial aid early in the exhibition planning; a way to structure the narrative in the digital environment; sometimes without first having tested the display in a physical model. Almost all hangings and re-arrangements of the collections are currently planned and visualized in CAD. The exhibition model is also published on the museum web site enabling virtually exhibition visits without boundaries in time and space.



Image 2: CAD image from the exhibition From El Greco to Dali at Nationalmuseum 2003

# A curatorial tool

From a curatorial point of view the benefits of being able to visualize the spatial relations within the galleries especially when putting objects of different materials, and different size on display has been of great importance; the possibility to move around, to go near or step back in front of a painting or a group of objects on display; to spatially experience the route a spectator might choose or to ensure that there will be space enough for a group of visitors joining a guided tour are other curatorial aspects which you might experience and try out in the CAD model.

The digital display also has collaborative potentials as everyone with an ordinary computer could get accurate information of the display. Recently in the exhibition *Passions* at Nationalmuseum this way of collaborating was tried out in the discussions concerning the display of the video installations *The Passions* by the American artist Bill Viola. The Gallery in Los Angeles at first insisted to send a courier to monitor the installation; requesting first class flight tickets and five nights stay in Stockholm, but after having seen the model and talked to our CAD designer, they found their presence needless due to the information of the display they had got from the model.



Image 3: Interior from the exhibition Passions at Nationalmuseum 2012

From this practical developments with the CAD followed a short but interesting experimental step into another virtual space. When hearing about the Swedish Institute plans to establish The House of Sweden, build 2006 by the architect Gert Wingårdh, and housing the Swedish Embassy in Washington D.C., in the digital world Second Life, Nationalmuseum proposed to put some objects from the collections on display in the digital building; an extension of the dissemination of the collections that has been part of the Museums activity since early twentieth century. The idea was realized in collaboration with the Swedish Institute and later on the museum even offered two traditional guided tours for a bunch of interested avatars.

# An analytical museological tool

In recent years there is a tendency to study museum history from a visual culture perspective rather than the sociological and political focus that dominated the field during the last decade of the twentieth century. In *Spaces of Experience. Art gallery Interiors from 1800 to 2000*, Charlotte Klonk investigates what kind of experiences western art museums have generated through different display principles and in relation to the ideals of a certain period. She finds the museum, as a good example of places in-between the public and the private sphere, very useful in all studies concerning the "*cultural history of experience*".<sup>3</sup> The experience is due to social and historical forces and according to Klonk the museum display expresses the consciousness of the curators concerning what kind of experience they want to give to the public.<sup>4</sup>

In accordance to Klonk and her idea of the representational function of art exhibitions one aim in this paper is to investigate the analytical potentials when using the CAD for reconstruction of historical exhibitions. What kind of questions does a historical reconstruction awake? Does it offer any analytical added value comparative to the study of a black and white photography? This kind of questions have been of interest for me during the last couple of years and in consequence to an interest in historical exhibitions and currently in connection to my PhD project which deals with the temporary exhibitions at Nationalmuseum during the period 1866 - 2012, with special focus on the relation between the exhibition practice, the art historical discourse and the socio cultural ideas of the same period.

<sup>&</sup>lt;sup>3</sup> Charlotte Klonk, Spaces of Experience. *Art Gallery Interiors from 1800 to 2000,* Yale University Press New Haven & London 2009, p.3.



Image 4: Black and white image from *Sveriges Nationalmuseum*, the Swedish Gallery before the re-hanging 1906.

The case study chosen for this investigation is a digital reconstruction of the collection display from 1906. Then the picture guidance Sveriges nationalmuseum, written by the author Anders Hasselgren, was published.<sup>5</sup> It is a lively and, with more than 400 images, detailed description based on a fictional tour through all the departments in the museum; in this period not only a fine art museum, but as a National museum, and like many of the European museums, born in the age of nationalism during the 19<sup>th</sup> century, Nationalmuseum was a museum of the nation. As a National Museum, the museum had to host the historical collections, the national antiquities, the armory collections, the coin collection, the sculptures and the collections of applied art and finally on top floor the collections of fine art which in fact meant that it already from the beginning was perceived as to overcrowd. The Venetian renaissance facade representing classical references was in the entrance hall combined with the Swedish mythology, the giant sculptures by Fogelberg: Oden, Tor and Balder. The collections were arranged according to the common and hierarchical ordering of museum collections in the late 19th century. At the bottom were the archeological and historical collections, in the middle floor the armory and coin collection together with the collections of applied art and then at last, at the top of the temple, the collections of fine art surrounded by the plaster casts of the antiques placed along the wall surrounding the banister. Before reaching the top floor the visitors also had a possibility to gain some acquaintance with another famous antique; a plaster cast of the Parthenon frieze which went along the walls of the staircase.

The fine art collections were presented in a traditional manor in schools dominated by the Flemish and Dutch 17<sup>th</sup> century, the French 18<sup>th</sup> century, the Italian school and the Swedish 18<sup>th</sup> and 19<sup>th</sup> century. Looking from a museum perspective Nationalmuseum definitively represented the modern and successful nation Sweden, although not a great power nation any longer but instead bearer of a cultural and national modern spirit fully comparable to its European neighbors.

The guidance combination of images and text provides an interesting source for further analysis and it even comprises the re-arrangements of parts of the collection which took place later the same year. Then there was a major change in the display of the Swedish and Nordic schools and this change is also recorded in the guidance. What does this re-ordering tells us and could a reconstruction of the display/visualization of the exhibition reveal the curatorial motives behind the installation in a way a two dimensional black and white photo could not?

<sup>&</sup>lt;sup>5</sup> Hasselgren, Andreas, Sveriges nationalmuseum, dess konstskatter och historiska samlingar i bilder. Stockholm 1906.



Image 5: CAD reconstruction 1906 display

This example shows the display of the Swedish nineteenth century paintings. It is a tight, three leveled salon display and it is quite easy to grasp that aspects as size and topic have been considered in the overall design; following the principles for art display during the late nineteenth century. In the guidance the visitors' senses are triggered by descriptions as: violent, lively, sensuous, brutal, light, cold, powerful, impressive etc. together with information concerning the artistic qualities and sometimes a brief biographical note. But how is this visualized in the exhibition? The black and white photo reveals and the reconstruction confirms a curatorial notion based on the dominant art historical narrative in this period when the academic tradition, in this gallery represented by Swedish historical and Nordic mythological topics, Swedish landscape and portraits, still was regarded as representative for the Swedish national spirit.

When working on the reconstruction of the re-arrangement of the 1906 display something odd and peculiar caught the attention. Why were Young Boy Peeling a Pear by Édouard Manet and Talking in the Twilight by another French painter, Lucien Simon, centrally displayed in the gallery destined for the Swedish and Nordic schools from the same period? Of course there could be pure practical and pragmatic answer to the question due to the rather poor representation of late nineteenth century French paintings in the Nationalmuseum collection by this time. But even though there could have been some pragmatic curatorial motive behind this display it still has a representational function raising questions concerning interpretation and experience. How did it fit the art historical narrative built on nationalities and schools? The two French paintings are centrally located on the wall which indicates a curatorial decision based on art historical notions concerning modernity and quality, but there is also an interesting diagonal line which combines the three portraits where the Manet painting is the middle one. It is possible to sense the grouping based on size and localization on the wall but also the overall spatial relations between the two opposite walls. Color is another important aspect brought to light in the reconstruction but the effects of lightening has so far not been able to explore and analyze.

As there are few resources actually describing an experience of the gallery interior it is necessary to analyze the curatorial documentation, and other comparative material of interest. Klonk studies the scientific developments concerning perception and the public space of fairs – the choreography of desire. She is looking for connections avoiding a parallel study, rather focusing on experiences shared by individuals with certain interests and needs. She is more influenced by Bourdieu but unlike Bourdieu she is not primarily interested in viewing habits but in what kind of viewing perspectives museums have transmitted to the public.<sup>6</sup>

In this case study the main focus has been on the visualization with an intention to investigate what kind of information a CAD reconstruction could offer. So far the 3D model has offered an immersive sense of the overall spatial relations in the gallery, but also the curatorial concerns based on colors, balance and variation. Who then is the ideal visitor in this sense? The ideal visitors to the Swedish gallery before the re-arrangement were probably thought to be men and women, but also families, from the expanding bourgeois or middle class, with a pre-conceived knowledge of the historical and/or Nordic mythological episodes depicted but also susceptible of the direct and sensual mood expressed

<sup>&</sup>lt;sup>6</sup> Ibid, p. 11.

in the large amount of academic landscape paintings; an aesthetic art consumer striving for pleasure. The re-arrangement is not radically different except for the two French paintings, it is very much governed by similar esthetical principles; the overall impression is more spacious and the Nordic paintings are gathered on the same wall. But although small, the difference indicates a curatorial sense of modernity. The reconstruction also supports an analysis from the point of view of the spectator. In the model it is possible to reenact a performance in the gallery space, the movements and direction of gaze, this performance reveals the curatorial aim to through variation, groupings and perspective alert the visual perception and the senses; an experience built on similar perceptual principles as the visual media of today.

# Digital history: representation, authenticity and experience

In a Nordic PhD student course in Digital History at Umeå University during the autumn 2013 one of the main questions discussed was how do digital tools and digital material change the study of the past? What kind of new demands have future historical studies to face when dealing with digital sources?<sup>7</sup>

Following the digital boom and during the beginning of the twentieth first century many critical voices have discussed and reflected upon the impact of digital development in museums. In the light of digital humanities and aspects as representation, authenticity and experience the museums social function in future society have been questioned. The participatory museum and other public aspects have been one of the main issues discussed by museum professionals and scholars; a debate often expressing the hopes and fears of the digital turn in the museum world. <sup>8</sup>

In an online interchange course published in an article in *The Journal of American History* 2008 (JAH): *Interchange. The promise of Digital History, where experts within the digital humanities and digital history* prominent scholars debated many different questions related to the academic studies of the digital field. This discussion also touched upon some museological and analytical perspectives which revealed the most common objections and fears when talking and using digital tools in museum practice. First there was a question of real experience, an expectation that the audience wants to face reality, to gain an authentic experience which preferably occurs in relation to a museum object.<sup>9</sup>



Image 6: Black and white image from Sveriges Nationalmuseum, the Swedish Gallery, after the re-hanging 1906

<sup>&</sup>lt;sup>7</sup> http://www.digitalhistorian.net/umedh/

<sup>&</sup>lt;sup>8</sup> f.e. discussed at the Nodem konference in Copenhagen November 24-26 2010, with papers published in *Nordisk Museologi, 2011:1,* Tema: Digital Museologi; Simon, Nina, *The participatory Museum,* California 2010.

<sup>&</sup>lt;sup>9</sup> http://www.journalofamericanhistory.org/issues/952/interchange/index.html

In this sense the artifacts are decisive but according to one of the debaters, Patrik Gallagher, leader in Exhibition design there is possible to create a narrative and an experience without artifacts. For him the ideal digital exhibition or display functions both as a teaser and a following up, which would encourage people to visit the museum, preferably not alone, and then afterwards use it for immersion. He also argued that the sense of reality in digital exhibitions could be elaborated even further with adding animations/moving pictures and the voices of the persons involved in the presentation or historical moment.<sup>10</sup>

The crucial question is perhaps what kind of experience you could have in a virtual environment. Gallagher stated that there are no big differences but he finds the loss of scale the most significant in the digital space.

Amy Murrell Taylor, associate professor of history at the State University of New York, expressed the second fear. Rhetorically she asked if digital representations would replace traditional history documentation and would museum web sites be an alternative to actual visits to the museum. Quickly answering, she concluded that the sensory and physical experience felt when meeting old artifacts will continue to attract people.<sup>11</sup>

According to Steven Mintz, director of the Graduate School of Arts and Sciences Teaching Center at Columbia University, the hands-on offering is not considered as a being interactive. For him true interactivity occurs on an intellectual and communicative level and he found this possibility within the virtual museums:

Ironically, virtual museums may be more capable of this than their physical counterparts. Virtual exhibitions can allow users to magnify objects for closer scrutiny. These exhibits can offer expert commentary and links to glossaries and other reference material. In addition, there is no issue of "flow"; one can spend as much time as one wishes with an object.<sup>12</sup>

This brief summary of the section of the scholarly discussion in JAH that focused on digital aspects in museums is of course only one small piece of the much larger discursive field within digital humanities. But it clearly reveals the questions and fears still in focus when reflecting and debating digital aspects; questions concerning authenticity, reality and experience. At the Nodem Conference in Copenhagen 2010 these aspects were also discussed by Dr. Chiel van den Akker.

Dr. Akker identifies three different ways of approaching and experience a cultural heritage object. It could be in a traditional original environment; in a preserving environment as f. e. museums or in a representational environment. According to Akker a virtual representation; a digital object could be regarded as representative of a tradition and in that aspect also a documentation of the history. He argues that digital objects are representations; images representing the original object and in a digital environment all collections are documents. Closely linked to the question of cultural heritage and representation is the concept of authenticity. Following the definition Walter Benjamin elaborated in *The Work of Art in the Age of Mechanical Reproduction* Akker concludes that there are two senses of authenticity is related to a unique object's accumulated history and the second sense of authenticity is related to documentation. Reproductions, e.g. digital images, do not have a unique status or a fixed position in time and space and therefore they lack authenticity in the first sense but virtual representations are documentations of unique object's; a part of their history, and therefore related to the second sense of authenticity.<sup>13</sup>

The CAD exhibition models are in this respect documents, representations of an intentional historical display, in a similar way as the physical 3D models. But as digital born files and representative documents of a museum history they should not only be a residue product from the exhibition planning process but a source for future investigation enabling detailed analysis of both curatorial aspects and the experience accomplished by the visual and spatial relations.

In an American survey from 1998 the respondents expressed a wish to at a larger extent be part of the construction of history offered by, for example, museums. It was not primarily due to lack of trust in the academic expertise but rather a preference for choosing path. The authors of the survey conclusively

<sup>&</sup>lt;sup>10</sup> Ibid.

<sup>&</sup>lt;sup>11</sup> Ibid.

<sup>&</sup>lt;sup>12</sup> Ibid.

<sup>&</sup>lt;sup>13</sup> Van den Akker, Chiel, Tradition (re)visited: From Place to Presence. *Nordisk Museologi 2011:1*, pp.107–110.

suggested that museums professionals should open up for a wider participation, like the one made possible through different web 2.0 collaborations.<sup>14</sup>

The digital visual and spatial developments have been explosive giving new opportunities to public participation and experience which have been of great interest for museums. But yet there is hardly possible to talk about a digital revolution in the sense of a total re-orientation in museum practice. The traditional way of one-way communicating is still dominating and museums tend to keep the power of interpretation and communicating; the digital public support offers a variety of predetermined choices, but the audience is still directed by the authoritarian curator.<sup>15</sup>

But, on the other hand, as the main focus in museological studies seems to have shifted from the social and political to the visual and perceptional aspects, there is also a new interest in the experience as analytical category; a turn from an interest in the museum as part of the national project to the spectator; the individual. This alternative perspective may be not radically different, but it indicates a changing focus; from the museum body, the mute art object and the passive culture consumer to the spectator as a creative force in this other story. With reference to the introductory quotation the question still remain: how could digital experience contribute to future museums perspectives?

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# Exploring historical, social and natural heritage: Challenges for tangible interaction design at Sheffield General Cemetery

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Abstract: This paper presents current research on the design, deployment and evaluation of tangible interaction concepts for an outdoor heritage space, the Sheffield General Cemetery. The Cemetery is an area of historical and natural importance managed and maintained by a community group. Following a co-design approach, we have conducted a series of activities at the Cemetery with the goal of developing novel physical/digital installations to support visitor experiences at the site. In this paper, we describe our work so far, particularly focusing on the "Companion Novel" – a fully operational prototype installation we have evaluated on and off site. We reflect on the challenges posed by such a complex site when developing novel tangible interactions for heritage interpretation.

Keywords: tangible interaction; outdoor heritage; physical/digital artifacts; co-design

#### Introduction

In this paper we present ongoing research on the project meSch (Material EncounterS with digital Cultural Heritage), exploring the potential for tangible interaction technologies to enhance activities at Sheffield General Cemetery (SGC), a conservation area of rich historical, social and natural heritage located in Sheffield, England. As well as a historical park displaying significant works of art and architecture, the Cemetery is also a local nature reserve. It is managed by a community group that organizes volunteer work for conservation, guided tours and other initiatives. In our project, we are exploring the challenges of visitor access, interpretation and appreciation at such a complex open-air heritage site, and how novel technological installations could support the activities of visitors and volunteers. Our focus is particularly on tangible interaction, and on how integrating digital capabilities into material objects and spaces can provide immersive and engaging experiences (Petrelli et al. 2013). This is our response to an increasing awareness (Dudley 2009) that information and digital technology in particular can divert visitor attention away from heritage holdings toward screens and devices (vom Lehn and Heath 2003), thus diminishing the engagement with heritage itself. By designing hybrid physical-digital experiences of the kind discussed in this paper we aim at bridging the gap between heritage and digital content, and to expand the range of interactions that cultural heritage professionals can deploy for visitor interpretation and engagement.

The research we are conducting follows a co-design approach, whereby our multidisciplinary team of designers, developers and social researchers is collaborating closely with SGC volunteers both in documenting and reflecting on the complexities of the site, and in exploring design ideas and rapid prototypes of tangible interaction concepts to be discussed and evaluated.

In the following sections, we present results of empirical work highlighting the challenges for access and interpretation at SGC: its outdoor and open nature, the significant seasonal changes, and the interweaving of historical, artistic and natural heritage occurring there. We also outline design themes that have emerged from the series of field studies conducted at SGC that are shaping the current phase of design exploration and rapid prototyping of concepts merging digital and physical interaction. In particular, we will detail how the challenges have been tackled during the realization of the "Companion Novel", a prototype personalized visiting companion that was designed for the Cemetery.

## meSch at the Sheffield General Cemetery

The Sheffield General Cemetery (http://www.gencem.org/) is a historic parkland cemetery, which opened in 1836 and closed for burials in 1978. It is now a free and open-access historical, architectural and natural conservation area owned by Sheffield City Council but managed by a community group, the Sheffield General Cemetery Trust, dedicated to maintaining and promoting the site. The meSch team has established a partnership with the Trust that includes a close collaboration with the volunteers who take care of and present this historic space to the public. The Cemetery was landscaped to be the peaceful resting place for people from all walks of life: the site is dotted with funerary monuments, memorials, chapels and a row of semi-interred catacombs. It is also a haven for wildlife and plants (Fig. 1). The volunteers offer regular guided tours on several themes, from history to wildlife, as well as providing assistance to people interested in locating a particular grave or memorial. The tour guides offer their services on a completely voluntary basis and based on their own knowledge and interests.



Figure 1: A view of the Sheffield General Cemetery in Winter

# **Field studies at Sheffield General Cemetery**

In an initial phase of work, the team paid repeated visits to the Cemetery and conducted observations of the site in order to understand its structure, the layout of monuments and of other places of interest, and to gain insights on the number and type of visitors that access the site. Members of the team also took part in a historical guided tour, taking note of the strategies that the guide employs to show the participants around the site, the themes that characterize the narration and the reactions and commentary by the participants.

In a second phase of work, the team interviewed eight of the SGC volunteers while taking a walk around the Cemetery. The participants were asked to describe their involvement with the Cemetery, their opinions on how the local community and visitors benefit from the site and to show the researchers their favourite places around the Cemetery. Through the interviews, the meSch researchers wanted to understand how the Cemetery is maintained and presented to the public, as well as to learn more about its history and heritage value by the people who know the site best. The meSch team learned many important characteristics of the Cemetery: particularly, that there are many different motivations for visiting, and that the historical and architectural importance of the site is only one of them. The many regular visitors go to SGC for its peacefulness, to exercise in beautiful surroundings, for relaxation and for informal exploration of the space while walking their dog or breaking the working day with a stroll. As the site is open-access, there are also many passers-by that use the main path crossing the Cemetery as a shortcut between two busy roads and might not notice many of the interesting features of the site.

Thematic tours are organized on a regular basis to present themes as diverse as architecture and landscape, local and social history, bird watching and fungi discovery (Fig. 2). All the events are free and always well attended. Activities are targeted to specific audiences such as short lunchtime tours for nearby workers, Halloween family crafts activities, bat and bird watching, etc.



Figure 2: A guided tour at Sheffield General Cemetery

Seasonal changes are an important aspect in shaping the visitor experience of SGC. The landscape changes significantly throughout the year, with a very strong contrast between the starker landscape during Winter and the lush vegetation and foliage in Summer. Moreover, thick vegetation in the Summer makes it more difficult for people to see gravestones and other monuments at a distance, and the lack of artificial lights in the Cemetery means that visiting hours are more limited during the winter months.

There is also a distinct atmospheric difference between the part of the Cemetery that was cleared of gravestones during the 1970s and the part that retains all the original structures; people entering SGC from the former might not realise that the site is indeed a cemetery and that there are historic monuments a short distance away. This duality of purposes is intentionally maintained: while paths cross the whole site, not every corner can be reached as many parts in the historical section are fenced off for safety reasons. These off-limit zones guarantee a natural sanctuary for animals and create an evocative atmosphere with overgrown vegetation partially covering Victorian monuments and tombs.

These characteristics of the site shape the visitor experience of the Cemetery, and are cared for and worked around by the volunteers, who help in the conservation of the buildings, the wildlife and, in general, of the atmosphere of the Cemetery. The design exploration activities that our team conducted, envisioning novel interaction possibilities for SGC, have taken the features and challenges of the site into careful account.

#### Exploring design ideas

The meSch team initiated creative design activities in parallel to field studies by running team brainstorming and by producing a number of design concepts for possible installations at the Cemetery. The volunteers participating in the interviews were shown sketches of the designs created by the team at the end of each interview, to inspire them joining in co-design activities and propose novel interaction concepts of their own.

The range of ideas covered by the concepts include portable artifacts that visitors can take with them during their walk around the Cemetery, as well as standalone installations for particular areas of the site. Core to all concepts was the attempt to focus on the heritage and its materiality, to grab the attention of passers by and to provide information situated in place to anyone interested. We aimed to be open and inclusive of people with different interests or even no specific interest, i.e. just passing through the Cemetery. Compared to other possible solutions, such as smart phone apps, this

approach does not require a visitor to know that an app exists and/or to install it; it exploits the "here and now" of the interaction, the serendipity of being in a cultural heritage place with no previous planning but simply the willingness to engage and enjoy.

The concepts were further discussed and developed during a creative workshop that was attended by a group of volunteers. They were invited to discuss the team's ideas and to propose their own ideas for tangible interactive artifacts, or modifications and add-ons to the concepts the team had shown them. The volunteers were then asked to explain whether and how they thought such designed artifacts could enhance the experience of the Cemetery. Other design constraints were discussed at length: for example, how to design technology that would work at equal effect in different environmental conditions, how to overcome power issues, bad weather, wear and tear and possible antisocial behaviour.

# Prototyping tangible interactions

A preliminary set of prototypes has been developed as an initial attempt to transform design ideas into working installations. The concepts revolve around three degrees of engagement with SGC: grabbing attention, inviting closer exploration and in-depth engagement.

#### Figure 3: The development of the Bird Box



The first prototype idea, the "Bird Box", is meant to grab the attention of the visitor, and without demanding too much full interaction: it simply hints that there is more in the Cemetery to be discovered. The Bird Box is a standalone, solar powered box that projects an animation of birds in flight to attract the visitor's attention towards certain paths in the Cemetery (Fig. 3). The animation can be regularly updated to reflect the seasons and the birds currently present at the Cemetery.

The second idea invites closer exploration, yet provides relatively simple occasions for interaction. We realized this with the "Binoculars", a rugged set of binoculars (which can either be hand-held or fixed on the ground) that provide an orientation-based augmented reality visual overlay to particular areas of the Cemetery to aid interpretation (Fig. 4).

Figure 4: The development of the Binoculars



The third idea is focused on those visitors who wish to engage more deeply with the site and are willing to explore more information and to undertake more prolonged interaction during their visit. This is realized by the "Companion Novel" (Fig. 5), that the team has developed into a fully working prototype for testing at the General Cemetery.

As a set, the prototypes provide multimedia, multisensory and complementary experiences that can engage visitors with the heritage surroundings. They are intended to provide different degrees of interactional complexity to different categories of visitors, thus offering something for people who do not wish to engage with detailed information as well as for those who desire a simple and relatively

short interaction with additional content, and, finally, visitors who are interested in delving deeper. In the following section, we discuss the "Companion Novel" in more detail, as the prototype that is at the furthest stage of development and testing.

Figure 5: The development of the Companion Novel



# **The Companion Novel**

The Companion Novel (Fig. 6) is an interactive book-like device that visitors carry with them during the visit, complemented by a set of Bluetooth speakers located close to points of interest (hotspots). By placing a magnetic bookmark on a page of the book, the visitor selects a different narrative theme: the appropriate auditory information on that theme is played by the speakers when the visitors reach a hotspot. The Companion Novel tracks the visitors in the Cemetery and their position with respect to the hotspots. When the visitor is approaching the hotspot a loud sound is played to attract the visitor toward the precise location; when the visitor is close enough to the hotspot, a story on a particular theme is played. Which content is played depend on which theme is currently selected via the bookmark. By virtue of the distributed audio, the locations themselves invite the visitors to approach, thus adding a new sensory layer to the site, and avoiding the problem of social isolation that has been found with certain audio guides (Grinter et al. 2002). At any point in time the visitor can change the theme by simply moving the bookmark to another page, thus supporting the exploration of either a single theme or multiple themes.

The form factor of the book is meant to support intuitive handling and to fit in with the environment in an unobtrusive way. The themes that the prototype proposes to the visitor are inspired by the lived qualities of the place, specifically: "Nature in the City" gives insights on the natural richness of the Cemetery; "This is My Story" tells the personal stories of some of the people buried there; "Weird and Wonderful" recounts surprising and amusing anecdotes in the history of the Cemetery; and "Favourite Spots" showcases some of the favourite places in the Cemetery as chosen by the volunteers and past visitors. Overall, the Companion Novel is a flexible means for visitors to immerse themselves in different characteristics of SGC.<sup>1</sup>



Figure 6: The complete prototype of the Companion Novel

<sup>&</sup>lt;sup>1</sup> A video detailing interaction with the Companion Novel can be found at: http://www.youtube.com/watch?v=GP0wAPO84Qo.

This concept satisfies a set of constraints:

- It focuses attention onto the heritage: sound is the key medium utilized, and the strategic placement of the loudspeakers focuses the attention to a given place;
- It engages visitors at multiple levels, including physically by walking and bookmarking;
- It supports group dynamics: the content delivery based on audio is inclusive of whoever is around; bookmarking a page can also be a group-mediated decision of what to listen to;
- It is novel, but offers straightforward interaction: no explanation is needed on how to use a bookmark on a book, and the stories will surprise or amuse;
- It shows alternatives and allows users to choose at any time: the Companion Novel holds different themes, one for each page; selection is simple via the bookmark and can be done at any time;
- It personalizes the content on the basis of clear conditions such as the theme selection made with the bookmark, and the moving towards a point of interest.

The stories proposed to the visitors by the Companion Novel are a critical element of the experience. The themes, the length, the type, even the tone of voice of the narrator have an impact. Discussions with the volunteers pointed out that the SGC Trust discourages attempts to use the Cemetery in ways that could be macabre, frightening or unsettling. This is not to say that all information provided in tours or publications is sanitized, quite the contrary. Ghoulish details are part of the narrative, but they are contextualized to provide a proper and historically sound setting for interpretation; Victorian society was very different in taste and manners than the society of today.

Time was spent by members of the team talking to the volunteers, searching the local library, reading original historical documents, considering the technical constraints (e.g. points of interest must be at least 30m apart; speakers have to be placed in a high position), visiting the Cemetery, and overall trying to understand which physical layout would offer a good ground for a variety of stories. Seven points of interest were selected for the prototype: one in the park side, four in the historical side and two on the border between the two. In the creation of content we favoured variety and used sources as different as acts of parliament, historical newspapers, leaflets and publications. We also went through a process of re-writing and dramatizing certain stories, particularly the self-accounts - for this a professional creative communication strategist was involved.

Different people, each playing their own character, recorded the narratives to be used in the Novel. Each file was associated with the conditions that would play it. While some conditions relate to the physical context such as the proximity to a point of interest, or current setting such as the theme selected by the bookmark, other conditions aim at maintaining a coherent narrative. For example, in two points of interest visitors can see how old headstones have been reused as building materials: it is then possible to introduce into the narrative an explicit reference to the spot previously visited. Of the seven points, five had multiple stories, while two had a single narrative that suggested personal exploration. Invariant points where everyone, irrespective of the theme chosen, would receive the same content were introduced following the co-design workshop with curators. They commented on the need, sometimes, to force a piece of information or to push a certain reflection, therefore overriding any choice made by the visitor.

Overall 32 pieces of content have been created, ranging in length from about 20 seconds up to just over two minutes, for a total of about 45 minutes of recorded sound. This is a limited set, however we are supported in this choice by empirical findings that only part of the content provided is accessed and only a little time is devoted to interacting with technology (Serrel and Raphling 1992; Hornecker 2008).

The final step in the creation of the content was the selection of the "attraction sounds", played when the visitors are about 10m away, to attract them closer to the speaker, to a position that enables them to hear the story. To trigger curiosity we selected unusual and contrasting sounds: a traffic jam for "Nature in the City"; a piece of opera singing for "This is My Story"; a high neigh for "Weird & Wonderful"; and a rap phrase for "Favourite Spots".

## Challenges for the Companion Novel on site

The current Companion Novel prototype is the result of an iterative process that alternated design and evaluation. We conducted expert evaluation where the different steps in the interaction were considered and possible problematic or open interaction issues were noted. Items that emerged were related to the lack of feedback when setting a theme via the bookmark, and to how to find the points of interest in the 14 acres of the Cemetery. The design of the prototype was modified to address these: the book now plays the attraction sound for that theme and a map of SGC showing the points of interest is now etched on the back of the book.

The feedback from the Cemetery volunteers complemented the expert evaluation. They gave us advice regarding the need for a minimal set of instructions on what to do with the book to give to visitors, and regarding the volume of the sounds, noting how the sound was too quiet to be heard over the bird song. They also observed that the vegetation during Summer is dense and it may further dampen the volume. These comments directed our thoughts on design modifications. The first page of the book now explains what the bookmark does and invites visitors to take their preferred path. We also focused on choosing loud and unexpected attraction sounds to effectively grab attention.

Field tests were carried out in the Cemetery to assess if the technology was working in-the-wild as it was in the lab, as the transition between a controlled environment and the complex site of SGC was one of the biggest challenges. Indeed, we quickly found out that Bluetooth (which the wireless speakers rely on) is prone to interferences and certain positions work better than others: a speaker placed at ground level works well only if there is no vegetation around it, the best position for a speaker in terms of Bluetooth connectivity is high in a nearby tree. The range of the signal also changes substantially from indoor to outdoor: in the lab the speakers picked up the Bluetooth signal within a 30 meter range; in the Cemetery, however, this distance was reduced to about 10 meters. It also happened that the attraction sound was sometimes skipped by the system and the story was played directly. We believe both issues to be due to the Bluetooth receiver within the speakers as they both disappeared when the Bluetooth receiver was on a Raspberry PI controlling the speaker.

Considerations of cost and maintenance informed the design of the hardware and software architecture. The intelligence of the system as well as all the content files are all contained within the Novel, whereas the speakers just play whatever sound is streamed to it. As such any change or amendment needs to be done on the Novel alone and the set of speakers left in place is relatively cheap as they are passive devices. Moreover the content of a Novel can be changed completely by laying new pages on the book and recording new sounds, thus allowing to reuse the same system in different outdoor heritage sites or to offer more and different interpretations. Both ways offer a sustainable solution to heritage sites that can share the costs or extend the use of the same technology for a longer period of time.

Most importantly for our research, the sound-in-place mechanism proved to be very evocative and effective in attracting attention to the surroundings. The bookmark was also very effective in providing a simple mechanism for switching the theme while at a point of interest. There was no delay in playing the story when switching to a different theme, therefore allowing visitors to explore multiple stories in a straightforward manner.

#### Conclusions

In this paper we have discussed current design work at the Sheffield General Cemetery. We have described some of the challenges presented by the site when envisioning novel tangible interactions to attract and engage visitors: the complexity of themes pertaining to the site, the environmental constraints and the ethos and mission of the SGC Trust. We have also described a set of design ideas generated with the collaboration and input of the Cemetery volunteers. These concepts address different types of visitors and play on some of the different qualities of the site, from the winding paths and vegetation that make memorials and monuments hard to discover, to the multiple themes of interest around the Cemetery. We have described in greater detail the design concept that is currently realized into a working prototype, The Companion Novel. Its architecture (the book-like device and the set of wireless speakers) responds to particular challenges surrounding heritage technologies for content delivery: the risk focusing the visitor attention on the technology, rather than on the heritage holdings; considering the social dimension of the visit; and creating unambiguous and intuitive ways for visitors to personalize the content and manner of their visit (Ardissono et al. 2012). As well as these, we have faced other challenges that are more specific to outdoor sites: in particular, the

changeability and openness of the environment and the limited possibilities for maintenance at such a large site ran by a volunteer group.

The prototype was progressively refined through a set of evaluation activities. Specifically, moving trials from the lab to the actual site unearthed a variety of technical challenges that we had not addressed before, from the positioning of the speakers, to issues with power and reception and issues regarding the design of the auditory content. The design of the Companion Novel addresses considerations of easy and economical maintenance by embedding most of the technology into the book device, while cheaper components are placed across the site. Embedding the content in the book device makes the update of the information to be delivered to visitors more manageable for the volunteers.

Through our work with SGC, we are aiming at exploring a set of design challenges and issues that are common to outdoor heritage sites in general. By creating a set of physical/digital prototypes responding to such challenges, we hope to provide the heritage community with open platforms for the provision of digital content through tangible interaction that could be then extended and customised by specific institutions and heritage professionals.

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# Galata Sea and Migration Museum: an immersive and interactive visitor experience

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Abstract: This project presentation focuses on new visitor experiences developed by the Galata Sea and Migration Museum (Mu.MA) in Genoa (Italy) in partnership with ETT S.p.A. ICT company.

This collaboration has already produced several permanent exhibitions, where new technologies better "explain the message" that the museum wants to impart. The first was the "Nazario Sauro" pre-show, an exhibition that reveals life in a submarine. Then came the Memories and Migration (MEM) section, which tells the history of emigration from, and immigration to, Italy by presenting real migrant stories. On a fully recreated 17th century Genoese galley, visitors enjoy an interactive experience with the "crew". The new Christopher Columbus section has portraits and video-audio renditions of his documents in various languages.

These exhibitions integrate original content with innovative solutions such as high-resolution monitors, interactive touchscreen interfaces, 3D reconstructions, proximity sensors, gaming simulations, augmented reality applications and interactive projections with on-screen actors - ensuring complete visitor immersion, and promoting and renewing interest and involvement. The museum aims to revitalise communication with visitors, transforming them from passive to active through an "immersive" experience. This approach is based on the concepts of "knowing through doing" and "recognise by touching", creating synergy with gallery artwork and environments, so that each age, academic and social group (from school children through to students, adults, parents and pensioners) will dynamically relate to the immersive visitor experience. Galata Museum's renewal action was carried out creating meticulous cooperation between museum curators (original content and context) and ETT (experts in the fields of ICT interactivity and museology). This collaboration works when the two main objectives are satisfied: 1) enhancement of inherent value of content and context; 2) rapid return on investment through substantial visitor growth - especially true now that central government funding is progressively less.

Keywords: migration museum, interactive museum exhibition, gaming simulation, touch screen interface, 3D reconstruction, augmented reality, Galata Sea and Migration Museum, ETT S.p.a.

#### Galata Museum – ETT cooperation: a new museum approach

This project presentation focuses on a new concept of visitor experience, developed by the **Galata Sea and Migration Museum (Mu.MA) in Genoa (Italy),** in partnership with **ETT S.p.A.**, an ICT company. The partnership - started in 2009 and still running - has helped Mu.MA to revitalise its exhibition configuration through the use of innovative multimedia devices, aimed at delivering the museum's message in a more efficient and inspiring way. Thanks to the many technological ICT advances developed in the last few years, the museum has been able to apply new and modern approaches to enhancing the visitor experience, while conserving historical context and content.

# **Galata Sea and Migration Museum**

Opened in 2003, the Galata Sea Museum is the Mediterranean's largest and most innovative maritime museum. It is notable in Italian maritime museum design for the quality and innovation of its creations. Today, with an assorted audience made up of people of differing ages and education, and often living far from the sea and its culture, Galata makes an impact though the ability to immerse the visitor in meticulous high-quality scientific reconstructions that give the best idea of an era, type of ship, and on-board life.



Galata Sea Museum building in Genoa

Travel is one of the main themes covered during a visit to the Galata Sea Museum: voyages which, while taking advantage of technical advances in transport methods, have always tempted man to challenge seas and oceans. The journey through the Museum, in chronological order, starts on the ground floor in the age of oar-powered ships, continues on the first and second floors on the old sailing routes of revolutionary geographical exploration, and ends on the third floor dedicated to the voyage to the Americas.

The Galata Sea Museum has chosen to devote a significant portion of its space to the permanent section entitled MEM (Memory and Migration). This is the first permanent museum section in Italy dedicated to "migration". The task of MEM is to "remember" national migration history and promote, through an international network of regional museums, a "local" memory of migration. Local museums are becoming increasingly important in this respect, and are helping communities to reinforce and even rediscover their identities. Of particular importance is the social cohesion effect, especially in areas containing minority groups among the population. There are now many Jewish and anti-racist museums across Europe, while other museums have dedicated sections to "emigration" and "immigration". Important among these are Genoa, Bremerhaven, Paris, Cherbourg, Antwerp and Belfast.

# The immersive approach and the use of technology

In recent years, MUMA has established a definite preference for multimedia and interactive tools, which present content to the public in an active way (as opposed to the traditional passive way) through an "**immersive**" experience. This approach is based on the concepts of "knowing through doing" and "recognise by touching", and on creating synergy with artwork and gallery environments. In this way, each age, academic and social group (from school children through to students, adults, parents and pensioners) will dynamically relate to the immersive visitor experience. The visitor shouldn't be impartial or neutral, but must be torn from his private world and transported to another era. Interactive tools enable content to be offered to visitors having different levels of understanding; both children and adults should come away with something positive in mind.

To offer an ever new and engaging experience to its visitors, the Galata Sea Museum has elected to progressively renew its permanent installations by using the best technological tools available on the market. The technologies used must be intuitive and easy to use, allowing operation by visitors of all ages and with different levels of familiarity with technological tools. They must also be sufficiently robust, both to resist visitor use over time, and to enable new content to be added for future visits.



Emigration multimedia immersive exhibition

Prominent tools in current use are HD and 3D video content (both with glasses and autostereoscopic), integrated and interactive new-media software content, touch and multi-touch screen technology, augmented reality, gaming simulation, hologram technology, RFID (Radio Frequency IDentification), voice or movement activated features, and QR (Quick Response) code connections.

A new 4D installation (including synchronised physical effects) is being developed and will be presented in the near future. Visitors will find themselves in the midst of a **sea storm** and will be able to appreciate how it feels to be at the mercy of the elements.

# **MUMA** multimedia installations

This collaboration has already produced several permanent exhibitions, where new technologies better "explain the message" that the museum wants to impart.

The first was the **"Nazario Sauro" pre-show**, inaugurated in May 2010, an exhibition that combines a multimedia area, where life on a submarine is shown in all its shades, before a visit on board the real submarine berthed in the dock just outside the museum. The multimedia area is not a "war game" but comprises the physical reconstruction of a submarine environment (settings, fittings and sound) and a learning trail where visitors discover the history of submarines, listen to stories told by the crew, explore the interior of the submarine using 360 degree 3D imaging, experiment with the Archimedes principle<sup>1</sup>, use the hydrophone and periscope, and drive the submarine on an interactive simulator. At the end of the "course", a personalised submariner's diploma is issued.

<sup>&</sup>lt;sup>1</sup> The various buoyancy tanks in a submarine, which determine how it floats, dives and surfaces, derive from the Archimedes Principle. Archimedes of Syracuse (c. 287 BC – c. 212 BC) discovered that, "any floating object displaces its own weight of fluid" and "any object, wholly or partially immersed in a fluid, is buoyed up by a force equal to the weight of the fluid displaced by the object". Using this principle, we can:

<sup>-</sup> measure the volume of an object by measuring the volume of the liquid it displaces after submerging;

<sup>-</sup> calculate the buoyancy of an object immersed into a liquid.



Submarine "Nazario Sauro" pre-show

The Memory and Migration (MEM) section, opened in November 2011, tells the history of emigration from, and immigration to, Italy by presenting real stories using over forty multimedia installations. The exhibition begins with *Emigration* (the past), where visitors experience a voyage departing from Genoa on transatlantic liners. Immigrants sailing to Ellis Island (New York), Brazil, or Argentina give first-hand testimonies, writings and photos. Each visitor receives a personal passport at the beginning of the voyage, which is then used at each interactive stage of the journey. The results of tests, plus the answers given at an immigration interview, will affect the outcome. All this gives visitors an opportunity to reflect on the experiences of immigrants. The area dedicated to Immigration (the present) shows the stories and the travels of migrants to Italy. This movement began in the 1990s and is still far from over. It has cost the lives of tens of thousands of people in the Straits of Sicily alone (about 1,500-2,000 deaths were calculated in just one year, 2011, the year of the Arab Spring). The installation dedicated to the 2011 landings on the Sicilian island of Lampadusa also includes two "Lampedusa boats", saved from destruction. Lampedusa was recently in the news again, when more than 500 men, women and children, mostly from Eritrea and Somalia, were on a boat that capsized close to the island. Only 155 survived. Other multimedia installations offer some examples of multicultural society in workplaces and at school, as well as cooking recipes from the five continents.



MEM – Memory and migration section

The **Desks of Knowledge** are new multimedia stations that enable visitors to discover and enrich their history of the Crusades and of the ancient order of the Knights Hospitallers of St. John of Jerusalem, who founded the "Commenda - Hospital in Prè", an architectural monument dating back to the 12th century A.D. The multimedia tools reproduce an exciting journey through the Middle Ages, retracing the routes and everyday lives of pilgrims, testified to by the travel stories of both famous and lesser-known characters, such as Saladino, Caffaro of Caschifellone III, Beniamino of Tudela, Benedetto Zaccaria and Matthew Paris.

**Climb Aboard the Galley** opened in June 2012. Visitors climb aboard a full-sized reconstruction of a seventeenth century Genoese galley and enjoy an interactive experience with the "crew", choosing to be a slave, a prisoner on forced labour, or a "buonavoglia", a volunteer probably paying off a debt. They participate in discussions between the senator, the captain and the shipwright, and discover aspects of life on board in the galley's "games room". This journey through time is completed by admiring rare antiquities and works.

The new **Christopher Columbus** section contains portraits, audio-video renditions of his documents, including the precious Code of Privileges, in various languages: mediaeval Latin, old Italian or 16th century Spanish - Columbus's language of choice. Visitors use a touch-screen to explore a painting by Cristoforo Grassi, *View of the City of Genoa in 1481*, one of the oldest and most precise indications of the shape of the port and city of Genoa in the fifteenth century. Additional content may be discovered using QR codes in three languages.



Ancient port of Genoa touch screen interface

## Public/private teamwork benefits everyone

The Galata Museum revitalisation action is successful due to meticulous cooperation between museum curators (original content and context) and ETT (experts in the fields of ICT interactivity and museology). Complete solutions typically comprise four stages:

- initial concept and design;
- content architecture;
- museology and installation (multimedia showcases, stations, videos etc.);
- management and maintenance.

Cost efficient services cover the entire process creating:

- 1) added value of content and context;
- 2) rapid return on investment through substantial visitor growth.

Central government funding is progressively less and additional visitor revenue is becoming increasingly important. When astute investment enhances the inherent value of museum content, the cost is amply recovered through additional visitors or users.

Since the museum adopted the new approach to the "Immersive and Interactive Visitor Experience", in 2009, it has progressively invested around €400,000 and the annual number of visitors has grown significantly, from 80,000 in 2006, to 130,000 in 2009, 230,000 in 2011, and over 250,000 in 2012.

#### **Best practices**

MuMa museum has been classified as a multimedia excellence among Italian museums by Skål International (Rome), the largest organization of professionals and tourism leaders around the world.

In September 2013, The Galata Sea and Migration Museum participated at the **MeLa Project** ("*European Museums in an Age of Migrations*" project funded by the European Commission under the Socio-economic Sciences and Humanities Program - FP7th) mid-term seminar "Let the Museum Speak: European Museums in an Age of Migrations" with a paper and presentation.

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# Indoors and outdoors: designing mobile experiences for Cité de l'espace

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Abstract: The CHESS project has been working with Cité de l'espace, a space technology centre, to explore the use of tablets and mobile phones to deliver visitor experiences that integrate across multiple experiences. In this paper, we articulate three key challenges present at Cité, describe a prototype experience developed by CHESS, and present a set of observations developed through an evaluation conducted in October 2012.

Keywords: mobile experience, cultural heritage, museums, technology probe, evaluation

# 1. Introduction

Cité de l'espace (CITE) (2013) is a science centre in Toulouse which specifically focuses on space exploration and technology. For the last two years, the CHESS project has been working to prototype and evaluate novel visitor experiences in collaboration with CITE. These experiences consist of fictional stories, told through the medium of an iPad, and incorporating audio recordings, video, photographs, interactive games, text and augmented reality. Visitor experiences mediated through mobile communication devices have been a focus of research for some time (see Abowd et al. 1997; Yiannoutsou et al. 2009) and are increasingly prevalent in cultural heritage institutions. Work at CITE has explored novel and appropriate approaches to designing effective experience, which have then been evaluated through the observation of naturalistic deployments and through interviews.

CITE presents significant challenges for the design of experiences, which are then relevant across the cultural heritage sector more broadly. Several key challenges have been identified through a variety of interactions, including ethnographic studies (Tolmie et al. 2014), public discussions with museum professionals (ECSite 2012) and interviews and design sessions with CITE staff. Challenges include:

**Responding to an existing site**: CITE presents a large number of exhibits, and museum directors would like to deploy experiences that tell stories which span across multiple exhibits. However, existing exhibits have not been designed with mobile experiences in mind. As such, design work has to carefully consider the challenge of how to integrate experiences into existing exhibits.

**Navigation and wayfinding**: CITE has a large and open site, with both indoor and outdoor exhibits. GPS will not work indoors, and indoor positioning systems, though present at this particular site, drain the battery capacity of mobile devices at an unacceptable rate. Methods are therefore needed to guide visitors to particular locations without the aid of a positioning system.

**Designing visitor journeys through experiences**: In seeking to design experiences that integrate across multiple exhibits, care is needed in establishing designs that provide for coherent experiences. Visitors need to be taken on a journey through the site in order to be provided with a story that is believable and immersive.

In seeking to address these challenges, our approach has been to develop a series of technology probes (Hutchinson et al. 2003). These are robust, usable but potentially incomplete prototypes that are introduced early in the process of design, which illustrate key features of systems, and which allow for the development of knowledge that will inform the design of technologies in the future. In this paper, we present a technology probe deployed in autumn 2012, consisting of a mobile experience which offered a choice between two fictional stories entitled "The Secret Diary of Philippe Perrin" and "Become a Reporter in the Year 5000 AD".

We begin this paper by presenting aspects of the design of this probe that respond to the challenges presented above. We then describe our chosen evaluation method, present key findings from an analysis of data collected during deployments, and discuss the implications of these findings for cultural heritage institutions.

# 2. Probe design

# 2.1 Responding to an existing site

Visitors to CITE will have a broad range of interests and intentions. We chose to provide two stories so that visitors could select their preference. "The Secret Diary of Philippe Perrin" focuses on the use of audio recordings to express a fictionalized diary written by Philippe Perrin, an astronaut who took a single trip to the International Space Station. "Support a Reporter from the Year 5000 AD" features a character who is a reporter from the future, and who intends to write an article on "space technology of the past". The design and production of both stories was targeted at children, due to prior ethnographic work suggesting that children tend to lead the visit at CITE (Tolmie 2013). On arrival, visitors are given a choice between the two stories, using an interface shown in figure 3.

To allow for the possibility of families who wish to work through both stories in parallel, both were constructed around the same five selected locations, four of which are museum exhibits. Table 1 provides a description of these, and figures 1 and 2 then illustrate a number of these locations. A key challenge is then the design of an immersive experience that integrates across these five locations, which are some of the most important exhibits at CITE.

Name	Description
Entrance hall	The main entrance to the museum, a large space containing a ticket desk and a series of entrance barriers.
Parterre des Planètes	A model of the solar system, presenting scale-models of each the planets (fig. 1).
Arianne launcher	A full-size model of a European Space Agency launcher, linked to an internal exhibition space (fig. 1).
Soyuz capsule	A real Soyuz capsule. Visitors can climb inside when members of staff are present, and otherwise can look in through a glass door.
Mir space station	A replica of the Mir space station. Visitors can observe the Mir from the outside (fig. 2), and can walk through the inside (fig. 7), which presents a re-creation of life in space.

Table	1: Locations	featured in	experiences
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A description of the five key locations featured in the two stories

To provide an integrated experience, media presented on the iPad draws on these exhibits as a reference point, and uses this media to tell a story that spans the exhibits. In the case of the "Secret Diary of Philippe Perrin", each exhibit is associated with a diary entry describing different stages of a trip into space, which culminates with a rich set of diary entries presented at the Mir which are used to illustrate the life of an astronaut living on a space station. "Support a Reporter from the Year 5000 AD" is presented from the perspective of a reporter from the future, who discusses the nature of the technology involved in each exhibit, and who asks the user to perform a variety of activities such as capturing photographs. At the conclusion of the experience, photographs are then integrated into a pre-written newspaper article which acts as a souvenir.



Figure 1: Parterre des Planètes and Ariane model (source: CITE)

Figure 2: Mir space station replica. A walk-way provides access to the interior space (source: CITE)



Figure 3: Interface used to select stories (Source: CHESS project)



#### 2.2 Navigation and way-finding

The two experiences outlined above are both constructed around four exhibits and the entrance hall, and functionality to support navigation to and from each exhibit seemed important. Given that the site combines indoor and outdoor elements, and given that no usable positioning system could cater for both, our approach in designing the probe was to integrate photo-based navigation, a novel approach in this kind of experience. Exhibits at CITE are large and recognizable, and we believed that a relatively small bank of statically or dynamically annotated photographs could support visitors in the process of navigation. Figures 4 and 5 illustrate typical navigation interfaces integrated into both experiences. How this navigation system worked in practice is then considered in our evaluation.

Figure 4: Specific navigation screen, used to take visitors from one important location to another (source: CHESS project)

Figure 5: General navigation screen, accessed by visitors who have become lost, disorientated or who have taken a break from the experience. Arrow indicates location of next important exhibit (source: CHESS project)



#### 2.3 Designing visitor journeys through experiences

Work by Benford et al. (2009) has highlighted the importance of carefully designing the journeys that users follow through a particular experience as a whole, so as to carefully frame individual interactions so that they make sense to visitors. These journeys, otherwise known as "trajectories", can be thought of at multiple levels, including the trajectory of the experience through the whole site and the trajectory at particular exhibits. The Mir space station exhibit provides an interesting case study for the design of an effective experiential trajectory, in that it sits at a natural transition point between outdoor and indoor space. Visitors generally arrive at the Mir after viewing some of the larger outdoor exhibits, including Ariane and the Parterre des Planètes. Due to the positioning of the exit ramp from the Mir, it is then natural for visitors to enter a large indoor exhibition hall after leaving it. The Mir provides an interesting opportunity, in that it is positioned in a large outdoor space which is mostly devoid of content. It also presents an interesting challenge for interaction design due to the nature of the pathway through its interior, which is narrow, and which can easily become overcrowded with visitors.

The Mir exhibit was an inspiration for the "Secret History of Philippe Perrin". It is the final exhibit featured in this particular experience, and is used to provide a climax to this story. We were therefore very careful to design a trajectory through this exhibit that made best use of it. To do so, the following interactions are included:

- 1. Navigation photographs clearly indicate that visitors should stop in the space outside of the Mir, rather than entering it directly
- 2. Digital content then gives families the opportunity to take a photograph of their children posing as astronauts (fig. 6)
- 3. Visitors can listen to a fictional diary entry from Philippe, presented as an audio recording voiced by an actor, in which he describes his feelings on approach to the International Space Station
- 4. Navigation photographs then prompt families to enter the Mir
- 5. Four QR codes are placed within the Mir (fig. 7). Each is linked to a video describing life in a space station, and showing astronauts living in the real Mir as it orbited Earth
- 6. On exiting, visitors are presented with a final diary entry in which Philippe describes his feelings as he left for home, and in which he describes his reasons for never going into space again. The experience then ends at this point.



Figure 6: Family photograph before entering the Mir (source: CHESS project)



Figure 7: Viewing a QR-linked video in the Mir (source: CHESS project)

## 3. Evaluation methodology

For the purpose of evaluating the probe, we recruited seven groups, all of whom had visited CITE previously. Each group included at least one adult, and at least one child who was between the age of seven and twelve (to match the core demographic at CITE). Table 2 summarises recruited participants. This was an exploratory deployment, and we gave families either one or two iPads so that we could learn about the impact of this choice. Group 6 was composed of two families who visited together, with each mother being accompanied by two children. This stage of the evaluation itself took place on a single day in the autumn of 2012.

Group	Adults present – relationship to children	Age and gender of children (m/f)	iPads
1	Mother	9 (m)	2
2	Mother and grandmother	6 (f) and 9 (m)	2
3	Mother and father	7 (f) and 8 (m)	2
4	Mother and father	8 (m) and 16 (m)	2
5	Mother and father	4 (f) and 9 (f)	1
6	Two mothers	7 (f), 9 (f), 9 (f) and 11 (m)	2
7	Mother and father	11 (m) and 13 (m)	1

Table	2.	Partici	nants	recruited	for	evaluation
Table .	∠.	i artici	panto	recruited	101	Cvaluation

A description of the participants who were recruited for the probe evaluation

Members of each group were given free access to CITE for the whole day, and were allocated a timeslot for the study. At their allocated time, group members met us in the CITE entrance hall and were provided with iPads which had been pre-loaded with the experience. They were first shown the experience summary screen and were asked to make a choice between the two stories on each iPad. They were then told that they could take as much time as they wished to explore the experience.

To support the analysis process, all group members were fitted with lapel microphones which were connected to audio recorders placed in their pockets. Their interactions with the system were discretely video-recorded, generally from a distance, but occasionally close-up to reveal fine details of

important interactions. Later in the day, a group interview with the family was audio-recorded to provide an opportunity for them to discuss their responses.

At the conclusion of the study, we collected and organized all available video and audio material. This was then studied, in detail, by a panel of researchers familiar with qualitative analysis process. The focus of this process was on identifying interactions which provided interesting insights in relation to the design challenges articulated earlier in this paper.

# 4. Findings

There is a substantial history of the use of technology probes in human-computer interaction research. In keeping with this tradition, much of our analysis focused on identifying and understanding points of breakdown, i.e. interactions which evolved in an unexpected manner. Frequently, an understanding of points of breakdown can lead to insights into how to design future systems. Based on our analytical work, we present five observations, all related to the three key challenges identified in the introduction to this paper.

#### Locations must be precisely defined for photo-navigation to be effective

In general, photo-based navigation support worked well, and visitors found their way to the correct location with relative ease throughout both experiences. We often observed families having brief group discussions about how to follow particular directions, but these were generally resolved quite quickly.

Photo-based navigation broke down where navigation to a very precise location was required by a piece of content. This was particularly clear in relation to a piece of AR content placed at the Parterre des Planètes, which featured the planet Pluto. Because Pluto is relatively small in comparison to the other planets, visitors often fail to see this model, and the AR content was designed to draw attention to it. However, the design of the content required visitors to stand close to a very specific location. The Parterre itself is roughly ten metres wide, and photo-based navigation instructions were not sufficiently precise. This then meant that some visitors accessed the content from the wrong location. Photobased navigation systems may need a mechanism for guiding visitors to really precise positions where precision is required – which is frequently the case with AR content. Alternatively, content design may need to be more flexible to positioning errors.

#### Existing features can be used to overcome difficulties with ambient light

Strong ambient sunlight is present throughout most of the outdoor environment at CITE, and can cause difficulties with interaction with mobile devices. Working from experience gained through earlier trials, our design featured simple interfaces with bold text and graphics in an attempt to maintain legibility. However, interaction with this interface was still difficult in some locations. Even given advances in technology this is likely to remain the case for some time to come.

In particular locations, we observed visitors adjusting to ambient light by locating shady positions, such as cafes, for interaction. This was particularly noticeable at the base of the Ariane, where a café was sufficiently close to the launcher to allow for meaningful interaction in the shade. Most outdoor exhibitions will have some areas of shade that can be utilized to support interaction, and hence experienced designers might choose to design content which can be interacted with in shady locations. Similarly, audio-based interactions might work best in locations known to be quiet.

#### Transitions into indoor spaces can disrupt other visitors

The four QR-code-linked videos presented in the Mir were the most popular part of the experience. Interviews with our visitors suggested that they had an AR-like quality to them, in that they showed what the inside of the real Mir looked like to visitors who were standing in a replica. Visitors were observed to spend quite a large amount of time interacting with this content, which suggests that this part of the design was successful. However, even on a quiet day, a significant queue built up outside of the Mir, due to the extra time that our visitors spent inside. A possible contributing factor here was that videos were placed in a slightly wider space just inside a door providing for a transition from outside to inside, with no windows providing a view to the outside. As such, our visitors could not see the size of the queue that was forming, and could not adjust their behavior accordingly. This breakdown then suggests that careful attention needs to be paid to the placement of content. It might be possible to integrate findings from research that considers the impact of lines of sight (e.g. approaches such as space syntax [Hillier and Hanson 1984]).

#### Physical markers need to be provided for content

In the Mir, video content was tied to physical markers, in the form of QR codes stuck onto available surfaces. However, in the rest of the experience, video and audio content was not tied to markers, due to difficulties in making modifications to exhibits. Instead of scanning codes, visitors used an on-screen button to self-report when they arrived at an exhibit, and were then provided with relevant content. In some cases, content was linked to certain interactions. For example, the video of a real Ariane being launched was intended to be viewed from under one of the model rocket engines, and visitors had to angle their iPad upwards for the video to be triggered.

Although this approach worked reasonably well for most of the interactions, breakdowns were encountered in some cases. Some visitors missed important content entirely, due to errors in navigating through the iPad interface. Other visitors reported in the post-experience interview that they had become worried about not finding all of the content, and were observed to search around exhibits to make sure that they had missed nothing. Some visitors misunderstood navigation functionality which encouraged them to watch the Ariane video whilst under the model engine. Though they did watch the video, it was then not in the intended place, and potentially not as immersive as planned by the designers.

Our conclusion is then that there is an advantage to incorporating physical markers into exhibits, as carefully designed markers can reduce some of the difficulties identified above. Where this kind of modification is not possible, then non-invasive mechanisms (such as projection) could be explored.

#### Choice must be accompanied by sufficient information

Interviews with participants suggested that making a choice between the two stories was difficult, due to insufficient information being provided about the nature of these experiences in the interface presented in figure 3. A number of participants felt that their choice was relatively arbitrary, and that they chose the story whose purpose they found easier to understand (which was universally "The Secret History of Philippe Perrin"). Mechanisms for providing hints about the content of experiences could be explored, and this issue is discussed in further detail below.

#### 5. Conclusions and further work

The probe and evaluation presented in this paper have proven extremely useful in developing our understanding of how to design effective mobile experiences. The observations presented above, though derived from work at CITE, have the potential to be relevant to museums and the cultural heritage sector more generally. Working from these observations, the following topics for research seem interesting, and will be actively pursued in the future:

1. Environment mapping to support mobile experience design

An environment map, potentially illustrating areas of shade and quiet within a particular environment, could be a useful addition to the process of designing mobile experiences. How could such a map be generated, and how might it be represented?

2. Experience trailers to support choice

Trailers, lasting several minutes, are regularly produced for feature films. They support potential viewers to quickly work out what a film is about, and support the process of deciding whether to invest time in viewing it. A trailer for a mobile experience could be produced, and might be beneficial in supporting choice and decision making. What features might an experience trailer include, and how might it be presented?

3. Mechanisms for supporting more precise positioning through photo-based location

Photo-based navigation systems clearly have potential, but may need to support more precise positioning. How can a precise photo-based system be developed? Does it require the integration of features into the environment itself?

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# Introducing iPads in Danish natural science museum settings: a youthful user perspective

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Abstract: For portable tablet resources to be efficient and relevant tools for participatory learning, their adoption and didactic substance need to be developed with a dual view to learners' socio-cultural contexts of learning and to institutional objectives for adoption. I substantiate my claim through analysis of a media-ethnographic study on the introduction of iPads at three Danish natural science museums – all with didactic concepts centered on user-generated video-productions. Digital mobile and social media technologies have long been associated with the promise of providing valuable and unique new opportunities for enhancing and supporting participatory learning experiences in museums. Recently, portable tablets have been a central focus in Danish political and learning discourses and many museums now experiment with ways in which iPads can deliver the assumed dissemination and experience results. This presentation discusses museums' use of iPads from a user-led perspective and, in particular, the mismatch between the call for museums to use these technologies as tools to embrace or even challenge young users' expectations and the user experience realities. Based on my preliminary analysis, I present two issues surrounding the differences between users' reflections on the user experience as compared to the content and communication purposes intended by the museums. Firstly, users' prior knowledge and experiences raise the bar for user expectations, reinforcing the need for contextual grounding and justification on the use of tablets. Secondly, use of iPads in some instances enhances the classroom feel to the visit seen from the young users' perspective. By way of conclusion, it is argued that even though didactic focus on creators is obvious, it has profound impact on conceptual framing and how natural science and media production and dissemination themes are balanced.

Keywords: participatory learning, portable tablets, social media, young people, user perspective

#### Background

Digital mobile and social media technologies have long been associated with the promise of providing valuable and unique new opportunities to enhance and support participatory learning experiences in museums, science centers, zoos and aquariums (Drotner & Schrøder 2013; Giaccardi 2012; Simon 2010; Tallon & Walker 2008). Recently, portable tablets such as iPads have been a central focus in Danish politics and learning discourse as 'the perfect tool' for replacing, supplementing or introducing new digital concepts and technologies in formal and semi-formal learning contexts (Bundsgaard 2012; Folkeskolen 2011; KMD analyze 2012). One could argue that even though portable tablets provide new and unique tools and possibilities the issues and research themes surrounding the introduction of new technologies in semi-formal learning settings are far from new (Rushby 2012). With the high frequency of technological swaps over the last decade from laptops, PDA's, smartphones and now tablets, and the persistent interest and priority of digital technologies in museums and research, a long list of research into mobile learning and the issues surrounding the introduction of new digital technologies in museum learning settings has eventually been provided (Rushby 2012).

Despite overlaps and similarities of issues surrounding, for example, the use of smartphones in museums, questions are still pertinent as to when, how, and why tablets are efficient and relevant tools for participatory learning. This is especially true in light of many museums' impending decisions to 'jump the bandwagon,' as well as other museum's virgin-like attempts to conceptually frame and make use of their recently acquired tablets. This paper's main proposition is that, for portable tablet resources to be efficient and relevant tools for participatory learning, their adoption and didactic substance need to be developed with a dual view of learners' socio-cultural contexts of learning and institutional objectives. This proposition may seem just as un-revolutionary as it is new. However, as argued above, its importance continues to stay relevant partly because development practices rarely follow the ideal patterns that theory sometimes advocates; but also because technologies, users, and use continue to develop and change.

This short presentation represents preliminary discussions connected to three first attempts of introducing iPads in learning settings, in: The Natural History Museum of Denmark, The Blue Planet – National Aquarium Denmark, and the natural history museum, Naturama.

# Personal context is an influential factor for user experiences and meaning making processes

Issues regarding the relevance and efficiency of digital technologies, and the dynamics of using technology, have a long and continued tradition within the areas of human-computer interaction and interaction design. In much interaction design theory (such as user centered design, user experience design and participatory design), the convergence of design artifacts, users and context is perceived from a holistic perspective (Sharp et al. 2007). This holistic approach to development and user experience shares similarities with Falk and Dierking's (1992), and George Hein's (1998) observations and theories on users' active construction of their museum experience. An important point in Falk & Dierking's large scale framework is that the user influences the experience in the interaction between the user's individual needs, knowledge, motivation and expectations (personal context) as well as the museum's physical environment (physical context) and interaction with other users (sociocultural context) (Falk 2009; Falk & Dierking 1992).

Falk and Dierking highlight twelve factors influencing museum meaning-making processes and the quality of museum experiences (Falk & Dierking 2008). Moreover, they argue it is the idea of sets of factors which can provide reasonable explanations for users' attitudes and understanding (Falk & Dierking, 2008). Finally, they stress the importance of the personal context: prior experiences, knowledge, motivations, and interests (Falk & Dierking 2008). These observations have guided this study's initial approach to understanding what role portable tablet resources play and can play in museums' learning settings.

# Methodological approach

In methodological terms, the project adopts a mixed-method approach involving media ethnography (observation, focus-group interviews) and an action-based research approach. The intervening part of the study has focused on participation as a concept and design resource in the development process specifically connected to the learning sessions at National Aquarium Denmark. There was additional involvement with The Natural History Museum of Denmark, and the natural history museum, Naturama, but this was limited to observations and focus-groups. The study primarily draws on observations and focus-group interviews with young users aged 13-17 years (oldest primary-pupils and youngest upper secondary-pupils). I followed two sessions in each of the three institutions (six sessions in total), observing pupil interactions with iPads and social dynamics between pupils. Focus-group interviews were conducted after the sessions (one hour with four girls and four boys in each focus-group) providing users' own reflections on their experience. In addition to this, pupils' content productions have been collected and analysed.

# Three very similar ways to have young users produce content

All three cases represent the institutions' first attempts to use tablets. They share several characteristics in their conceptual framing and didactic design. As argued by Nina Simon (2010), many museums are fixated on creators, despite the diversity and popularity of other participatory options. This focus also characterises these three cases which all choose to have users produce videocontent. Although with differences, National Aquarium Denmark and The National History Museum of Denmark have chosen to have the user-led content productions as a central part of their overall didactic design. Both stressed their formulated teaching purposes through the use of keywords like 'production', 'dissemination', 'communication', 'knowledge sharing', 'strengthening IT- and media competences', 'designing' and 'being creative'. Terms not normally connected to teaching purposes at the two natural science institutions. Also they let the production and production-planning phase take up much of the session time and instructor guidance resources available. Furthermore, they had the issues surrounding the user productions as one of the central developmental focal areas and evaluation criteria. Another common feature is the choice to have information gathering and task solving activities built upon a combination of QR-codes and pre-produced videos containing interviews with scientists (for example, The National History Museum of Denmark) or short introductions and simple tasks provided by the educators (as in National Aquarium Denmark and Naturama). Users are asked to explore the content tagged to QR-codes placed in collections or exhibitions and collect videos and images connected to their task solving and observations.

#### Discussion

Based on my preliminary findings, I summarise two key points of discussion for my presentation:

(1) Bi-directional expectations are not aligned between young users and museums. Users' reflections on their experiences illustrate the mismatch between the call for museums to use these technologies as tools to embrace, or challenge, young users' expectations and the users' experience realities. This point is illustrated by presenting two patterns that my data suggests: Firstly, user expectations in general are very high. Tablets are becoming like electrical outlets. Like Facebook and other digital technologies, iPads are becoming part of young people's 'infrastructure', not necessarily providing anything unique or spectacular. As a consequence, expectations, prior knowledge and prior experiences raise the bar for users' expectations. The need for contextual grounding and justification on the use of digital technologies can be considered a highly influential factor in the young users' experience processing. They have tried it before in other learning contexts and are used to reflecting on and evaluating digital experiences. The overall experience is very sensitive to users' scrutiny, in part, because the use of iPads can become the core experience. Secondly, the use of tablets extend the classroom feeling: From a user perspective, the use of iPads in some instances enhances the extension of the classroom experience, risking a downplaying of the unique contextual grounding of the visit. Many young users reflect on the classroom feel to their visit, when enhanced by the use of iPads. They are aware of their visit being a school visit with learning purposes, but a common thought is concern around the feeling that they have not utilised the full potential of the sites because they have had a tablet 'to take care of'.

(2) Didactic focus on creators is obvious but it has a profound impact on conceptual framing. This ultimately results in a mismatch between institutional objectives for adoption and user realities. The choice to have users producing video-content seems obvious and has positive impacts on the experience (both from a user and museum perspective). However, the practicalities surrounding the production of videos influence the overall conceptual framing to such a degree that both users and museums comment on it. One consequence is the risk that focus is diverted away from the site, the artefacts (or living organisms) and the themes important to a natural science institution. The issue lies in the direction the learning sessions are taking. They are either 'media production or dissemination learning sessions having evolution as theme', or 'evolution learning sessions using iPads and media-production as learning tools'. Even though these two directions seem extreme, the tipping of a balance is a pertinent issue from the perspective of both users and museums.

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# Investigating central factors for learning in digital workshops in art museums

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Abstract: This paper presents a study about processes supporting possibilities of student learning in digital workshops in art museums in Denmark. The investigation aims at providing insight into effects of selected factors important for learning in settings where digital media is used and dialogic communication is the approach. To address the research question of what conditional and processual factors can be argued to support learning potential, a model is developed theoretically and analyzed using structural equation model (SEM) on data collected in museums after the workshops (n=502). Results suggest that dialogic performance of museum educators, a positive art experience and qualities in the process of working with digital media are factors which can be argued to strongly support students' participation and reflection. The findings also show that in case students are disinterested and amotivational in meeting art and see little value in experiencing art works, their level of amotivation is likely to be decreased by these factors.

Keywords: museum education, art learning, digital media, young people, semi-formal, outcome, measurement

#### Introduction

The work of art museums in school service programs is an important activity for students' familiarity with, and learning about, art and issues presented in images and installations of art works. In these educational activities students are invited to discuss interpretations and meanings in exhibitions to learn about topics and issues relevant to society. In ARKEN Museum of Modern Art and The National Gallery Denmark, selected art works are the starting point for such endeavours, and efforts to support students' discussion and reflection are planned in three hour digital workshops, which are part of school and museum arrangements to visit art exhibitions. These efforts aim at engaging students in debating content and facilitating learning experiences involving a challenge to their views and attitudes towards art, as well as introducing them to ways of perceiving art as a resource for reflecting further in future occasions after the museum visit.

Evaluation of these activities and efforts are often performed within a qualitative approach, which provides insights into individual or group learning experiences and learning processes as conceived in the particular situation. While these types of evaluations provide rich knowledge of, for example, student interaction and discussion about art motifs among peers seen from the student's perspective,<sup>1</sup> or the advantages of using digital media,<sup>2</sup> the objective of the present study is to examine how selected factors influence learning possibilities in digital workshops from a general perspective. The central question is: from the viewpoint of art museums, are the efforts in digital workshops likely to facilitate learning?

The study establishes a conceptual model of the relationships between relevant dimensions of the workshop elements and student outcome, which are mediated by how motivated students feel and how they participate in discussion during activities. The model is based on preliminary fieldwork in the two museums, which aimed at clarifying important factors. The fieldwork resulted in an initial theoretical map of relations between students' perceptions of preconditions for learning, motivational aspects of the interaction, participation in dialogues and the student outcome. The operationalization draws on both the ideas explicated in the notion of latent phenomena, such as "perception of the dialogic performance of the museum educator", which are put forward in the theory of scale

<sup>&</sup>lt;sup>1</sup> See how young people use different codes in the articulation of experiences and for interpreting art works in Helene Illeris's work (Illeris 2005).
<sup>2</sup> See how mobile blogging platforms link art museum and school activity in Palmyre Pierroux's and her colleagues article

<sup>&</sup>lt;sup>2</sup> See how mobile blogging platforms link art museum and school activity in Palmyre Pierroux's and her colleagues article (Pierroux, Krange, & Sem 2011).

construction in measurement (DeVellis 2003, p.9), and on the view of constructs as socially constructed concepts, which take meaning in particular contexts through interaction and language use, as explicated in the concepts of "share-holding" and "co-authorship" in the work of Ragnar Rommetveit (2003, p.214). The constructs found important for learning processes are measured by a set of indicators (Kline 2010). Thus, the measurement of constructs and their relations are theoretically derived within a holistic approach which produces a map of relations contained in the model. This is then further developed empirically using techniques of exploratory and confirmatory factor analysis and structural model estimation, which support arguments for the effect of selected factors influencing learning within the aggregated generalized perspective.

# **Background and fieldwork**

Digital workshops are educational events primarily aimed at upper secondary school and high school students, who visit the museums as part of a curriculum or a thematic project designed and planned by the teachers. The type of workshop included in this study uses still photo or audio-file recording as frame and tool to create small narratives of 2 to 3 minutes length edited in software packages such as Garage Band on Mac computers. Student learning experience in four types of workshops: "The wild 80s", "Media used in art", "National identity" and "Portrait, staging and identity" are surveyed in the study. These workshops conform to the general scheme of three elements: 1) students are guided on a tour in the galleries and relevant art works are selected for the purpose of discussing a theme or issue relating to the exhibition, 2) students are given a task to solve, which links to the theme and which involves their co-creation of a digital file in the form of recorded speech or a photo accompanied by text in group work, and 3) a presentation of the products in class, which entails a collective evaluation of the process of creating the file.

The concept of national identity is, for instance, debated through active co-production and negotiating of content and meanings in groups. Students are free to choose any material to create a scenario that they see illustrative of their view on the issue. Digital photos are then recorded and the group select the best and write short texts to illustrate its meaning. For example a group formed the Danish flag out of four red mattresses and placed a student on each of them to illustrate that although we as a population are different with varying lifestyles, affiliations and attitudes, the flag symbolize unification. Ideas and understandings of what it means to connect to a national identity were amply discussed within a setting of productivity.

The preliminary observations of work processes and student behavior provided a basis for conceptualizing central themes in this educational context. Motivational aspects related to student experience of the art works, the way the educator communicated content and invited students to give their opinions, and the process of actively producing seemed important dimensions of the workshops to understand relevant conditions for learning. The observations revealed that students participated with comments, and in some incidents also posed questions. But in some cases the students' behavior also seemed rooted in disinterest and low motivation to engage, as some were chatting in the background despite the educator's invitation to join in. Following these observations it was relevant to ask how a general pattern of factors enhancing learning possibilities would look like. Does the level of amotivation impact the opportunities to learn? On the basis of the preliminary observations and theoretical scrutiny a conceptual framework and a model were built to be tested against data.

# **Conceptual framework**

With the initial observations as points of departure, a conceptual theoretical model was developed including a set of hypotheses to formally organize the analyses. See figure 2.



Figure 2: Conceptual model of factors enhancing learning possibilities

The model shows each construct as an oval with a name and abbreviation in parenthesis. In each oval a set of indicators are theorized to reflect the construct in question, they are then used as questions in the questionnaire. To reduce complexity in figure 2 the 53 indicators are not shown. Each arrow denotes an association assumed to link the constructs (either 'positive' or 'negative', where 'negative' means that an inverse relationship is assumed, e.g. art experience is assumed to reduce amotivation as in H11 -). The conceptual framework thus implies the idea of latent variables, which can be measured within a reflective measurement process using a set of indicators (Kline 2010, p.280). In the following section, constructs and their relations are presented and it is discussed how these can inform establishing the entire holistic model used to enquire into factors enhancing learning possibilities.

# The three preconditional factors

The art educator plays a central role as initiator and organizer of events. Dysthe notes that dialogue and conversation are about qualities of the way participants take part in conversation. In education, students will tend to participate if the educator performs well in supporting these qualities (Dysthe 2003). Thus, the construct 'perceived educator dialogic performance' (PEDP) which she contends relates to the qualities of dialogue, i.e. conversation, as mutually symmetric and shared, acceptance of equal legitimacy of expressions, and the enabling of multi-voicedness (Dysthe 2002, p.342). In the context of art gallery education, particularly 'authentic questioning', the educators' use of student verbal contribution for further conversation is crucial. When the educator creates a welcoming atmosphere, invites all to participate, demonstrates interest in student opinions, and use responses purposefully, it is likely that this relates to a perceived dialogic atmosphere (PDA). This positive atmosphere supports participation in educator dialogue (PED), relates to the overall enjoyment of the workshop (ENW), and it will have an association with positive potential for further reflection (PPR). Moreover, it is assumed that students who perceive the educator's dialogic performance as positive are supported in a positive art experience (AE). Thus hypotheses H1, H2, H3, H4 and H5 are stated.

Viewing spectacular motifs in paintings which challenge preconceptions of normality, or experiencing colorful and large art works in halls of art museums, are examples of central elements in art experience. The experience can involve a state of heightened awareness (Pelowski & Akiba 2011, p.81), and it can evoke curiosity and spark the feeling of wanting more information, hence inspiring

reflecting and initiate questions of what, how and why? Art experience (AE) is thus assumed in the model to be indicated by the felt situational interest, attention and feeling "I want to know more". As art experience (AE) is associated with interest and inherits dispositions for action (Ganger 2006, p.63), it is hypothesized to relate to participation in both the educator dialogue (PED) and the group work discussions (PGWD) and to overall enjoyment of the workshop (ENW). Thus H8, H9 and H10 are added to the model.

The third preconditional factor regards the phase of group work processes. Here students - in a controlled free choice environment - are given a task to solve and in this process discuss the meanings and interpretations of art works. This process offers a framework yielding feelings of engagement (Erstad & Gilje 2008, p.222), an environment of imagination, a degree of feeling free to express personal views (Yardi 2008, p.107), which are assumed to be supportive for discussion and negotiation of content. The proposed construct is therefore labeled "perceived qualities of media production process" (PQMPP). Learning possibilities in this process are linked to thinking and articulating interpretations and meanings, and for students to develop own opinions (Drotner 2008, p.169) when views are exchanged among peers (Sinker 2000, p.208). Because of these qualities and the fact that digital media content in digital photos and audio recordings embrace several modalities (Considine, Horton, & Moorman 2009, p.473), it is hypothesized that perceptions of this environment relate to both participation in group work discussions (PGWD), positive potential for reflection (PPR), and furthermore, that engagement during the process may lead to an evaluation of the workshop as overall enjoyable (ENW). These relations are stated in hypotheses H12, H13 and H15.

# Processual factors supporting learning possibilities

As described above, student disinterest, disaffection and a perception of little value in activities, i.e. "amotivation" (Ryan & Deci 2000, p.59) is a strong feeling among some students. This is conceptualized as one of the factors crucial to understanding processes of learning. This construct and the other process factors are incorporated in the conceptual framework as mediators for the relations outlined above. It is assumed that perception and evaluation of the three preconditional factors relate negatively to amotivation (AM), which is depicted in hypotheses H6, H11 and H14. A high degree of positive art experience (AE) is therefore assumed to relate to a low degree of amotivation (AM), and likewise high degrees of perceiving the educator dialogic performance (PEDP) and qualities of the media production process are anticipated to link to low amotivation (AM). The mediating function of amotivation is construed in the following way: If students evaluate the art experience (AE) positively, this is assumed to reduce amotivation, which in turn is argued to both increase levels of participation and the overall enjoyment of the workshop, because students who feel less amotivated will tend to engage and to enjoy the activities. This capacity of amotivation as an inverse mediator, result in three more hypotheses in the conceptual model: H20, H21, and H22. However, amotivation was also shown in the preliminary study of typical viewpoints to be an enduring emotional state, which is likely to result in students leaving the museum with little knowledge or potential for reflecting further gained (Kobbernagel 2013). Consequently, amotivation is at the same time assumed to link to a negative potential for further reflection (NPR). Thus, hypothesis H23 is formulated to designate this possible negative dimension.

A second factor theorized to support learning possibilities is the degree to which students perceive the atmosphere as positive and inclusive with respect to dialogue (PDA). In their reports of art gallery educational activities in five large art museums in Copenhagen, Hjort & Larsen (2003, p.18) and Bøje, Kampmann & Larsen (2005), explain that as some students tend to feel alienated in art intellectual discourse and overtaken by authoritative interpretations put forward by the educator it is important that educators reduce this through supporting students to tell their views and create symmetric dialogic relations. Perceptions of this aspect of the communicative atmosphere are thus anticipated to support learning outcome (PPR), enjoyment in the workshop (ENW) and the level of participation in both educator dialogue (PED) and group work discussions (PGWD). Therefore the hypotheses H16, H17, H18 and H19 are added to the model to represent the positive effects of students' perceptions of a dialogic atmosphere.

In Helene Illeris's work on young people and contemporary art, she proposes social interaction in the form of articulating opinions about the experience as one key condition for enhancing learning (Illeris 2005, p.237). In this study participation is chosen to encompass dialogical communicative behavior. Putting words to experience is one of the vehicles for entering processes of accommodating and assimilating knowledge. Dysthe takes this one step further by arguing for the importance of both verbalized and non-verbalized conversation in social interaction and hence opportunity to learn. She

explains that dialogue is not only a facilitator for learning processes in its verbalized form, dialogue also means an inner process of thinking inspired by dialogical qualities (Dysthe 1999, p.40). Dysthe's position is supported in Mustapha & Rahman's (2011) more recent findings which speak of four important ways to participate in learning contexts, among which is passive non-verbal participation; they find clear evidence of how silent behavior can induce attention, involvement and thus possibly entail learning (Mustapha & Rahman 2011, p.155). The meaning of participation in the context of a digital workshop is therefore clarified with both aspects. The constructs proposed to cover participation: participation in group work discussion (PGWD), and participation in educator dialogic (PED) are assumed to link directly to learning potential and through the evaluation of the workshop as a felt, enjoyable event (ENW). The former is argued for in the work of Illeris and Dysthe, and for the latter, Jacky Lumby explains in her work that enjoyment and learning are likely to relate because participation has to do with social interaction among peers, and working with friends in a collaborative process (Lumby 2010, p.256). This adds four hypotheses to the model: H24, H25, H28, and H29.

Evaluation of workshops seen from the perspective of museums' strategic wish to build relationships, also has to incorporate the question of whether students enjoyed the visit (ARKEN 2010). Overall enjoyment of the event thus both secures a basis for receiving students as future guests, and in the context of art learning, enjoyment facilitates a transformation of disinterest to openness towards art, and thus the state of enjoyment is assumed to increase learning. In this context, overall enjoyment of the workshop is indicated by feelings of pleasure, excitement, and that it was fun to take part in the workshop. The construct is thus defined at a more general abstract level than in, for example, the enjoyment of using a website (Lin, Gregor, & Ewing 2008, p.42), and connects more to the cumulative retrospect emotion, as Lumby formulates: "Trait emotions are built over time and refer retrospectively to cumulative experience in enjoying classes. State emotions are experienced in the present, the current enjoyment of a specific class. Emotional traits are therefore predicated on the persistent experience of particular emotional states" (Lumby 2010, p.250). Along these lines it is argued that a student's evaluation of the workshop as enjoyable will likely increase the positive potential for reflection (PPR) and decrease the negative (NPR). Thus, hypotheses H30 and H31 are added to the conceptual model.

# **Outcome factors**

The operationalization of outcome is inspired by, but does not adopt in full, two other constructs: 'Critical Thinking Disposition' (CTD) and Student Approach to Learning (SAL). In regard to the former, Nancy Lampert argues that "...reflecting on multiple interpretations of subject matter is an aspect of critical thinking, so it stands to reason that engagement in critical and aesthetic inquiry fosters in art students a disposition to think critically" (Lampert 2006, p.216). Critical thinking is thus preparation for engaging in reflections in relevant situations, however it is not probable that students in a three-hour event achieve this, rather this is seen as a possibility in the present study.

Whereas CTD concerns with more cognitive categories, the concept of SAL deals partly with a total of attitudes and skills, e.g. intentions and motives (Diseth 2007, p.188; Kember, Biggs, & Leung 2004, p.262), defined to capture, what could be termed 'an orientation towards learning', and partly a more substantive aspect which capture the way student's reflect. The SAL instrument contains two subdimensions denoting a 'deep approach to learning' and a 'surface approach to learning'. The first subdimension has a scale, including items covering both student's thinking and behavior, i.e. interest, seeking of meaningfulness, and relating ideas. The second subscale includes items of lack of purpose, and unrelated memorising (Diseth 2007, p.194). The other part relates to educational conditions, but these are not included here, because the outcome factors are intended to tap into what students think they experienced in terms of learning. Outcome factors are thus defined as students' evaluations of learning possibilities, such as: feelings of meaningfulness in the workshop; recognition of the fact that viewing and experiencing art also depends on the viewer positioning; intention to use the content in the future; and a changed view on art.

However, perceptions of meaning and intention are reasonably linked to interest and some degree of affection towards the experience. As some students seem persistently disinterested, it is meaningful to conceive of the outcome in two ways: a negative - which entails a degree of rejection of content; and a positive - entailing a degree of accommodating the content. The case of rejection is also discussed by Illeris, but it is unclear, if this state involves possibilities to learn in some way (Illeris 2005, p.239). Despite simplification, the two constructs, positive and negative potential for further reflection about art (PPR and NPR) provide a way to use the model to evaluate the strength of preconditional and process factor's role as antecedents of learning possibilities. As explicated above, theory argues that

participation is a central process factor for enhancing learning possibilities, hence participation relates to a positive outcome, but a positive experience of participating in dialogue with the educator or in the group work may also decrease the negative outcome factor (NPR). It is probable that the tendency as conceptualized in the model is double-sided, so that, overall experiences transform the perceptions entailing an attitude of little value gained. Lumby shows that students who are active often describe that they achieved something during the event (Lumby 2010, p.258). This is likely also in cases where participation includes verbal and non-verbal dialogue. Consequently two more hypotheses are added H26 and H27 to denote inverse linkage between the participatory constructs and negative potential for reflection, meaning a high level of participation relates to a low level of the negative outcome.

# Data collection and analysis

In total 53 indicators were formulated to measure the concepts explicated above and these were written into a questionnaire used for data collection. During autumn 2010 and spring 2011, 670 students attended a digital workshop, and responded on paper sheets to the questionnaire directly after the workshop. In a missing value analysis, systematic non-responding was found in 14 workshops containing 168 student responses, which were removed. The resulting sample contained 502 responses and of these 199 visited ARKEN (96 in "The Media" workshop, and 103 in "The Wild 80s" workshop). 303 visited The National Gallery Denmark (137 attended the "National identity" workshop, and 166 attended the "Portrait, staging and identity" workshop). In total 246 girls and 213 boys completed the survey (Mean of age =15.5, and SD age = 1.68).

Following the procedures in SEM estimation of the model, results are shown as regression weights in figure 3. These are all significant p<.01. The model achieved the fit indexes (recommended values in bracketed parentheses) of  $X^2$  = 1318.5, (p<.0001 df=496)[p>.01 or better >.05], CMIN/df = 2.68 [<.3], CFI = .92 [>.90], TLI = .91 [>.90], SRMR = .13 [<.10], and RMSEA = .06 [between .05 and .08] (Arbuckle 2010; Brown 2006, p.87).





\*Estimates are standardized (beta) partial regression weights, and all estimates shown are significant at p<.01.

These values are for the most part above or near the cut-off points, and the model can be argued to fit data with minor caveats. For more about model fit see Paul Barrett's discussion (2007). By examining the beta weights it is possible to initially list interpretations. Interpretation of a partial regression in SEM is based on the translations: .10 is weak, .25 is medium or moderate, and .4 is strong (Schumacker & Lomax 2010, p.128). It should be noted that one of the constructs, 'participation in educator dialogue' (PED) was not confirmed in confirmatory factor analysis. The construct of reflection during educator dialogues proved both more meaningful and statistically reliable. Therefore PED is changed to RED.
# Results

1) Dialogic communication seems to be a powerful approach to enhancing students' possibilities of learning. This is especially seen in the relations PEDP->RED beta =.47, p<.01 and RED->PPR beta =.53, p<.01. Students who perceive the educator as respecting opinions, listening and encouraging dialogue about experiences, seem more likely to engage in reflection during dialogues. This increases the likelihood that students acquire a potential for reflecting further after they leave the museum. The dialogic effort of the educator furthermore is likely to support a positive art experience (PEDP->AE beta = .34, p<.01), which in turn seems to increase reflective thinking during the dialogues (AE->RED beta = .46, p<.01) and students' perceptions of a positive dialogic atmosphere.

2) A dialogic atmosphere (PDA) does not seem an important attribute of conditions enhancing possibilities of learning. Perceptions of a good mood, comprehension, and support for sharing personal experiences are not important attributes in the learning perspective, as the only significant relation of perceptions of dialogic atmosphere is PDA->ENW beta = .26, p<.01. This means that dialogic communication as clarified in this model to a lesser degree involves students perceiving the atmosphere; dialogic performance is rather about evoking reflections. Apparently, the model does not support an argument for perceived dialogic atmosphere as a relation important for engaging in reflections during the dialogue with the educator or participating in the group discussions.

3) Art experience, indicated by students' attention and wishes to know more, seems supportive of reflecting during the educator dialogue as noted, and also the discussions in group work processes (AE->PGWD beta = .23, p<.01), which in turn increase the level of positive potential for reflection (PGWD->PPR beta = .16, p<.01). The latter is however remarkably weak and it suggests a difference in strength between the two forms of participation, that is, group work discussions where students talk about their interpretation, discuss meaning with peers, and develop their own opinions are, compared to the educator dialogue, a much weaker factor enhancing learning possibility.

4) The qualities of the process in working with media enhance the possibilities of learning through the supportive and motivating frame for the group work discussions about the art works and the content of the task. This is shown in PQMPP->PGWD beta = .29, p<.01. The qualities of producing with media also seem supportive of students' overall enjoyment of the workshop (PQMPP->ENW beta = .19, p<.01), but participation in discussions and developing opinions about art does not relate to students' overall enjoyment of the workshop. However, the qualities of media production process seem to link moderately to positive potential for reflection as seen in PQMPP->PPR beta = .26, p<.01. Thus, the model suggests that digital media use overall is a strong factor enhancing learning possibilities.

5) Overall enjoyment of the workshop (ENW) does not relate positively to positive potential for reflection nor does it link negatively to negative potential for reflection. That means that despite the fact that the perceptions and behavior of students, as noted in the points above, may involve the emotional state of enjoyment, the overall enjoyment of the workshop does not seem to be a factor enhancing possibilities of learning. Thus increased likelihood of learning is linked to the activity of reflecting during the educator dialogue or in the group work discussions and not to the fact that students see the workshop as enjoyable.

6) Relations of amotivation on the other hand seem to play an important role. Amotivation is likely to be reduced if students evaluate the educator's dialogic performance positively (PEDP->AM beta = -.14, p<.01), and a positive art experience appears in the same (but stronger) to decrease level of amotivation (AE->AM beta = -.32, p<.01). Similarly a positive perception of qualities of working with digital media seem to decrease amotivation (PQMPP->AM beta = -.32, p>.01). Furthermore and importantly, less amotivated students are more likely to listen, see new things in the art works and think further about the themes raised, than highly amotivated students, because amotivation relates moderately negative to reflection during dialogues with the educator (AM->RED beta = -.22, p>.01). These results suggest that of the three preconditional factors, art experience and perception of qualities of the media production process are the strongest conditions to reduce amotivation. If amotivation is low this in turn links to higher levels of reflection during dialogue and higher overall enjoyment of the workshop. The reducing effect on amotivation, however, cannot be read, as at the same time increasing participation in group work discussions, because this relation is insignificant.

7) Amotivation furthermore appears to link very strongly to negative potential for further reflection (AM->NPR beta = .47, p<.01). That is, a negative outcome is very likely to be experienced by students who cannot see what is gained, who think the activities were meaningless and that it was a waste of time, e.g. those highly amotivated. This aspect of the evaluation of the workshops indicate that amotivation

among students has a possible important interpretation. Because the negative outcome is unrelated to, and hence not reduced by, any of the other factors, amotivation appears to explain why students leave the museum with a negative potential for further reflection. A possible interpretation of this pattern may be that the felt amotivation is so strong, that no other central factors have an impact, and when based on disinterest and little perceived value from investment, there are ony reduced possibilities of enhancing learning.

#### **Final comments**

The attempt in this study was to produce a generalized picture of central factors important for enhancing learning possibilities in digital workshops. As shown, it is possible to develop a model. which in terms of statistical criteria reaches an acceptable level, and which, with respect to meaning in the relational pattern connects to the discourse of art gallery learning and digital media use presented in theory. It contributes by presenting a holistic map of relations, as they can be found and analytically constructed through theoretical reflection and examination of the empirical material. It makes suggestions about the nature and effect of selected factors in this particular environment in the four workshops in ARKEN and The National Gallery Denmark. The model shows that the dialogic approach, i.e the dialogic performance of the museum educator is an important antecedent of learning potential, because the model suggests that perceptions measured at an aggregate level show a relative strong pattern of effects. Dialogic performance of museum educators is important, but interestingly the effect is not found related to the perception of the atmosphere as dialogic. It suggests that students are not bothered about atmosphere, and results thus contrast with the findings of Hjort & Larsen (2003) and Bøje et al. (2005). Over-intellectualization and the feeling of being an alien in art elite discourse is not necessarily a factor of importance. This resonate well with the characterization of young people as responsible, knowing and decisive about what, when and how to learn about content (Illeris 2005).

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# Investigating design research landscapes through exhibitions

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Abstract: What characterizes a design research exhibition compared to a traditional design and art exhibition? How do you show the very materialities of the design experiments as a means for communicating knowledge of research and of practice? How do you present, review and utilize such an exhibition?

With those questions in mind, the intention and challenge for the Nordes 2013 Design Research Exhibition was to expand on current notions of staging research enquires in design research conference contexts. Artefacts, installations, performances, and other materialities that relate to the theme of the conference - Experiments in Design Research – were displayed as tools to express and communicate different design research enquires. Through this paper we will describe the Nordes exhibition as a specific case that renders questions visible in relation to how to utilize a design research exhibition. Furthermore, we suggest ways of inviting participants to explore what role exhibitions and all their materialities can play in design research through a 'design-research kit'.

Keywords: exhibition, experiments, probes, design conference, artefact

### Introduction

The fifth Nordic design research conference, Nordes, took place in Copenhagen June 2013. Since its establishment in 2005, this venue has gained its position as perhaps the most important scholarly event in design field in the Nordic countries (Brandt et al. 2013, p.4). Gathering a diversity of actors presenting conference papers and exhibiting related works, the topic of the 2013 conference was *Experiments in Design Research*. This paper will present the conference exhibition and our shared attempt to utilize artefacts, installations, performances, and other materialities as tools to express and communicate design research enquires side by side with conference papers. The 2013 exhibition was the most challenging and ambitious in the history of Nordes. As authors of this paper and as co-chairs, we will describe our experimental way of designing the curatorial process, the exhibition space, and a 'design research kit'. The aim is to discuss what might be the role of exhibitions in design research contexts.

In the context of the first Nordes conference, entitled *In the Making*, design was conceived as "a restless field positioning as a productive practice in between conceiving and making" (Binder et al. 2005, p.3). With this definition the conference was already exploring how material artefacts and processes of making can contribute to research. The aim of the first conference was to bring together a diversity of people who share an interest in understanding and developing design as a transdisciplinary practice by paying attention to ways of exploring, explaining and challenging what we know in and through design. The conference directed its interest towards diversity, challenges and emerging design practices. In this paper we are taking this challenge further by focusing on diverse material exploration through design research exhibitions.

In respect of the overall conference theme of experimentation the Nordes 2013 Exhibition was conceived as designerly exploration into materials, technologies, and expressions. It also entailed design experiments as means for promoting social change or as critiques of political and ethical values. The ultimate aim of the design research exhibition was two fold: to present the very materialities of such design experiments; and, to explore how the outcome can work as a tool to express and communicate research enquiries.

In this paper we first take a closer look at what kind of role exhibitions have gained in the field of design research, which we then relate to some contemporary curatorial challenges within traditional design exhibitions. We proceed by introducing the case, Nordes 2013 Design Research Exhibition. We then describe in detail the processes related to the evolving exhibition – including the curatorial process, spatial design as well as the designing of 'The Nordes Design Research Kit'. Finally, we sum up by pointing out problems and future opportunities for the role of exhibitions in design research contexts.

# The role of exhibitions in design research

The book "Design Research Through Practice" (Koskinen et al. 2011, p.89-107) discusses how design related practices are utilised in the field of design research, and furthermore how these practices are related to the idea of exhibitions. Here, the way in which people see and experience the material world and elicit change through debate is questioned. The roots of this discussion can be found in the sphere of critical and artistic discourses:

Critical design, or design that asks carefully crafted questions and makes us think, is just as difficult and just as important as design that solves problems or finds answers. Being provocative and challenging might seem like obvious role for art, but art is far too removed from the word... There is a place for a form of design that pushes the cultural and aesthetic potential and role of... products and services to its limits. Questions must be asked about what we actually need, about the way poetic moments can be intertwined with everyday and not separated from it. Critical design is related to... design propaganda, and visions of the future... Its purpose is to stimulate discussion and debate amongst designers, industry, and the public. (Dunne & Raby 2001, p.58)

As encouraged above by Anthony Dunne and Fiona Raby, the initiators of the term 'critical design', contemporary designers can adopt a critical attitude if they wish to make the public aware of their true interests. With these kinds of practices, designers are able to shake up the routines of everyday life (Koskinen & al. 2011, p.95). According, the primary purpose of critical design is to make people think:

(...) the interesting thing is to explore an issue, to figure out how to turn it into a project, how to turn the project into some design ideas, how to materialize those design ideas as prototypes, and finally, how to disseminate them through exhibitions or publications. (Dunne & Raby, cited from Koskinen et al. 2011, p.95).

Thus, according to Dunne & Raby, exhibitions are important mediums for materialised design ideas to distribute carefully crafted questions. When considering this possibility in relation to design research, it is obvious that for many design researchers, exhibition items, such as prototypes, photographs and videos are important mediums to express and communicate research enquiries, on an equal part with written text. It should be emphasized that artefacts in research exhibitions are exhibited in theoretical frameworks rather than as stand-alone artworks. This means that the exhibition item, in whatever medium it might be, has to be experienced and recognized in relation to the design researcher's theoretically perspective and reflections (e.g. written text), and also in the light of the overall framework of the event in question.

We will come back to this point, but before we move on we introduce our first motivation for the Nordes 2013 Exhibition and emphasize how it ties into some contemporary concerns of design curatorial practices.

# The motivation behind the Nordes 2013 Exhibition

According to Christina Zetterlund (2013, p.50), exhibitions within design have an influence on how design and craft is understood outside the practicing design communities. Zetterlund describes how the exhibition format has helped to move design and craft beyond the private everyday use of products. Hence, exhibitions are potential important mediums to communicate design to a wider audience. Moreover, the problem with many museum exhibitions is that their display of collections has emphasized a certain definition of the craft and design object, in particular that of the history of design as 'visual objects that decorate capitalism' (ibid.). Consequently, Zetterlund is calling for alternative exhibition formats that take us beyond the dominant contribution that accordingly has institutionalized the field of craft and design.

For us, design research exhibitions have the potential to contribute to such an alternative. Nonetheless, our challenge was slightly different since design research is rarely caught up in 'only'

aesthetic or capitalistic issues. Rather, one challenge within design research contexts are how to get beyond verbal ways of staging design research enquires. Academic texts can also be considered as 'material', but they already constitute main parts of that which makes up design research conferences. Hence, our intention has been to introduce, include and invite three-dimensional and non-verbal materialities that might not feature so vividly in design conference situations. The kind of materialities that are often close at hand in a range of different design practices include wood, ceramics, bits of code, film and paper.



Figures 1 & 2: The photo on top shows some of the attendees at the Nordes 2013 exhibition opening. The photo below this shows the short description stating the project's overall aim and research questions.

To make a review of how exhibitions were featured in previous Nordes conferences, we retrieved information from the Nordes conference website (www.nordes.org) that gathers all information about common Nordes activities. Based on this review it became obvious that the conference has historically offered some possibilities to show and present 'case studies'. Although there was little or no information on how case studies were actually exhibited and executed during the conference.

We are highlighting this because it shows aspects and challenges of a design research exhibition. Artefacts, materials and experiments can be much harder to present and document if they are to contribute to some kind of knowledge. This also points to the power of text in contributing to research - it can be easily saved, documented, and shared. We can imagine that academic systems such as referencing have evolved and changed over time through a history of trial and error. Those are features that many material things such as artefacts and exhibitions in design research lack. The fact that there is so little information of the previous Nordes exhibitions - compared to accepted conference papers illustrate this point. This ultimately leads to questions of how we document, share, and build upon each other's knowledge in a materially pluralistic manner?

In the next section we describe through both images and text how we tried to meet some of those challenges during the exhibition.

# The design research curation process

The Nordes 2013 Exhibition had 50 designers and design researchers applying to participate, and after a double blind review, the exhibition included 27 exhibitors in total. The submissions for the exhibition could either be submitted as an exhibition piece accompanied with a two-page paper explaining the main idea of the work and how it is related to the conference theme, or as an exhibition piece accompanied with a full or exploratory paper. All exhibition proposals had to be documented as visual material, such as through photographs or video to allow the blind peer reviewers to evaluate the work.

Each submission went through two peer reviewers, using the same process as how papers proceed into the Nordes conference. The two reviewers were assigned due to the specific expertise within the field of the submission. For the exhibition items, the reviewers were asked to describe the aesthetic, communicative, and experimental qualities of the piece. Furthermore, they had to give an overall rating of the piece, as well as a rating of their own expertise within the area. Based on the ratings an average score was calculated, that automatically accepted or rejected the submission.



Figures 3a & 3b: The illustration shows one of many attempts to cluster the different exhibition items into more comprehensive fields of design research (a). The photograph shows a layout of the physical boards and tables in the exhibition (b).

The accepted submissions were subsequently invited to make iterations to their submissions according to the suggestions from the reviewers. During this time, we as chairs made up a rough sketch of how the different submissions and experiments could fit into the exhibition (Figure 3a). The experiments that were to be exhibited ranged from voice-activated interaction designs and performances to craft-based objects in ceramics.

# The spatial design of the exhibition

To deal with the challenging fact that some exhibitors would have to pack their exhibition-items to go through customs and may only arrive hours before the opening, we decided to allow room for the exhibitors to stage their own experiments. As a 'blank canvas' the exhibitors where given the options of using a standing board, a table, or a combined choice in size 2m x 2m made of plywood, to communicate their design research experiment (Figure 4).

The exhibition architecture was designed according to the clusters of the entries. To create this layout we organized and combined the submissions according to themes. We uncovered five overarching themes. With the help of post-it notes the themes were then applied to the boards and tables (Figure 3b). This arrangement was then positioned into the physical space of the Exhibition Hall.

Through email dialogues and Skype-sessions between the exhibitors and chairs, the Nordes 2013 Exhibition slowly came into being. But the opening event of the exhibition only fulfilled the task of showing stand-alone artworks. The task of considering how the exhibition items contributed to a more theoretical framework was to be realised in the special slot designed purposefully for uncovering the roots of this research-related exhibition. For this purpose, we decided to develop The Nordes Design Research Kit.



Figure 4: The picture to the left shows the plain board the exhibitors where given to utilize according to their needs for exhibiting their items. The second picture shows an example of the actual set-up of the exhibition piece 'Time experiments – Design for reflection' by Liv Maria Henning and Fanni Baudo.

# The Nordes Design Research Kit

To engage the conference participants we created 'The Nordes Design Research Kit' by applying the idea of 'probes'. Since discussions and dialogue do not necessarily arise in a straightforward way, the intention was to allow for more vivid exchanges between exhibitors and conference participants - to utilize the full potential of the conference participants' expertise as a part of the exhibition.

For achieving the goal, we applied the base idea of 'cultural probes' as outlined by Bill Gaver (Koskinen et al. 2011, p. 40-41). In the field of design research probes are used as vehicles that are sent out to gather information. Often the purpose is to support self-documentation, with the benefit that they operate and gather information without the presence of the researcher (Koskinen et al. 2011, p.41). However, the key idea behind the probes can be applied in various ways. Furthermore, probe tools can be a playful way of gathering information and engaging users into the design processes (Mattelmaki 2006). They can also be used for sensitizing users or research participants for a discourse of a certain topic (Ahde-Deal 2013, p.47-50).

While Ahde-Deal treated design probes as starting points for conversations about emotional attachments with jewellery, we used probes to establish dialogues between exhibitors and conference participants. In this way, the topic was left to be explored in relation to the each exhibition piece.

'The Nordes Design Research Kit' used the metaphor of an explorer's kit. It consisted of a set of coffee mugs, a 'design research map', some 'enquiry notes', pens and coffee. This was all packaged in two coffee cups and given to the conference participants during a special exhibition slot (Figure 5). Each participant, or 'explorer', teamed up with a partner - with whom they shared the kit - while exploring the Nordes design research landscape and enjoying coffee and cake. We describe two less self-explanatory components of the kit in more detail below.



#### Figure 5: The 'Nordes Design Research Kit', at the entrance to the Nordes exhibition Hall.

**Probe 1:** *The Design Research Landscape* (Figure 6) is a map that first indicates the overarching research themes that made up the Nordes 2013 exhibition. In addition, it also illustrates the physical layout of the exhibition space. Referencing a cartographic process to symbolize the exhibition, each island on the map was given a specific design research theme corresponding to the Nordes conference session themes (see also figure 4 and related explanation). The island, 'Experiments as Making Explorations' featured the more crafty material explorations. 'Politics of Design' featured more provocative exhibition items such as the home abortion kit 'Abort N' Go'. While, 'Messy Method' showed pieces that would deal with more explorative methods of using design to conduct field research.

Furthermore, different sights, such as the actual exhibition items where presented as specific landmarks. Heights, depths and slopes - the characteristics that tie together a landscape - where featured as extracted sentences from the papers that accompany and contextualise the exhibition item.



Figure 6 : The 'design research landscape' map.

**Probe 2:** *The Enquiry Notes* are made up of re-packaged 'Post-It' notes that encourage the explorer to leave a trail of enquiries, or questions to be utilized by other explorers after them. As one walked around the exhibition the enquiry notes could be attached to the boards and tables. For example, Priska Falin's exhibition item 'Aesthetic Experimentations on Ceramic Materials' (Figure 7) showed a selection of test pieces accompanied by the sound of crackling flux (Falin 2013, p.486).





Figures 7 & 8: Exhibition piece 'Aesthetic Experimentations On Ceramic Materials (above)', and the enquiries that the exhibitor received during the Nordes exhibition slot (below).

Falin, who explores new artistic potentials from ceramic materials and sound, received enquires that ranged from positive comments, to questions and suggestions (Figure 8). On one of the enquiry notes an explorer writes 'I cannot resist touching them', while another reports 'I would enjoy gaining insight on the actual chemistry - not necessarily formulas but what makes textures or colours? How does information like that affect my understanding of the product?' Another explorer asks Falin 'could we interact by playing your artwork ourselves?'

In this way the enquiry notes started to generate their own discussions between different participants and exhibitors. One could add to someone else's enquiry, which each exhibitor or participant could then utilise by seizing the moment to discuss a certain topic when the enquiries where scribbled down. Alternatively, the exhibitors could venture out as explorers themselves to enquire into someone else's relevant work. At the end of the conference the exhibitor had the possibility of bringing the enquiry notes as a trail of insights and reflections enquiring into her particular exhibition research topic.

Overall, this large Exhibition Hall was a very lively central point for the whole conference. It hosted conference paper sessions, keynote presentations as well as the opening ceremony. Hence, the conference participants used the space for other reasons as well – not only to explore the exhibition. Thus, the pieces were not only seen nor discussed via 'enquiry notes' during the special exhibition slot, but during the three days of the conference.

# Discussion

In trying to position the role of exhibitions compared to traditional design and art exhibitions we argue that the very characteristics of a design research exhibition lies in the synthesis between the text and the design experiment. In concurrence with this, the current curatorial design research challenge is firstly to consider how this synthesising characteristic can be utilized. Then secondly, to consider ways that allows exhibitions, with all their materialities, to become serious and important components of the more text-based academic procedures of design conferences.

Through our case study, the Nordes 2013 exhibition, we have presented and discussed how design research exhibitions help utilize such characteristics. In regards to the first challenge we have accounted for how the 'Nordes Design Research Kit' produced exchanges between the written paper and the exhibition item. Furthermore, we encouraged exhibitors to show process and experimentation as central to the exhibition, in conjunction with a written paper that positions and contextualises the experiments. Those are both important features that help add to a more pluralistic perspective on how materialities can contribute to knowledges in the making.

In respect of the second challenge; to allow materialities to become more important components in design conferences we argue to 'review the reviewing'. Reviewing 'some-thing' for design research follows a research tradition that is geared towards assessing papers. This became very visible in some of the review feedback that the Nordes exhibitors received. Exhibition items such as prototypes, photographs and videos may not fit well into traditional modes of making design conferences. Typically, the reviews of the exhibition pieces were assessed *both* through the paper and the visual material. Here the reviewers would, for example, assess how the visual material was experimental, and how the two-page paper could benefit from being written in a more straightforward manner to

position the experiment. The reviews for the full or exploratory paper were more problematic in terms of the exhibition items. Here the reviewers tended to focus on the review of the paper, and in some cases did not even consider the review of the exhibition item.

To point to futures; further ways to overlap, intermingle and stage both text and other designerly materials can be done through micro-exploration, such as our example the 'Nordes Design Research Kit'. A further possibility is to expand the exhibition area as a more dynamic and flexible environment for paper presentations in relation to the exhibited artefacts - in contrast to the classical auditory setup (for further examples of this see 'The Art of Research', organised since 2005). As well as to consider ways of making design research exhibitions more public to utilize the medium of the exhibition to communicate design research to a wider audience, such as the design practioners.

With regards to reviewing, there is definitely room for improvement, to consider better ways to review exhibition items. At the same time, using the more traditional format for accepting conference contributions for a design research exhibition also shows an opportunity. The fact that we do not have one curator, instead the decisions of who exhibits have been spread out of over many different people, or reviewers, means that the curation has been de-centralized.

Finally, when considering our task as co-chairs and authors, our closing contribution has been to document the Nordes 2013 exhibition. This paper is one way to document and share our experience, so others can build on the knowledge we have gained. We want to argue that research in its most basic sense - contributing to knowledge that allows others to build upon - contributes to new means of curating design exhibitions. This very paper contributes to a way of synthesizing between text and experiment, theory and practice. It is in itself an experiment in how to further elaborate on the characteristics of design research exhibitions.

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# Mixed reality and the Holy Ghost Church in Turku

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https://www.utu.fi/fi/yksikot/bid/projektit/Sivut/Futuristic\_History.aspx

Abstract: Our paper will deal with the creation process of a mixed reality based presentation and a 3D model of the Holy Ghost Church in Turku in Finland as a part of the Futuristic History research project. The focus of this case study was to research how experts from the fields of history, archaeology, economics, engineering and art can work together to produce attractive user oriented content for museums.

Mixed reality covers both virtual and augmented reality solutions. Augmented reality stands for technologies combining interactive virtual elements and information with reality in real time. The content can be presented using mobile or wearable equipment, like a smartphone, tablet or eyewear.

The building of the Holy Ghost Church began in 1588 but was never entirely completed. The church, however, was probably in use for a couple of years before it was severely damaged in a fire in 1593. Afterwards the church ruins were used as a cemetery. The last visible remains of the church were cleared in the 1650s to make way for the realization of the new street plan for the town. The ruins were revealed in archaeological excavations in the 1960s and 1980s.

The mixed reality experience of the Holy Ghost Church includes both an inside and outside presentation of the church. The experience consists of an accurate 3D model enriched with natural imagery, 3D scanned elements, live action video and realistic soundscape. Further information is presented in textual form and alternative historical interpretations are presented visually.

The main challenge was that no pictorial representations of the church have remained. With the help of the material from the excavations, archival research and comparisons with similar buildings in Finland and Sweden the presentation is made as historically reliable and accurate as possible. The viewer is however reminded that the model is only an interpretation of the past, and not the past in itself.

Keywords: augmented reality, mixed reality, Holy Ghost Church, Turku, 3D modeling

# 1. Introduction

The usage of augmented reality in historical sites is rising and several applications have already been made (www.armedia.it/tracker.php; www.vindolanda.com/). These applications may include features such as showing old photographs over modern day buildings or reconstructing the destroyed parts of a partly ruined building. On the other hand, virtual reality solutions such as virtual tours and recreations of historical sites with the help of computer aided modeling have existed for a long time (Masuch et al. 1999). Mixed reality solutions provide a wide range of possibilities, yet there are a lot of challenges including historical research and technical solutions.

In this paper we present the production of the mixed reality application of the Holy Ghost Church in Turku, Finland. The goal was to research the historical backgrounds, implement mixed reality applications, study usability requirements and analyze the business opportunities. In addition one of the most important research areas was to study the production process of creating a mixed reality application for a historical site. The model was done as part of the Futuristic History research project (Mäkilä et al. 2013).

This paper is organized in the following way: Section 2 describes the mixed reality concept. Section 3 introduces the history of the Holy Ghost Church. In Section 4 production goals and process details are discussed. Section 5 describes the process of recreating historical content and in Section 6, the technical aspects of production are discussed. Challenges and solutions are presented in Section 7. Finally, conclusions are described in Section 8.

# 2. Mixed reality

'Mixed reality' stands for the combination of reality, virtual reality, augmented reality and augmented virtuality. In this paper the focus is mainly on augmented and virtual reality. Augmented reality (AR) is a live view of real world with augmented elements such as audio, video or imagery. Augmented content can be shown with a variety of devices such as tablets, mobile phones or eyewear. Virtual

reality (VR) is a pure computer generated environment that can simulate a real or imagined world (Milgram & Kishino 1994). There are a great variety of virtual reality devices and new ones are in development (www.oculusvr.com).

Mixed reality solutions yield new possibilities for viewing historical content. Historical studies are always combinations of historical fact and interpretation. When a lack of research material is significant it may lead to several possible views. There is no need to hide all the alternative interpretations from the public. These diverging views and interpretations could rather easily be shown to the user, thus giving the user the possibility to evaluate them. In addition, the user may not even want straightforward information, but may come to understand the level of interpretation involved and may even get to know the research process. Furthermore, showing different eras could be clarified by giving the user a chance to choose the era to be presented.

# 3. The Holy Ghost Church

At the end of the 16th century, Turku (Åbo) was the most important city in Finland, then a province of the Swedish realm, and the second largest city in the kingdom. Its population was between 4000 and 6000. The city was also the capital of the diocese of Turku. The Turku Cathedral consecrated in 1300 was the only church still in use in the city after the reformation (Laitinen 2012, pp.312-314).

The construction of the Holy Ghost Church began in 1588 by King Johan III. The purpose was to build a church for the Finnish speaking residents of Turku, because at that time Swedish was the language used by the ruling classes and thus the language of the service in the Cathedral (Gardberg 1966, pp. 8-16). The Holy Ghost Church may never have been entirely completed but it probably was consecrated before it was severely damaged in a fire in 1593. The ruins of the church were still used as a cemetery. The last visible remains of the church were cleared in the 1650s to make way for the realization of the new street plan for the city (Kalpa, Junttila & Moberg 2011, pp.13-16).

In the archaeological excavations of the 1960s and 1980s the foundations were unearthed. Later, it was decided that the foundations shall be left visible for visitors. In addition, the Holy Ghost Chapel was established on the remnants of the foundations (Kalpa, Junttila & Moberg 2011, pp.12-16 and 70-80).

# 4. Production goals and process

Not every historical building or event is suitable for an augmented reality application. The major criteria used in this project were historical knowledge, public interest, business opportunities and usability. All these facets are also in relation technical challenges.

Without suitable quantity and quality of historical knowledge, the recreation process becomes a difficult task and the historians are forced into interpretation, make decisions based on guesswork. Naturally, public interest has to be taken into consideration if the end product is designed for consumers instead of professionals or just to be a mere showroom toy.

Therefore, business opportunities need to be analyzed as well. Important aspects include the needs of different customer segments, sales and marketing, payment method, device management and platform decisions. Also the accessibility of the attraction has its' effect on the business model applied. Without proper business model or best practices from the field business solutions are only educated guesses.

In addition, the usability of augmented reality applications requires a lot of attention since the area is rather new and there are no standard usability solutions. AR glasses for example require additional study. Concerning usability, AR devices are usually intended to be mobile and to be used while moving around the scene, thus requiring a lot of attention from the user. Therefore, safety issues such as staircases and other changes in land or floor must be taken seriously.

While developing emerging technologies, an information ethics analysis can prevent some of the negative impacts created by new technology (Floridi 1999; Moor 2005). While other analyses prevent mistakes being made in the creation of bad or poorly selling software and hardware, information ethics concerns functioning, but ethically questionable solutions, thus preventing the loss of reputation and - in the end - capital. In AR solutions these concerns include, but are not limited to, privacy, data ownership and equality (Heimo et al. 2014).

After the analysis of the historical knowledge, public interest, business opportunities, and usability the aforementioned relation to the technical solutions must be emphasized with cost-benefit analysis. Many of the technical possibilities play a key role in the final product. With proper knowledge of the solutions at hand both the required and the most beneficial solutions can be located and implemented in the system. When conducting pre-production analysis, it is important to realize that the area of AR is under continuous research and new challenges and opportunities arise frequently.

Once the target was determined it was considered important to define common goals and discuss application possibilities. Since AR applications are a rather new, cross-disciplinary concept, it was thought that the research team should include personnel from different educational and professional backgrounds. Thus, there lies a risk for various misunderstandings to occur.

To negate the aforementioned misunderstandings, an iterative approach was found to be suitable to constantly build and show a demonstrative application to the research team. This approach merged visions and emphasized the common terminology of the project team members, making it easier to discuss further development. In the project, the research on historical matters was continuous and the search for new material and references was found to be helpful to gain a common vision between historians, economists, engineers and other professionals.

# 5. Recreating historical content

In the Futuristic History project, previous archeological and historical research was carried forward. For the creation of a 3D model of the Holy Ghost Church, the interior and exterior looks and the possible furnishings were studied. Based on these studies, interpretations of the designs were made. One of the main challenges in the reconstruction process was that there were no pictures and only a little archaeological and archival material left of the church. The challenge was approached by comparing designs to other similar buildings that existed in the same era.

The extensive publications Suomen Kirkot (Churches of Finland) and Sveriges Kyrkor (Churches of Sweden) yielded valuable information about the appearance and furnishing of the contemporary churches. An earlier interpretation suggested that the Holy Ghost Church was much like the St. Jacob's Church in Stockholm. Further investigation of the literature (Quensel, Lundmark, & Hedlund 1928 and 1934) and material from the excavations of the Holy Ghost Church revealed that the architecture of the church differed considerably from St. Jacob's Church. The Askainen Church from the first half of the 17th century (Riska 1961) was revealed as a better example on how the Holy Ghost Church might have looked. The medieval Holy Cross Church in Hattula and its 16th century furnishings (Knapas 1997; Hiekkanen 2007, pp. 282-291) were also used as references.

Even though the reformation and conversion from Catholicism to Lutheranism in Sweden began in 1527, some features in church furnishings, such as the lack of benches, remained throughout the 16th and the beginning of the 17th centuries (Laitinen, 2012, pp.312-317 and pp.329-330). The choir screen was considered even more important during the 17th century than it was before the reformation (Pirinen 1996, pp. 49-53 and 177-178). On the other hand, new elements appeared in the church space. Before the reformation the pulpit had been rare in Finnish churches (Laitinen 2012, p. 327; Hiekkanen 2003, pp.111-112).

The floor, baptismal font, chandeliers, candlesticks, wall plaster, doors and pulpit in the 3D model are all influenced by the design of Holy Cross Church. The windows are considered to be very dark and rather opaque, allowing only a dim green light to pass through. The windows in the Askainen Church were used as a reference. The examples of the sconces (used for light dispersion), the crucifixes and the choir screen are also taken from the Askainen Church. The choir screen is depicted as green, a common color at the time. Besides the Askainen Church, a 3D model of Petäjävesi Old Church was also used as a reference for the choir screen. The ceiling is still under discussion, it may have been level or barrel vaulted. The reference for the level ceiling is from the Louhisaari Mansion.

Thus the created model combines historical knowledge of the Holy Ghost Church and general knowledge of Finnish and Swedish churches, their furnishing and the services within them in the 16th and 17th centuries. This is how the model was made historically as accurate and reliable as possible.

There is music used in the application, in form of 16th century Finnish chant. The music was recorded in the atrium of Martin's Church in Turku and the particular track used is "Jeesus Kristus Uhrix Meille". In the application there is also a priest giving a short introduction about the Holy Ghost Church. A priest's clothing at the end of the 16th century included a long black robe and a white ruff.

# 6. Technical aspects of the production

The technical aspects of production include 3D modeling, application development and acquiring the specious visual look. 3D modeling includes various methods such as 3D scanning, manual modeling and reference based modeling. Application development refers to the actual building and deployment of the software. Together, modeling and development form the resulting visual look by taking advantage of different techniques, discussed in this section.

# 6.1 3D scanning techniques

Many different techniques exist to create virtual 3D models. One method that has gained popularity in the last few years is 3D scanning, which in some cases results in extremely accurate models. Unfortunately, models created for use in professional museums are rarely suitable for consumer grade products. One of the key factors here lies in the wide range of hardware and software that is used to run such applications. An average consumer tablet computer for example cannot draw the complex point clouds produced by 3D scanning fast enough to achieve real time performance. Thus in most cases the material needs to be created, especially for real time use. On the other hand, the ever growing amount of processing power allows for more and more visually attractive games, resulting in the target audience's demanding the same quality from all the content they consume. This sets high demands on cost efficiency.

# 6.2 Manual modeling pipeline

To research the best ways to create material for the project, many separate practices were tried out. Based on archeological research done in the 1980s and additional work carried out for this project, archaeologists created a rough 3D model of the church (Image 6.1). This model was then used as a reference for the shape and size of the actual model appearing in the application. An important element in enlivening game graphics is the use of materials and textures to make models appear more detailed and lively than their basic geometric form. To achieve the best possible results most of the textures in the application were created from photographs shot at real locations appointed by the historians. The use of textures was also applied to certain objects decorating the interior. The sconces and the chandeliers were modeled extremely roughly and all the visible details were achieved by using transparent textures defining the visual shape (Image 6.2). Other commonly used feature in modern game graphics are different kind of shaders, further modifying the look of the materials (Akenine-Möller et al. 2008).

Image 6.1: Original 3D model



A rough 3D model of the church based on the archaeological research.

Image 6.2: Sconces



Geometry and texture used for the sconces.

#### 6.3 Modeling the interiors

According to our knowledge and interpretations, the design was very ascetic and minimal. This meant a lack of decoration and only very few items inside the building. The challenge was to make the interior seem lively despite this minimal look, so that it did not appear as an empty, and perhaps even unfinished, shell. This challenge became a starting point to establishing communication habits between content creators and historians. Conveying the very ascetic nature of the site was of crucial importance as it would define the look and feel of the whole scene.

The arches at the doorways and at the entry to the choir serve as a good example of the difficulties our artist had in getting to the right mindset. The lack of decoration and small details could be seen as a lack of information rather than the actual desired look. Questions were thus asked about whether there were any paintings or small carvings surrounding them. Especially important in the process were the reasons behind the answers: the rather poor Finnish population had no interest in spending vast sums of money building the church.

The seemingly simple dialogue also helped the historians to understand what kind of information the content creators needed - not just what existed but also what definitely did not exist - and the reasons behind this information. Once the right mindset was achieved the content production took on a much faster pace as the vision of the final look was shared to a greater extent. Sharing the vision of what was needed also helped our historians find reference materials needed for the final production. For example a lot of photographs were shot and some of them ended up in the final application, integrated into textures. A clear example is the pulpit which only has a very crude geometry (Image 6.3) but is highly detailed due to real world textures.



Image 6.3: Pulpit

Geometry of the pulpit.

Understanding the requirements of the content production made it possible for historians to suggest the most feasible references when multiple historically accurate choices were available. For example the material of the font has little effect on the content production but the shape does. Therefore it was possible to suggest a version that was both easy to create and still historically accurate even if in the reference photographs the material was not desired.

To increase the vibrancy of the interior, two wooden sculptures were added. Most likely, these would have been donated from churches nearby and thus would not be in ideal condition. Therefore it was possible to use real sculptures existing today as reference material and they did not have to be reconstructed to their original form. As two fitting sculptures were available at the Museum Centre of Turku it was decided to test out the viability of 3D scanning.

The sculptures were captured using the Artec Eva 3D scanner (www.artec3d.com). The resulting point cloud was then heavily processed with both hole-filling and point reduction algorithms and in the end finalized by hand to achieve a real time renderable version. The amount of work with this technique is less than modeling from scratch when the models in question are complex, such as human figures.

With a simple model as with more defined shapes such as furniture for example, it is much more efficient to create the models from the ground up. Most of the interior elements in the application were modeled in this manner with the help of photographic reference material.

# 6.4 Building the application

Once the models and the textures were created they were imported to Unity3D, a multiplatform gameengine (http://unity3d.com/). Unity3D takes care of real-time rendering along with the implementation of user interface and functionality. Lighting is done with pre-calculated light-maps, thus there is no real-time light calculation. The priest is implemented as a video texture with help of 3rd party plugins for mobile devices. The background in the video texture is made transparent with chroma key technology. The application is implemented for iOS and Android; an Oculus Rift PC-version is also implemented with OculusVR Integration Kit (www.oculusvr.com/). For PC-version, additional postprocessing shaders were used: blooming, screen space ambient occlusion and high dynamic range shading. Unity3D makes it possible to deploy the application to several different platforms and the application is currently deployable to iOS, Android, Windows Phone 8 and Windows devices.

Most of the software used in the content production was free and open sourced. This enabled the use of the same software without the need to fiddle around with license issues. Blender (www.blender.org/) was used as the main modeling and texturing tool with the help of Cloud Compare (www.danielgm.net/cc/) to process the 3D scanned point clouds. Inkscape (http://inkscape.org/) and Gimp (www.gimp.org/) were also used for creating the textures along with Photoshop as a commercial complement.

# 7. Challenges and solutions

One of the greatest challenges in the content production was the lack of any concrete source material. There exists no pictorial evidence of the church and even the textual sources are scarce. This left our historians and archeologists to work with only the research material from the excavations done at the site and what still was left of the samples taken at them. To counter the lack of actual reference material the project team members used other available sources - other similar sites from the era - in the end they drew conclusions about the most likely alternatives.

Another solution to the uncertainty about the actual look was to implement different views of the church. Since the ceiling is still under discussion, whether it was level or more like a barrel vault, it was made possible for the user to view both alternatives with a simple switch-button. This also conveys the idea that certain things are open to interpretation.

The lack of source material not only hindered possibilities relating to historical accuracy but also made it difficult for anyone but the historians and archaeologists, if even them, to grasp the actual look and feel of the church itself. Most importantly the artist needed to be able to share their vision but at first this proved to be difficult to enable. When this problem was identified, the project team sat down and discussed the matter thoroughly. This resulted in the sharing of information and the agreement that further communication was needed. The project team ended up passing around and discussing plans on non-finished content to constantly steer the end result towards the targeted look.

As if it had not been enough that most members of the project team did not have a clear picture of the actual target, the look and feel of the church, and the interpreted designs were under constant change due to the increasing historical knowledge. When new information came in from the research process the interior of the church would change from one design to the next. In the end the project team did what was thought to be based on the most stable information. Certain milestones were also set up when the project team would just have to go with the information available at the time and agree to have an amount of possible historical uncertainty in the design.

# 8. Conclusions and further research

In this paper the history of the Holy Ghost Church in Turku was presented together with the process of recreating historical content. Production goals, process details and technical aspects were also discussed together with challenges and presented solutions.

A key point of this paper is the challenge of recreating historical content when there is only a minimal amount of historical knowledge available. Making the interpretations of the visual look, and conveying them to the artist was a major challenge. The solution was to find reference material and approach the desired look with continuous iteration. Despite the challenges, reasonable results were achieved (Image 8.1; Image 8.2).



Image 8.1: Model

Part of the model rendered with Blender.

Image 8.2: Application



Application running on iPad.

On the development side the challenges included the changing requirements. When new historical knowledge was acquired and the interpretation changed, the development team had to make the respective changes. 3D scanning was found to be a good solution for obtaining fast results without consuming much time.

The future research could include more study on the visualization process: how to bring the visual interpretation to digital form in a fast, accurate and cost-efficient way. If the applications were to be commercialized the business models and usability aspects should be studied further.

On the technical side 3D scanning and relevant algorithms would require further research. In addition, augmented reality technologies, such as eyewear and positioning, may play a remarkable role in the future.

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# Museu do Resgate (Museum of Ransom): can everyday videos proclaim documental and patrimonial values?

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#### http://www.museudoresgate.org

Abstract: In this paper we present the project "Museu do Resgate" (Museum of Ransom), which has been developed within the PhD program in digital media at the University of Porto. Initiated in June 2012, this project's mission is to gather on a website (www.museudoresgate.org) different views on everyday local cultures, recorded on video. The main objective is to contribute to the discussion, identified in an early stage of the investigation, about a new museum concept, which seems to be growing online, the "museum of all". This is being built collectively and emerges from the proliferation of new tools for creating and sharing digital content online, used by many people to document their daily lives.

Our research project aims to contribute to the reading of the emerging concepts of "documentary". We seek to understand how digital media can contribute, through its strongly ubiquitous, social and participatory characteristics, to the inclusion of citizens in documentary practice. Consequently, we seek to understand the documental and patrimonial value of everyday videos.

The practical project was launched with the support of the City Council's cultural program "Manobras no Porto", that during 2011 and 2012, aimed at encouraging and financing projects that wanted to explore their interactions with local communities in the Historical Center of Porto.

Given the inclusive nature of our project and the importance of citizens' natural and spontaneous participation, we adopted a set of diverse research methods with exploratory and ethnographic characteristics. Therefore, in this paper, we will expose the methodological approach as well as reveal the difficulties, surprises and opportunities that we found in the course of the implemented actions.

Finally, we present a set of preliminary conclusions, explain what will be our main contribution to the research area and propose an overview on future developments.

Keywords: daily life, local cultures, documental heritage, participatory visions, audiovisual documents, Museum of All

# New ecosystem of audiovisual consumption

The research project that this paper refers to, arises from the suspicion that the concept of documental subject may be experiencing profound changes, facing the reality of the society of media consumption that has become increasingly participatory.

In fact, the participatory media<sup>1</sup> have been recognized as responsible for a large number of changes in traditional media ecosystem. The production, sharing and consumption of media content are increasingly available to anyone. In this age of 'consumer-generated content', we have been witnessing the emancipation of the passive consumer individual, who can now very easily become an active producer individual. This means the emancipation of the individual, not only in the consumption chain of media content, but also in relation to the great political, economic and social organizations. Now, this individual no longer depends on these organizations to structure his participation in society, or to communicate with other individuals.

<sup>&</sup>lt;sup>1</sup> By participatory media we mean the set of online and offline processes that have been introducing the participation feature in the ecosystem of producing, broadcasting and consuming of media contents.

After nearly a century consuming media content through a unidirectional configuration, in this new century, people are looking for alternative ways of consuming media content. During the twentieth century, people had access to cultural production through mass media such as radio and television. Today, with the internet, many people have swapped the radio with online music consuming websites, and more and more people are swapping the television with online video sharing websites, where most of the contents are user-generated. Indeed, we have been observing an increase in the amount of new audiences consuming audiovisual content on online platforms such as YouTube, instead of doing it on television, as past generations used to do (Strangelove 2011).

Unlike what happened in that medium of unidirectional structure (TV), on YouTube, most of the content that people consume are produced by individuals with a lack of academic or professional qualifications in the audiovisual area. According to Michael Strangelove (Strangelove 2011), the great abundance of spectators in YouTube is due to the user-generated feature and, among many other things, this topic has been marking the difference between YouTube and television, as a means for consuming audiovisual contents.

YouTube users make use of the more common video recording tools — from camcorders to mobile phones — and the increasingly accessible video editing tools, as 'weapons' for representation and expression. These digital tools enable the construction of a personal view, and share it with other users and members of a group or a community, something unimaginable in a medium like television. And we believe that the social stimuli of sharing, cooperation and collective action have been continually encouraging the growth of the people's willingness to engage in the media content ecosystem. It is the desire to achieve the viewer's credit or even a viral fame on the Internet, which continues to promote the production and sharing of audiovisual content on platforms such as YouTube.

# The audiovisual documentation of daily life as heritage

Among the wide variety of types and categories of amateur videos that can be found on YouTube, we want to focus our argument on those, which, in one way or another, can contribute to documenting the everyday life of local cultures. The subject can be personal, family, a group, a community or a population. Some of these videos work even as unique views of events, which otherwise would not have such instantaneous and factual cover. Despite being unstructured and dispersed on platforms like YouTube, these documents present the potential to contribute significantly to the preservation of an intangible cultural heritage of societies.

The recordings of cultural heritage of groups, communities and civilizations have been a major area of interest to linguists, anthropologists, ethnologists and sociologists since the early nineteenth century. Several investigators, armed with new skills, tools and practices have been recording habits, traditions and cultural expressions endangered, over almost two centuries. In the early twentieth century, the international agency UNESCO adopted a convention (UNESCO 2003), concerning the safeguarding of intangible cultural heritage. However, this convention has raised a discussion among several scholars from anthropology and sociology. Some argue that it was a victory for anthropology, since this was the first time there was an explicit concern with the intangible heritage of local cultures in an official document produced by an international agency. Others argue that this convention only came to confirm a political vision on this theme, filled with a great contradiction. It seems to adopt a globalized vision in relation to the concept of cultural heritage. Manuel João Ramos, a Portuguese anthropologist, suggests that it is a "mental colonization of a variety of cultures in a way that contradicts the intention of preserving cultural diversity" (TSF 2009).<sup>2</sup>

According to what is described by UNESCO in its convention (UNESCO 2003), intangible heritage is something alive, dynamic, and constantly changing. Therefore, its protection, preservation and consequent "crystallization" is something that in certain situations may not make any sense. Take the case of traditions with which local communities have no longer any connection or identification, or where procedures and work techniques became obsolete facing the technological evolution, or the case of the establishment of new rigid spelling rules that can endanger the natural evolution of a language.

Therefore we believe that, given its diversity and uniqueness, we cannot pretend to describe a particular local culture through globalizing processes, provided with a single homogenized perspective,

<sup>&</sup>lt;sup>2</sup> Translated by the author of this paper from Portuguese to English. The original quote in Portuguese is: "colonização mental de uma série de culturas que, de certa maneira, contradiz a intenção preservadora da diversidade cultural".

which will only contribute to a cultural uniformity. We must not apply the methods of classification of material heritage to examples of intangible heritage. In fact, the process of safeguarding intangible cultural heritage has been delegated to officially recognized organizations, such as the research centers in anthropology and sociology (linked to universities) and museums, which have the mission to document, collect, preserve and present representative elements of the expressiveness of local culture. The judgment on what kind of and which objects or subjects may have heritage value has been the responsibility of an elected set of experts. They have been the ones who decide what is or is not provided with patrimonial vocation.

However, if culture is something that concerns the individuals, members of a group, a community, a population or a civilization, as stated in the convention, who better than these individuals to decide themselves what should or should not be preserve in their own culture? More important than deciding what should be preserved and how it should be preserved, is to include citizens in the decision making process. We believe that by engaging citizens in this process, making it participatory, we will strengthen the social fabric, the values of citizenship and the very authenticity of what is preserved. Above all, we will be then safeguarding the whole process against confinement to political, commercial and/or tourism interests.

Thus, in our research we question what may be the contribution of participatory media in this process of recognition of heritage value. In other words, how can the participatory media contribute to the inclusion of citizens in documentary practice and thus make that the safeguarding of intangible cultural heritage a collective action, ceasing to be allocated only to official institutions? In this context, what can be the role of audiovisual amateur recordings of everyday lives? What is their heritage value?

If we look again at what is going on YouTube, we realize that people are instinctively contributing to a documentary recording of certain aspects of their culture, or how they see the world. Although scattered and unstructured, these recordings seem to be part of an audiovisual archive of everyday life. This archive, if gathered, structured and interpreted, may resemble a kind of living museum, built collectively, not only by those who visit and use it, but also by all those who actively contribute to it. We believe that our research project may contribute to the discussion about the concept of a 'museum of all' through its practical project, the "Museu do Resgate" (Museum of Ransom), opened in 2012.

#### The work phases and their methodology

The research project within which was developed the Museum of Ransom, began long before 2012. In fact, for a better understanding of the research methods that we used, it is important to understand the five phases of the research project.

The first phase, developed under the Masters degree (Brandão 2008) served as the starting point for all further research work. In 2008, we developed a set of four exploratory exercises involving the Serralves Foundation in Porto and its Museum of Contemporary Art. These exercises aimed at understanding the results of the participation of the museum's visitors in the construction, reconstruction and deconstruction of their own institutional identity, using video as a tool.

In a second phase, already under the PhD degree, there was the need to deepen the approach to the concept of participatory museum, or, more precisely, the 'museum of all'. After surveying a set of hypotheses of territories to continue the work and after reformulating the initial questions, we realized the need to distance ourselves from the traditional territory of the institutions. Then the Manobras no Porto, a cultural intervention program centered on the geographic territory of the Historical Center of Porto, emerged as a good opportunity to start a project where we could test our assumptions and seek answers to our research questions. So, the main objective was to build a collective audiovisual repertoire. The mission of Manobras no Porto was to involve citizens in the construction of their own cultural activities and thus, identities. This mission of inclusion was the major reason that reinforced the suitability of this program as a territory to develop our case study.

It is important to mention that we realized early on that the methodological approach best suited to the objectives of our research, that needed be taken from this phase onwards, was the action-research model or auscultate-propose. This is an approach within which, after a phase of exploratory and empirical work of observation and data collection, we would present practical exercises that explore contexts of participation and collaboration.

Consequently, in the second phase of this research, in 2011, we developed a preliminary and exploratory work where we studied the subject and its territory of action, the program Manobras no Porto. It was then that we adopted an intuitive methodology, which involved the use of participant

observation during the Manobras no Porto activities, the implementation of a set of exploratory interviews to various cultural activists of Porto and others involved with the program, and the development of short participatory audiovisual exercises. This phase allowed the testing of some experiments, and also the reading of the potential feedback that people can give when they are asked to express their own views on their street or town.

At the beginning of the year 2012, after the identification and characterization of the territory of action, the opportunity arose to propose a practical project that could pronounce our research intentions and test the hypotheses. In June of the same year we launched the project Museum of Ransom, a website with the aim of bringing together the recordings of everyday at the Historical Center of Porto, conducted by its inhabitants, visitors and people who work there. Recordings made without aesthetic challenges that could be conducted using any type of equipment that create video. Recordings made by anyone with any talent for video making.



Image 1: Submission form at the Museum of Ransom website.

Image 2: Grid of rescued videos at the Museum of Ransom website.



Print screens from the Museum of Ransom website.

The third phase of the research was, mostly, about the construction of the website, to the aggregation of all the collected videos. This website is divided into three areas: an area where the user can get to know more about the project and its mission, an area asking for contributions via a submission form (image 1), and a third area where the user can access all rescued videos (image 2). In this phase, we designed a visual and communication strategy, where we opted to adopt very direct, honest and simple language, as we believed that the project should be understood easily.

During the construction of the website, we also started the fourth phase of work, the main objective - through direct contact with the people of the historical center of Porto – was to communicate the project, recruit regular contributors and present results. We collected videos that were already made, house by house, and planned weekly recording sessions, which we called 'raids' (image 3). Participants, mainly from outside the historical center of Porto, were invited to submit their views through pathways or oriented by a set of previously announced topics of interest. The outcomes were presented through video projection at local establishments such as pubs, cafes and restaurants and also in debate sessions, included in the program of Manobras no Porto.

For the logistical support in the fieldwork and the programming and implementation of the website, two people were recruited. All the actions taken were documented in photographs and videos. And all the episodes, conversations and contacts that we made with people involved in the project were recorded in a field diary. These techniques allowed the entire work process and its results to be subject to regular review throughout the development of the project. Thus, some of the initial expectations had to be reshaped and adapted to the surprises, obstacles, difficulties and opportunities that were being found.



Image 3: Video raid at a local barber shop.

Mr Adão filming at Mr Agostinho's barber shop.

In the fifth phase of the research project, already underway, we intend to expand the Museum of Ransom to other sites, territories and contexts. We have already developed a workshop during the digital media festival "futureplaces"<sup>3</sup> as well as partnerships with other academic projects: one on the theme of Porto's gastronomy, another one on the memories of one street in a small town at north of

<sup>&</sup>lt;sup>3</sup> The "futureplaces" website can be consulted online at: http://www.futureplaces.org.

Porto and another one on the assemblage of the audiovisual repertoire of the bands and musicians who rehearse in the old shopping center STOP, also in Porto.

### **Conclusions and future work**

This last phase of the project will also involve the restructuring of the website, which will include a set of recommendations on how to implement a new 'Ransom'. The user, or visitor of this 'metaphorical museum', will be able to contribute with his own videos, provide new interpretations of the existing archive (through the assembly of new audiovisual narratives), and even submit proposals for curating new application contexts for the project. So what was developed in the historical center of Porto will thus be one of many possible applications of the ideology and actions of the Museum of Ransom. It is thus our intention to open the project to new uses and interpretations, in order to contribute to the development of a critical awareness of the importance of the documenting process in the creation of a collective visual memory of local cultures, and of the heritage potential of everyday amateur audiovisual recordings.

#### Acknowledgements

This project is currently developed under the flagship of the PhD in Digital Media at the University of Porto, as part of the UT Austin-Portugal program for Digital Media, in the research institute ID+ and in futureplaces media lab for citizenship, coordinated by Heitor Alvelos.

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# Museum without walls: a digital site-specific museum in São Miguel das Missões

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http://www.karolinaziulkoski.com/Museum-Wlthout-Walls

Abstract: Museum Without Walls is a model for site-specific museums. It provides immersive experiences with no physical interventions: the content is all digital and triggered on site only, bringing information and meaning to historical sites.

Keywords: augmented reality, projection mapping, digital museum, transmedia storytelling

# The project

Must museums have rooms and walls? From this question came the concept of "Museum Without Walls", a model for heritage areas. The museum exists entirely in the digital realm, and is experienced on site only. History is told in parts using different technologies - each tells the tale most suitable to its characteristics. For this proposal the case study is São Miguel das Missões, Brazil, a former Jesuit mission, and the chosen media are video mapping and Augmented Reality. The daily projection serves as a collective night time experience that depicts the epic final battle of the mission. The Augmented Reality application allows for deeper individual exploration, intimately displaying daily life in the mission.

# Research

"Exhibits not only provide an opportunity for visitors to look but to think, to explore, to wonder, and to investigate" (Olofsson 1979, p.166). This project aims at educating the visitors of São Miguel das Missões about life in the mission, how it was during the pinnacle of the reduction and what led to its demise. Moreover, its goal is to do so through methods that are fun and engaging.

Based on Levi-Strauss's magical thought, visitors learn by context, association and previous experiences, as opposed to a formal education model (quoted in Graburn p.179). Indeed, for Falk and Dierking, the museum visit is an interchange between three contexts: personal, social and physical – visitors continuously create each context, and the interaction among these result in their experience (1992, p.2). Research "suggests that the experience of exhibits is fundamentally produced in social interaction between visitors" (Lehn p.1353). Most people choose to visit a museum in groups, so a large part of their attention is devoted to their social peers (Falk and Dierking 1992, p.41). Interaction among a group, and even with other visitors, shapes the way in which people understand an exhibition. Social interactions play such a large role in a museum visit that they are rarely forgotten, and, sometimes, they are the most recalled factor many years after the exhibition experience (Falk and Dierking 1992, p.54). A museum experience is shaped by the social context – interpretation and learning outcomes are very much the results of a group outcome (Falk and Dierking 1992, p.54).

This research informed the products chosen to compose the case study for Museum Without Walls, as well as visitor's behavior and current events on site. An existing daily light and sound show has been showcased for thirty years and features notable actors, such as Fernanda Montenegro, the only Brazilian to have been nominated for an acting Oscar. Therefore, it is reasonable to renew the spectacle and incorporate it as one of the museum's features. The show is already known by visitors as something they should attend to during their visit, and is a highly social and communal experience. However, at their visit to the site during daytime, there's no aid. School groups have guides, but everyone else is essentially alone and there's no information, or even labels. This provides an opportunity for a second component for the museum. Considering the literature review above, and site observation which points to the fact that the audiences visit the site in small groups, there should be a product to allow for education about the mission in a fun way, and in a way that connects to the intimate context of these small group visits. People already have highly technological devices, such as smartphones. To use the visitor's own device is not only more practical, but also reduces costs and gives the visitors themselves more freedom - it's their device, they can use it at their own discretion.

The technology chosen to be used in a mobile and tablet application for use in site is Augmented Reality. According to Kipper and Rampolla "Augmented Reality is taking digital or computer generated information, whether it be images, audio, video, and touch or haptic sensations and overlaying them in a real-time environment" (2012, p.1). Essentially, it allows the user to see the real world in their screen with the computer generated content on top of it. In this particular case, it can provide a view of how the mission was before becoming a ruin. The Augmented Reality technology is attached to a context: it works by providing an image it recognizes or through GPS coordinates. So the application will only deliver content when inside the site, serving as an aid and not an alternative to a visit to the place. Although mobiles and tablets are being used more and more as tools for individualization, many applications can be used in groups. Parents use smartphones with their children. One tablet can serve an entire group at the same time in many museums' educational programs. As long as the application is built with interaction between small groups of people in mind, it is absolutely feasible for groups of up to four people to share it, making it a social experience.

# Audience

"People are the only reason for museums to exist" (Dean 1996, p.19). Defining who those people are for a given exhibition is a key factor. For this project, the targeted public represents a very broad group - men and women of all ages. Three groups are recurring visitors: school classes, elderly visitors and couples, with or without kids.

# User scenario

During the day, visitors use their smartphones to visit the site at their own pace, with freedom to choose between the Augmented Reality visit and the audio guides. It can be shared in a small group, so there is no need for each person to have their own device. The application is meant for use on site only - if users delete it later, it's not an issue. At night, they may come back to the site - or just remain - for the projection mapping show.

#### Implementation

With the products that comprise the museum already settled - the existing light and sound show and the idea of an Augmented Reality application - the project developed in a very straightforward way. For the light and sound show the best option available was projection mapping. This technique turns objects into display surfaces for video projection by spatially mapping them. It allows for the use of the existing script and sound narrative, updating them with visuals by using the church ruins as a canvas. The most important issue here is content. The majority of projection mapping events around the world - developed so far - display only visuals with no narrative. For this project, the process happened in the reverse order: the sound narrative guided the visuals, complementing them and delivering meaning. The 45-minute script tells the history of the epic battle which led to the end of the mission. It is dense, abstract and very theatrical. Therefore, the visuals do not need to be literal and there is artistic freedom. For this technique, its limitation is also its biggest strength: the manipulation of architecture generating optical illusions. In a long narrative such as the one presented here, there are moments in which the manipulation of architecture fits perfectly; at others, however, architecture has to be completely dismissed.

The spectacle was produced and performed in a small scale acrylic laser cut model and documented, as pictured below, using the MadMapper software and a small projector. The storyboard displays key moments in the show:

Image 1: Storyboard 1



16:09-eyes running, beauty revealed

16:25-free your eyes from r

Source(s): Author



#### Image 2: Storyboard 2



25:02 - "see what my hands did"

26:05 - bell tolls

Source(s): Author





Source(s): Author

Image 4: Projectors and lenses for permanent placement on site



Source(s): Author

The application development started with research about Augmented Reality providers. The chosen platform was Metaio, since its functionalities are the most suitable to the project. Using GPS

coordinates, it displays the original settlement with an accompanying narration explaining the daily life at the mission. The projection mapping event deals with an epic story and is a spectacle designed for a large audience. In contrast to this, the application is designed for small groups with small devices owned by themselves and allows for a more intimate approach, suitable for chronicles of everyday life. For the content, interviews were conducted with Prof. Nadir Daminani, head of the Center for Missionary Culture at URI, the local university. AR is a powerful tool, but one of its limitations is that it cannot support complex 3D models. However, there are considerable investments being made in this technology, which should improve this situation in a short time.

This is the first part of the application. There is another one, which displays interesting stories from the community. For this, interviews were conducted with local people. The stories they shared were incredible. However, early on, there was a preoccupation regarding how to deliver these narratives, as not everyone is a great storyteller. So the decision was made to produce these stories with actors and sound effects in audio only, so that visitors feel they are being guided through the site, as if the story being told is actually happening around them.

The user experience design of the application is very simple: the first screen offers the option to choose between the audio guides or the Augmented Reality visit. The design is done entirely with illustrations. The color palette displays earthy tones, and the use of textures in unusual places - like the use of a fabric pattern as hair - deliberately steers away from a children's illustration, although they are not completely unappealing to them, as children are a significant part of the audience as well. The application is fully functioning for iOS 6 and up.



Image 5: Application Flow and Design 1

Source(s): Author





Source(s): Author

# Image 7: Application Flow and Design 3



Source(s): Author

#### Image 8: Application Flow and Design 4



Source(s): Author

All of the design components from both projection mapping and the application are thought to be complementary and consistent, so that the audience understands they are part of a single project. These include illustrations, colours, textures, discourse tone and style, and video visuals.

#### Conclusions

This proposal represents new possibilities for museums inside historical sites – it is a model adaptable to the stories each place might have, allowing visitors to learn the history of a place without needing to visit a site and then a museum about the site. More than a technology, it is a concept. Technology can be replaced at any time; what is relevant is the way content is being delivered without interventions.

But most importantly, this project represents a concept of a museum without physical boundaries. Instead of having small objects inside glass boxes, the contents of the museum are stories heard within their original contexts. Visitors are free to move within the site and visit it in their own pace. This project was developed through the lens of the visitor experience and through an analysis of how audiences behave in an exhibition setting, resulting in a museum that will enhance their experience.

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# Tacit record: augmented documentation methods to access traditional blacksmith skills

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Abstract: Traditional craftsmanship is a specified domain in UNESCO's Convention for the Safeguarding of the Intangible Cultural Heritage (2003). During 19<sup>th</sup> and 20<sup>th</sup> centuries, museums and archives in the western world have been collecting a considerable amount of artefacts and producing records of trades, workshops and manual procedures referring to threatened traditional crafts. What potential value is embedded in the records on traditional crafts? To whom and for what purpose may this documented heritage be of interest or have value? We find these questions critical to the subject of museology and to general safeguarding strategies of intangible cultural heritage. How can we develop augmented documentation methods and displays of traditional craftsmanship?

This paper critically investigates film making of traditional craftsmanship, and experimental methods as an appropriate way to elicit tacit dimensions and multisensory aspects of craft skills. The text is grounded on a case study of a documentary from early 1970's, recording two old blacksmiths making a wrought iron scythe. This documentary has generated several research questions: How instructive is this documentary as a learning resource for blacksmiths today? What meaningful information dwells in the colour and sound of the work process? How does the discontinuity of the edited film effect the intelligibility of the process in action?

The tacit dimension of craftsmanship has been investigated in philosophical and pedagogical research (Gamble 2002; Mayer 2003; Polanyi 1958; Schön 1983, 1987), management and organisation theory (Agyris 2003; Kolb 1984), and recently in the emerging field of craft research (Adamson 2010; Niedderer 2009). However, the peripheral focus on documentation methodology to elicit the tacit dimensions of traditional craftsmanship is not extensively examined. Peer research to this study is performed at The Art and Design Research Centre (ADRC) at Sheffield Hallam University (e.g. Hjort-Lassen & Wood 2013; McCullough 1997; Wood 2006; Wood, Rust & Horne 2009) and the Craft Laboratory at the university of Gothenburg (e.g. Almevik 2012; Jarefjäll & Sjömar 2011; Karlsson 2013) exploring the use of film record and time-geography in the documentation and display of craftsmanship.

The documentary is scrutinized through a time-space path and a procedure analysis. Setting out from the data and interpretation of the film record, the craft procedure has been re-enacted by the authors. The re-enactment gives a critical reference to the documentary, exposing discontinuities, lacunas, misinterpretations and hideouts of tacit blacksmith knowledge. Core problems in understanding skills and judgements made by the old blacksmiths relate to qualities lacking in the documentary concerning colour and authentic timeline. One sub-experiment concerning the judgment of colour in the process of hardening and welding is conducted through visual and IR measurement.

The general outcome of this investigation, concluded at the end of this article, contributes to a documentation methodology for heritage craft skills. We present a set of craft protocols along with a critical discussion on documentation practice to meet the agenda of "living" cultural heritage. The conclusion, with respect to museum collections and exhibitions, is that crafts people need to become involved in the work in heritage institutions, not only as objects or informants but also as work-companions and agents of generic knowledge.

Keywords: Documentation, traditional craftsmanship, blacksmith, tacit knowledge, time-space geography, craft protocol, process analysis, re-enactment, craft science

"Das Programm der Aufklärung ist die Entzauberung der Welt"<sup>1</sup>

(Theodor W. Adorno 1947)

# Introduction

Traditional craftsmanship is a specified domain in UNESCO's Convention for the Safeguarding of the Intangible Cultural Heritage (2003). During 19<sup>th</sup> and 20<sup>th</sup> centuries, museums and archives in the western world have been collecting a considerable amount of artefacts and producing records of trades, workshops and manual procedures referring to threatened traditional crafts. What potential value is embedded in the records on traditional crafts? To whom and for what purpose may this documented heritage be of interest or have value? We find these questions critical to the subject of museology and to general safeguarding strategies of intangible cultural heritage. How can we develop augmented documentation methods and displays of traditional craftsmanship?

This paper critically investigates film making of traditional craftsmanship, and experimental methods as an appropriate way to elicit tacit dimensions and multisensory aspects of craft skills. The text is grounded on a case study of a documentary from early 1970's, recording two old blacksmiths making a wrought iron scythe. This documentary has generated several research questions: How instructive is this documentary as a learning resource for blacksmiths today? What meaningful information dwells in the colour and sound of the work process? How does the discontinuity of the edited film effect the intelligibility of the process in action?

The documentary is scrutinized through a time-space path and a procedure analysis. Setting out from the data and interpretation of the film record, the craft procedure has been re-enacted by the authors. The re-enactment gives a critical reference to the documentary, exposing discontinuities, lacunas, misinterpretations and hideouts of tacit blacksmith knowledge. Core problems in understanding skills and judgements made by the old blacksmiths relate to qualities lacking in the documentary concerning colour and authentic timeline. One sub-experiment concerning the judgment of colour in the process of hardening and welding is conducted through visual and IR measurement.

The investigation shows that the producers and editors of the film do not fully understand the state-ofthe-art in craftsmanship. The documentary gives the impression of going deep into the knowledge of making a wrought iron scythe. However essential information related to the craft is absent. It will be exposed in the forthcoming presentation that the old blacksmiths do not carry on a functional tradition, but rather expose a break in the tradition of craftsmanship. The wrought scythes that are made in the film do not have the essential qualities to be used as scythes. A dysfunctional broken craft tradition is presented as traditional heritage.

The general outcome of this investigation, concluded at the end of this article, contributes to a documentation methodology for heritage craft skills. We present a set of craft protocols along with a critical discussion on documentation practice to meet the agenda of "living" cultural heritage. The conclusion, with respect to museum collections and exhibitions, is that crafts people need to become involved in the work in heritage institutions, not only as objects or informants but also as work-companions and agents of generic knowledge.



Fig. 1. Photograph from the smithy.

# State of the art and beyond

The tacit dimension of craftsmanship has been investigated in philosophical and pedagogical research (Gamble 2002; Mayer 2003; Polanyi 1958; Schön 1983, 1987), management and organisation theory (Agyris 2003; Kolb 1984), and recently in the emerging field of craft research (Adamson 2010; Niedderer 2009). However, the peripheral focus on documentation methodology to elicit the tacit dimensions of traditional craftsmanship, beyond conceptual framing, is not yet extensively examined.

The achievements from the early digital museum projects in the 1990's to contemporary cyber museology are radical and successful in giving virtual access to exhibitions and stored cultural objects as well as archival records. Furthermore, developments in digital museology have opened up the museums to new audiences and learning situations (see Davis 2004; Langlais 2001), and have recently provided new methods for participatory production, heritage design and "co-curating" of history (Atkinson 2011; Allen & Lupo 2012; Stappers 2006). New approaches in virtual learning environment (VLE) and computational biomechanics in comparable craft-like fields such as
physiotherapy, surgery and sport science are exploring augmented documentation methods (e.g. Holmberg 2008). The use of animations and virtual settings such as VR cubes or measurement-driven body models may capture performances and make the representation mobile and transferable, both to parties not present and to future generations.

Nevertheless, these precise representations do not automatically reveal judgments grounded on knowledge in action. Concerning craftsmanship, the substantive contributions in investigating working procedures are rather found in the crafter and maker communities, the so-called Do-It-Yourself movement (DIY). Illustrative examples include Inger Degerfeldt's crafts dictionary with instructional videos and student portfolio database "@tt slöjda" (http://www.slojd.nu) and, relating to this paper, Jock Dempsey's interactive demonstrations of traditional blacksmith techniques "iForge" (http://anvilfire.com).

There are research environments that resonate with the aim and approach of the study presented in this paper. The Art and Design Research Centre (ADRC) at Sheffield Hallam University have focused on suitable methods to reveal and make explicit tacit craft knowledge embedded within the experiential processes of creative craft production. Nicola Wood is a leading researcher, bringing a design approach to the problem of capturing and passing on the skilled knowledge of expert craft practitioners (Wood 2006). She has worked closely with craftspersons in the mission to understand how craft skills may be elicited and embodied in learning resources, aiming at bridging the knowledge gap between novice and master (Wood, N, Rust, C & Horne G 2009; Hjort-Lassen & Wood 2013). Simultaneously facing the dual problems of what is to be learnt and how it will be learnt, she has revealed how master craftsmen do not consistently teach and instruct, as they do themselves in action.

Another research environment that has contributed to the methodological development of craft documentation is the cluster at Norwegian University of Technology and Science (NTNU), cooperating with Sør-Trøndelag University College (HiST), the agency for Norwegian Craft Development (NHU). Harald Bentz Høgseth at NTNU pinpoints methodological issues in relation to the interpretation of craftsmanship (Høgseth 2007). His research is located in the fields of archaeology and building history, and he is trying to understand craftsmanship knowledge and skill by interpreting the physical traces of the historic craft action. The documentation methodology is directed both at the performance and the end product, combining 3D modeling of objects and notation systems of bodily performance.

The Craft laboratory at the University of Gothenburg is a research cluster for experimental research in the field of traditional craftsmanship. The Craft Laboratory has developed methods for self-observation by elaborated craft protocols, film records and visual graphs to elicit the multisensory and performative aspects of craft (Sjömar 2011, 2013; Almevik 2012; Börjesson 2013). Several integrated doctoral projects have a methodological perspective on documentation, seeking to explore the generative aspects and tacit dimensions of procedural knowledge in crafts (Karlsson 2012; Renmælmo 2009). This study directly relates to Patrik Jarefjäll's research, exploring traditional blacksmith procedures using time-space geography, process analysis and self-reflected re-enactments (Jarefjäll & Sjömar 2011).

#### The case: Documentary of traditional scythe blacksmith

The regional museum in Västerbotten has produced artistically refined records of traditional crafts, cultural environments and livelihood through the film media. The majority of the 60 films from the museum are made either by Sune Jonsson (1930-2008) or Rickard Tegström (1909–1981). Jonsson's documentaries and photography won him the International Hasselblad Prize 1993. Tenström's internationally recognized documentary "Rajd" (1945) captures Sami reindeer livestock. During the latter half of the 19<sup>th</sup> century he made several records of traditional crafts with ethnological assistance by Katarina Ågren, including deep studies of craft procedures and workshops by basket makers and blacksmiths.

In the film "Liesmide" [wrought scythe] Tegström and Ågren display the work of two brothers, Helmer and Bengt Lundgren in Hötjärn, Lövånger, in the region of Västerbotten. The film dates to 1971 and the fieldwork is carried out during two days in total. The film is 18 minutes long with faded colour and no sound from the actual environment. The applied speaker presents information of the visualised operation and comments on the blacksmith's terminology for tools, procedures and parts of the scythe. The film starts when the two brothers, who have learned the craft of wrought iron scythes from their father, enter the old smithy and start to prepare the iron. The timeline follows the procedure step-by-

step from cutting up the iron, forming the scythe, and welding and hardening the steel. In the final scenes the brothers show off the final scythe.

What potential value is embedded in this documentary of traditional blacksmith crafts? What is the purpose of this documented heritage? Who is it of interest or value to? By what methods could a documentary of a craft procedure be analysed?



Fig. 2. Terminology from the documentary "Liesmide" by Rickard Tegström.

#### Time-space geography of the documentary "Liesmide"

Our investigation starts with an analysis of the documentary using time-space geography, a method originating in cultural geography. One objective is to test time-space geography as an analytical tool. Beyond this methodological interest, we stress how the discontinuity and the audio-visual information in the documentary are manipulated in the filmmaking and the editorial interventions. The methodology of time-space geography focuses on the movement of an individual, or the so-called individual's time-space path, correlated in a temporal-spatial environment and visualised in a graphic template. The analysis in this case results in a protocol about the film that is not to be mixed up with the actual craft process. This protocol serves as an interpretation tool as well as comparative material to the procedural reconstruction of the actual craft.

The analysis pinpoints discontinuity in the time-space path. We have counted 151 clips, reducing two days of film shooting to 18 minutes and 17 seconds including text-based meta information and environment panoramas. The average frequency of clips is 7.3 seconds. This is an average for Tegström's documentaries in general, and also praxis for the 1960's Hollywood school where he was trained (Jordan E. DeLong et al. 2012).

Time-space geography was developed by Torsten Hägerstrand (2009, 2000, 1991), originally to serve geographical diffusion studies of the migration and spread of new technologies. The method has been modified to the nature of our empirical material and objective.

1. The time-space path is the timeline of the documentary.

2. The space is the visual appearance of space displayed by the film.

Defining concepts of space for a blacksmith is unconventional in relation to how the methodology is commonly used in geography. Spaces like 'outside' or 'interior of the smithy', and locations such as 'the forge' or 'the anvil' are easily distinguishable spaces.





The fast movements of a blacksmith between short-range distances on the anvil - from the horn, to the face, to the heel - or by tools temporarily added to the anvil, "re-space" this micro-environment like swages (or 'bending tools').

The time-space geography exposes lapses in the documentary. The film does not make it clear how many scythes are produced during the film shooting. In general the film follows one scythe, but we see, for instance, three inlay pieces of steel being cut up. At the end of the film two scythes are displayed. Whether there is one scythe in operation or a series edited in one timeline (or the same clip looped to fill a sound-gap for the speaker) is of vital importance for the interpretation of craftsmanship. It is for instance not possible to repeat the final operation of hardening the steel in water that is done in the film. The scythe would crack. We assume, they start off with material for three scythes, one is

discarded, and one is preferred to show off. The filmmakers edit clips working with the different scythes serving for a record of the general procedure.

#### Interpretation of the filmed blacksmith process

The second type of protocol is a conventional process analysis, often associated with industrial production and the application of the measurement-time-method (MTM) for industrial efficiency. The process analysis is an intelligible type of protocol, however, in relation to craftsmanship it may be deviously instructive. The linearly sequenced procedures are, what Michael Polanyi refers to as *maxims*, i.e. rules of the art that may serve as a guide if integrated in the practical knowledge (Polanyi 1958, pp.49-50). The maxims are representations, not to be confused with the actual craft knowledge. The process analysis visualises what could be interpreted as an ended knowledge system (Senneth 2008), but the master craft knowledge is very complex, and rather an open-ended knowledge system (Giunta E., Lupo E. & Trocchianesi R. 2011).

- The process may be defined as an action that contains sequenced procedures, aiming at transforming raw material to a distinguished product. In this case the transformation of a piece of iron into a scythe, by a sequence of blacksmith procedures.
- The procedures have distinguished causal goal-mean relations. However, it is not possible to fully control the craft situation, and therefore the quality of the result is not predetermined by standard procedures. The craft knowledge involves the continuous feedback and corrections of procedures. Craft depends on, as David Pye claims, "the judgment, dexterity and care which the maker exercises as he works" (2008, p.4).
- *The moments* snapped from the craft actions may uncover the judgments, dexterity and care contained within the procedures.

In the specific case of the smithery in Tegström's documentary, we have identified central procedures and snapped core moments within the process, with critical comments on material, tools and working methods. This protocol is useful to interpret and prepare for the re-enactment, giving a hypothesis of the actual procedure represented in the documentary.

The film shows in all, 20 procedures within the smithing process from raw material to the made scythe. There are general procedures in blacksmith crafts, like hardening and annealing. There are also specific procedures in scythe making, like the banding of the blade by a concave swage tool. The smith hits the banding obliquely against the neck, making a ridge that preserves the form of the blade while attenuating to the chine. In the moments of actions, variants in performance are exposed, like the use of a snowball in the procedure of annealing the steel.

Judging by the action related to the visible result, the performance is dysfunctional. The blacksmiths in the film work the material very hard - stretching, bending and wielding the scythe - sometimes in too high a temperature, where a considerable amount of steel is burnt off. This is visible by the many sparks of iron around the matter. Thus the work is carried out in cold iron many times. It is not appropriate in this procedure in the craft of blacksmith. The steel in the welding does not always seem to have been fused. The surface looks oxidised and the texture porous with notably enlarged grain (in the material structure). There are visible cracks in the blade close to the tang and to the snat. The scythes presented at the end of the film do not have the required qualities to be used for haymaking.

STEP	MOMENT	LOGG	PROCEDURE	INFORMATION		
1		01:30	Klyver stålet	Klyver 0-stål till liens egg med varmmejsel i tre lika delar.		
2		02:40	Kapar stålet	Kapar ståltenar från 0-stålämnet - längd ett kvarter = 15cm		
3	×2	03:30	Räcker stålet	Stålets längd sträcker sig längs hela eggen, och en bit in på låret.		
4		03:35	Mäter upp järnet	Plattjärnets längd mäts med 0-stål som mall/1+1 kvarter = 30cm		
5		03:49	Kapar järnet	Kapar järnet kallt med varmmejsel. Bockar och bryter av.		
6		04:12	Tunnar ut järnet	Tunnar ut ena sidan av halva järnets bredd & 0-stålets längd.		
7		04:46	Bockar järnet	Förbockar järnet i mitten med hammarens pen. Många värmningar/dålig kontroll?		
8		06:44	Lägger i stål	lläggning av 0-stål, kallt		
9		07:04	Packning	Stål och järn packas samman med hammare & slägga		
10		09:00	Väller-räcker	Förväller stål & järnämne, vidare välls ämnena samman. 9:15 mitten av järnet, 9:24 toppen, 9:33 mitten		
(11)		09:50	Vällning/räckning	Väller toppen med för hög välltemperatur, mellan 09:50-57 brinner stålet i vällämnet, 10:16-24 räcks vällämnets bakände/lår/tjuet		
12	×.	10:24	Kapning av vällämnet	Kapar kallt med varmmejsel & bryter av vällämnet från plattjärn. 10:24-10:37 syns en tydlig tvärgående spricka, pga. för hög välltemperatur,		
13	K	10:52	Räckning	ca 15 cm fran den avkapade anden-tjuet/laret. Räcker tjuet/ låret. 10:48, 10:55 noterar välltemperaturspricka		
14		11:07	Formning	Formar brom/låstappen kontrollerar tjockleken på låret kontinuerligt med fast tolkmått.		
15		12:07	Kälning	Med kälsätt & slägga smids en ränna längs hela lieämnet som bildar övergång mellan rygg & blad. 12:12 från varmt till kallt, 12:33 varmt igen		
16		13:19	Bockar och riktar	Bockar övergång/böjen mellan liebladet & fästet/låret		
17		14:10	Bockar och riktar	Bockar bromen/låstappen		
18		14:36	Formar liebladet	Tunnar ut bladet kallt, smider med hammarens ban och pen om vartannat		
19		15:15	Formning -pening	Formar en fördjupning med hammarens pen över sänke som ger förstärkning för liebladet		
20		15:37	Stämplar lieblad	Stämplar lie två gånger, det är sannolikt två olika liar?		
21)		15:46	Härdning	Värmer det färdigsmidda liebladet & söker härdtemperatur. Släcker i vattenkar. Härdar och släcker två gånger i sammanhängande följd. Det är cappolitt fråga om två glika lice		
22		16:42	Anlöpning	Liebladet väms upp för anlöpningen, temperaturen kontrolleras med snöboll så den inte blir för hög & härdningen går ur helt. 16:43 syns ett annat lieblad där glödskal/oxider skrubbas bort med tegelsten & får fram den blanka metallytan för att se & följa anlöpningsfärgens skiftningar.		

Fig. 4. Process analysis. Photographs from Tegström 1971.



Fig. 5. Example of overheating of the steel when welding, creating massiv oxidation causing fissures later in the forging process (see arrows). Photographs from Tegström 1971.

#### **Plasticine modeling**

The information in the documentary did not answer two crucial questions for guidance of the reconstruction: What steel quality and measures of the raw material were used? Steel quality, weight or measures affects both the procedure and the final form and measurements of the scythe.

The measure to start with is important. In the documentary, the smiths use relative measurements and templates that we can only make assumptions of. To test the relation between the form of the raw material and the scythe, a plastic model was made. This is a traditional method in forging, presented as early as 1927 (Metzger 1927). The modelling has a two-folded function. Firstly, to prepare and practice the forging process, obtaining a pre-understanding of the form as well as the procedures. Secondly, the plastic model serves to test the relation between the volume of raw material and the measurements of the scythe.

The raw material is normally reduced during the process of making a scythe; the steel is heated over 200 times. This factor is skill dependent. The material will spark away if over-heated and over-worked, but various types of steel burn off differently. The speaker in the film refers to "zero-steel" which is not a conventional specification. It might be a misunderstanding or a personal or local term. We assume it was an iron of traditional quality with carbon 0.6-0.7%, common during the 19th and early 20th centuries. To imitate the characteristics of low alloye carbon steel. (SS 1770) was used.



Fig. 6. Plasticine modelling

#### Reconstruction

The reconstruction of the process has been carried out by Patrik Jarefjäll and Otto Samuelsson, both blacksmiths and craft readers. The aim is to expose and test the information presented in the documentary. What information is guiding the forging process? What information-gaps are necessary to fill in?

Skill is an issue of trustworthiness in the reconstruction. Skill is a vital ingredient in the investigating method: to reflect in action and over action. The team possesses profound blacksmith skills and can relate to forging praxis and living traditions in the category of wrought sharp-edged tools. However, they do not have extensive experience making scythes. Two scythes were produced in the reconstruction. The first one was more for learning than investigating.



Fig. 7. Spaces in the time-path of the reconstruction

The casting of the reconstruction involved one smith and one striker. The smith keeps focus on the process, while the striker, besides working the sledge, also managed documentation. The documentation consists of an event log to frame procedures and moments in the process in time and space. As a back up, a film camera was rigged to capture the whole process. The event-log provides data to the time-space path of the reconstruction, giving a comparable protocol to the documentary.







Fig. 8. Time-space path of the reconstruction.

The investigation is similar to traditional action research, in the sense that the researcher is a subject undertaking actions that are at the same time the research object. The researcher is directly influenced by the result of the reconstruction. The research contains elements of planning, action, observation and reflection, but not in the line of Kurt Levin's action research spiral (Levin 1946, see critique by eg. Wood 2006). The analytical friction is created by moving between observation of matter, self-observation *in action* and self and participant observation *over action* (see Schön 1983, Molander 1996). The protocols are essentials, serving as documentation and at the same time as hypotheses and displays of results. The dialogue, the reinterpretation of records and the production of craft protocols, build up the level of inquiry, from personal experience, to gaining a possible intersubjective result.

Documentation is fundamental to the investigation, but it also causes problems. The documentation mission takes focus away from the actual performance. The requirements in research are destructive to the tacit knowledge required in the action, that itself is required in this type of practice-led research. The research questions and focal interventions disturb the flow. The scientific term "observation effect", may be relevant to define this type of problem, when the very observation effects the nature of the object studied. Documentation is important, but the only way is to truly represent tacit knowledge is as craft knowledge.

Another critical aspect of the reconstruction is the difficulty in judging the effect in action of one's own internalised experience. The challenge is to use experiences and skills, and at the same time undertake a performance that may follow another tradition or working method. For instance, the smiths in the documentary packed the steel in the welding process in a way that was causing problems. For craftsmen, it is common practical logic to solve problems in action rather than to question and review the situation from *another* theoretical position than the one undertaken in action. This is logical in the field of practice. Using craft practice as method for inquiry, it is devastating. To follow the exact procedures demonstrated in the documentary was necessary to expose more precisely what aspects of the process were dysfunctional. In this case, a sum of bad decisions: too much heat burning off material; not working the weld enough when correctly heated; working too hard on cold iron; and starting from the tang to the edge causing problems keeping the steel in position.

#### IR measurement of colour judgment over heat

The documentary has faded colours, and consequently this aspect of the forgery was difficult to assimilate in the reconstruction. The speaker tells us that the old smiths make important judgments of colour when hardening and annealing the blades. Therefore, two sub-experiments were performed, in order to explore problems and possibilities to record and display colour in a useful way for forgery. The

test was set up to interpret the problems exposed in the documentary: that the weld of steel in the scythe's blade did not merge. And that the final scythe had cracks in the blade.

The test was set up in a smithy with an infra red (IR) camera.<sup>2</sup> The IR filming was synchronized with conventional filming by two cameras. These were set to give different angels of the procedure, one narrowly focused and one giving the situational setting.

Firstly, a prototype of a weld, similar to the actual scythe was made. The prototype was welded in two different manners. One over heated and another aimed at a optimal temperature. The approximations were measured by the infra red (IR) camera and related back to the result. The over-heated weld was measured to 1030 - 1230 degrees c. during welding, and the test aimed at an optimal temperature of 1000 to 1100 degrees c.



**Fig. 9. Weld prototype and film situation.** The sample of welding (left) shows the result when overheating the 0,6 % carbon steel in the middle. This happened because of warming for to long time in the forge. The 0.6 % C steel starts to melt and "burn" and while striking, the material starts to fissure. The 0,1 % carbon steel at the sides are better preserved due to their higher melting-point. (Right) Image from the IR-camera on the welding test. The temperatures measured during the different welding tests shows inconstancies, questioning the use of IR-camera to estimate temperatures while welding in this test situation.

It is not possible to give an exact optimal temperature. The skill is to balance within a span, aiming at reaching the same temperature on the steel as the surrounding iron, somewhere about 1000 degrees c. On the one hand, the balancing act is to avoid extensive high temperatures, resulting in enlarged granules of steel that deteriorate the quality. Hitting too hard with hammer blows might result in splitting the materials instead of fusing them. On the other hand, the balancing act requires not working the weld in too low a temperature, risking welding cracks in the blade.



*Fig. 10.* An attempt to synchronize the registrations from the IR-camera and the film from the welding tests was made.

Our interpretation of the welding in the documentary is that the smiths did both wrong. The unusual long weld as in a scythe was sometimes over-heated, and the granule of steel was enlarged and ruined. The weld did not join together. The documentary also indicated that the weld was sometimes worked almost cold, resulting in mechanical cracks.

The second test concerned the hardening. The speaker tells us that "the smiths judge by the colour of the steel when it is the right temperature to harden". The scythe is heated and, at the right moment, is sunk down into a long narrow barrel of ice-cold water. The blade is held straight with the edge upward, so that it won't warp. The annealing, when normalising the steel, is made with a snowball. The colours shift, but the smith's readings of the steel are not examined further in the documentary.

Our last test concerns the judgement over temperature in hardening. The temperature is judged by the colour. The optimal temperature to get a fine and solid structure of the material can vary with different types of steel. The kind of low carbon spring-steel SS 1770 that were used are recommended for hardening at 780-800 degrees c.



**Fig. 11.** The hardening tests show a correlation between measured temperatures by the IR-camera and the fineness in the grain seen in the surfaces of the fractures done in the hardened steel. A finer grain points out nearness to optimal hardening temperature 780° C, cooling in water, according recommendations from manufacturers of the 0,6 % carbon steel, SS 1770).

A traditional way to test the hardening and to learn the scale of colour, is to make a test with a gradient scale of heat on a piece of steel. The steel is cut up and the optimal temperature can be judged by the granule of the steel. The smith had to memories the look of the right colour.

In the test this traditional way of testing the hardening was made and at the same time filmed with the IR camera. In this way the smith's tacit judgement was tested, both by the nominal scale of temperature and by the granules. The methods were triangulated. The result was surprisingly consequent: the visual judgement of the right temperature was at the second mark (Sp 2), giving the temperature 748,5 degrees c. and a solid steel cross section.

The conclusion is that it is possible to use an IR camera to reflect upon the tacit judgement concerning colour in the craft of forgery. However, there are many shortcomings with the technology. Firstly, the IR camera cannot measure a reflective surface. Therefore the annealing process such as the polished blade is as reflective as glass. Secondly, the IR camera continually self-calibrates in relation to the varying temperature in the room. This implies a shift in the timeline and number of shots when edited to synchronize with the other films. A third problem is that the IR camera gives the temperature at the surface, when in forgery the cross section is the most important.

#### Conclusions

This investigation is a contribution to on-going experimental and partly heuristic research, to develop an augmented methodology for documentation of traditional craftsmanship. The general result of this case study is the testing of the time-space geographical method, applied on traditional craft performance. The time-space geography is a development of the event-log, and puts light on the discontinuity and the spacing of the craft performance. The method can be used to analyse an existing document, or to prepare for a re-enactment, and possibly also to plan a documentary. The presenting of the individual path from top down corresponds to the reading of a homepage. A further development could be to link audio, motion pictures, guidance and meta-texts to the diagram presented on a homepage. The testing of triangulating visual judgement of steel colour as tacit blacksmith knowledge, within both traditional analogue tests and digital IR measurement, suggests technological aids for the smith to train judgements on temperature by the colour of iron. Further studies would be interesting, to examine the subjective and possible inter-subjective judgements of steel temperature by colour, and how this could affect a smith's strategy and outcome in processes of welding, hardening and annealing.

The case of the documentary "Liesmide" shows that the producers and editors of the film do not fully understand the crafts. The wrought scythes that are made in the film do not have essential qualities to be used as scythes. The old blacksmiths do not carry on a functional tradition, but rather expose a break in tradition of craftsmanship. In contemporary museum work, trained crafts persons need to become involved in this type of documentation. The aim cannot stop at a nice story, when the needs of safeguarding and enhancement in this type of rare crafts are tremendous.

#### From esoteric archives into living heritage

Mass production and mass consumption have greatly challenged craftsmanship. Trade structures for crafts have been dissolved, enterprises have been decimated and curriculums of vocational education focus mainly on the qualifications demanded by industry. In some cases centuries-old traditions of knowledge and skills have been lost. Still, in this transcending intersection, small craft-based enterprises constitute a large part of the economy. According to the European association of craft enterprises (UEAPME), the small craft-based enterprises generate one-third of all employment opportunities in Europe (FBC 2011). UEAPME also notes that craft production has different functions and meanings in today's society.

During the industrialization era, many craft fields moved from everyday functional production to artisan products and arts. A recent phenomenon is that traditional crafts use heritage as a means of branding, or more actively seek out the field of heritage preservation and embrace the identity of intangible cultural heritage (ICH) of a nation, region, community or group. There is a risk that these crafts become obsolete, and end up as esoteric archive records.

When a craft is defined as 'traditional', one may assume that the tradition is threatened. There is a call for a new museum practice to enhance the capacity of traditional craftsmanship to meet future challenges. An augmented documentation could serve craft persons and communities to investigate a craft-related problem, to create learning resources or experiment new work methods, tools and products. To meet a broader audience and support the all through necessary co-craft strategies in the weak and endangered craft fields.

#### Endnotes

1. "The program of enlightenment is the disenchantment of the world". Translation by the authors. In Swedish

Aufklärung is translated by the word trolldomskraft.

2. The termographic manager was Per Stenberg, KIMO Instrument AB, certified ITC Level II No: 2011SE24N003. The camera used was a FLIR T-640, radiometric collection was made by FLIR Tools+, and editing and export FLIR ThermaCAM Researcher pro. The accuracy is calibrated within  $+/-2^{\circ}$ C or +/-2% of reading.

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### Technologies for supporting inter-religious and inter-cultural dialogue at religious museums: the on-field experimental action of Museo Diocesano, Milano

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http://www.mela-project.eu/

Abstract: This project presentation describes the first results of an ongoing experimental action conducted within the frame of the European FP7 research project "MeLa- Museums in an age of migration" (www.mela-project.eu) related to the topic of new museum technologies applied at Museo Diocesano, a religious museum in Milan. The project is based on a collaboration between the Design department of Milan Politecnico and ITIA-Institute for industrial technology and automation of CNR (National Research Council).

Keywords: inter-religious dialogue, museum and technology, multi-vocal narration, museum interpretation

#### Introduction

Mela Project is a four-year research project funded by the European Commission under the Seventh Framework Programme. Its main objective is to define innovative museum practices that reflect the challenges of the contemporary processes of globalization, mobility and migration. As people, objects, knowledge and information move at increasingly high rates, a greater awareness of an inclusive approach is needed to facilitate mutual understanding and social cohesion (Basso & Pozzi 2012).

Among the other project partners, the Design department has the task of developing experimental design proposals for museum exhibitions, in particular connected with the ICT role in museums. The aim of the cross-disciplinary research for museums is to develop possible scenarios that can be translated in the production of various experimental exhibition designs as test verification of the theoretical investigations.

By the nature of their institutional role, museums, are committed to improve society, pursuing strategies to facilitate dialogue between different cultures and solve issues arising from cultural diversity (Silverman 2010, p.13). It is relevant that in 1996 UNESCO adopted the *Action Plan on Cultural Policies for Development* in which important principles were announced. In particular a relevant role has been assigned to the dialogue between cultures, as a major social and political challenge and as a prerequisite for peaceful coexistence.<sup>1</sup> UNESCO reiterated the importance of these statements: in 2001 with the *Universal Declaration on Cultural Diversity*, and in 2005 with the *Convention on the Protection and Promotion of the Diversity of Cultural Expressions*, ratified by eighty countries (including Italy) at the end of 2007, thereby acquiring binding force (Bodo & Bodo 2007).

The museum has become more and more a "listening ear"<sup>2</sup> of a multicultural and intercultural society where cultures co-exist and debate. The intercultural dialogue relies on differences among cultures or "diversities" considered and enhanced as resources for mutual understanding. The museum, accepting the challenge to describe and interact with society, could be the privileged place in which these resources can be endorsed. The topic of "representation" is central in museums that need technology in order to represent themselves. "The cultural resonances of technologies can at time even serve to problematize or question" the contents of the museum (Lupo, Allen 2012). One of the most interesting and controversial themes of the inter-culture debate is inter-religious dialogue. The

<sup>&</sup>lt;sup>1</sup> "Action Plan on Cultural Policies for Development" was adopted by the Intergovernmental Conference on Cultural Policies for Development - Stockholm, Sweden, 2<sup>nd</sup> April 1998. Point 5 of the principles recognized: "The dialogue between cultures appears to be one of the fundamental cultural and political challenges for the world today; it is an essential condition of peaceful coexistence." See http://www.unesco.org/cpp/uk/declarations/cultural.pdf

<sup>&</sup>lt;sup>2</sup> This Expression has been used by the Anacostia Museum & Center for African American History and Culture's director, during his conference presentation at the General Conference of ICOM in 1971.

Museo Diocesano, as a religious museum, is an appropriate venue for religious narratives, discussing this topic, by stimulating debates, and fostering equality and dialogue among different communities (Capurro 2010, p.108).

The representation of religious issues in the public discourse of contemporary society seems to be a difficult issue. Problems of identity, diversity and dialogue among different cultures are amplified whenever religious aspects are involved. That is an important concern for museums.

The *mise en scene* by religious museums is not a neutral topic but is affected by cultural settings and by the contexts of the museums themselves. There are different approaches to what can be summarized under the label of "religion". Talking about religion can imply the following aspects: *"discussing on religion"*, when discussing, contesting or undermining religious identities; *"discussing among religion"*, when confronting, discussing or questioning religious diversity and frictions; and *"discussing through religion"*, when debating among diversities using religion to open the discussion towards a wider cultural sphere (Capurro, Lupo 2013). For the creation of an effective project, which has intercultural dialogue as its principle goal, the work team had to consider all of these variables and possible frictions.

#### **Objectives and methodology**

The aim of this experimental action is to discuss and verify the intercultural potential of religion and the possible role of the museum as an ideal place for inter-religious encounters. It consists in designing a visitor experience by transforming the contemplative cultural experience in an interactive and contributory visit, possibly also enabling intercultural dialogue. The project is a prototype path limited to five paintings from the collection of Museo Diocesano, selected in the so-called *Sala della Confraternita del SS. Sacramento e S. Caterina:* five paintings of the eighteenth century representing various miracles about the Eucharist.

The project is based on the use of digital technologies, like video narrations, performative interaction and 3D visualisations that can stimulate different interpretations.

Technology is a transversal driver that intercepts place/space, content and sociality within museums, functioning as a medium that widens the relation between visitor and content to the ones among visitors and content-in-space and visitors and visitors. (Lupo, Allen 2012, p.163)

The development of a digital interface in the museum, together with a platform enabling comments, and the production of contributions on religious topics, should facilitate the connections and relations among visitors with different cultures.

The most promising aspect of bringing technologies in the museum come through an approach that is well informed by the technological culture form which these technologies and their use-patterns and values emerge. That is, thinking "eco-systemically" about what it means to bring technological interventions into the culture and historical context of a cultural or heritage institution, and vice versa. (Lupo, Allen 2012, p.26)

Design Department with CNR decided to present the contents, both narrative and in the form of a questionnaire, through a tablet. The programmatic intention is to increase the use of technology devices, in particular, with the introduction of tools based on augmented reality, characterized by 3D reproduction of museum works.

#### **Research phases and future actions**

The experimental action will be conducted in two different steps, tailored for different visitor targets. In both tests the visitors will use a tablet which contains a video and a questionnaire. The first test took place in October 2013 (http://www.mela-blog.net/archives/3021), and involved experts and specialists (e.g. persons with a deep knowledge of their own religion: priests, theologians, rabbis, etc...). This test has an instrumental nature, designed to verify and review the efficacy of the interpretative tools in enhancing the visitors' experience and to improve the contents. Through user generated content (UGC), by collecting different expert opinions and a wide range of religious beliefs, our aim is to increase the potential multivocality of the narration. Having collected different religious point of views, the questions that will be addressed to the second-test-individuals will be improved by the feedback obtained from the first-test-individuals. The second test will involve general users, not-specialists (e.g. second generation immigrants and foreign community residents in Milan). The second phase will also

add new contents to test the path and to understand whether the intercultural model of socialization through performative and connective technologies is functional or not.

Each path mentioned, namely *specialist* and *not-specialist*, will be made up of four different experience levels. Each experience level will contain three themes: historical/artistic themes, Roman Catholic religious themes, and faith and symbolic themes. These contents allows for five dynamics of interaction: contemplative, interpretative, contributive, connective and performative. The idea is to locate similarities and analogies with other religions through the connections to other works on the same topics in the museum. Regarding the possible use of the five dynamics, interaction with technology intends to act at various levels of usability:

**Contemplative:** visitors are invited to whatch a video representing one of the five paintings showing different aspects of the miracle. The tablet must be pointed to the real paint; it will reproduce the image on the screen and the video will start. The idea is to increase the watching experience through digital technologies, amplifying and enriching temporal and spatial horizons of vision, and also showing no so obvious links between the works.

**Interpretative:** visitors will be encouraged to relate information achieved through the proposed video, together with their own previous knowledge, by answering a simple questionnaire on the device. Technology itself acts as a facilitator, providing the user with different interpretations of the subject and stimulating critical reflection.

**Contributive:** visitors can add a personal contribution directly to the tablet's folders (e.g. a reference, object, imaginative representative of their religious view, or expression of their culture). Dynamic contribution involves the direct participation of the user called to provide a personal interpretation of the work, and a visiting experience embracing previous knowledge, cultural references or relevant quotations. Therefore the size of the "basket of religious references" will be richer from contribution to contribution, enhancing future visits.

**Performative:** one of the aims of the project is to introduce performative (or gestural) action through digital technologies. The general user will be able to activate some contents on the tablet with gestures and actions consistent with different cultural practices, avoiding standard interactions with the technological tools and stereotypes of interaction (i.e. touch, click, move and drag).

**Connective:** digital technologies connecting people to the cultural heritage (community building) act as a facilitator for social relations. Community building processes come as a result of direct social involvement, or through a consistence presence of technology, allowing a better knowledge of the other cultures.

This dynamic creates the paradigm of listen - interpret - contribute - perform - share.

The dynamics of interaction are decided according to user targets to achieve different objectives by testing multiple technologies. A path for the evaluation of contents will be offered to the specialist: their contribution will help verify the hypotheses behind the project, by giving a professional interpretation of religious values connected with intercultural integration within the museums.

Through an experimental sample of public views, the project aims to verify new interpretative tools for religious heritage in order to activate intercultural dialogue. To associate religious heritage to historical and artistic cultural heritage, potentially allows for the activation of a cross-cultural experience of investigation into possible analogies between different religions inside a museum. Moreover the project wishes to experiment with narrative models, with participatory and interactive contributions and social use of technology, to present cultural and religious heritage, promoting the use of mobile devices and tools, such as tablets or smartphones in museums.

The main cultural purpose is to develop an intercultural enhancement of the artistic heritage for the specific museum, but with the idea to spread the results, and share them in order to be adapted to similar circumstances. This experimental action could eventually provide new information and materials to create new curatorial narrations, parallel to the current ones, within the Museo Diocesano.

By the end of 2013, the two tests (experts and general users) will be evaluated together with their contents. By the beginning of 2014, the path will be proposed for a higher number of intercultural visitors. Data and results will therefore be analysed in order to evaluate possible repeatability to a larger number of museums.

The objective of this project is not to work with advanced technologies, but to build multi-vocal narration and promote an inter-religious exchange through them. Moreover, the project is *ongoing* and

this paper should be considered as a programmatic guideline. At the end of the project a final publication will be created.

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# The Futuristic History project: recreating history with augmented reality solutions

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https://www.utu.fi/fi/yksikot/bid/projektit/Sivut/Futuristic\_History.aspx

Abstract: Futuristic History is a two-year research project started in January 2013, implemented in cooperation with University of Turku and VTT Technical Research Center of Finland. Its goal is to research and develop augmented reality based solutions and business models for tourism and culture. TEKES, The Finnish Funding Agency for Technology and Innovation, is funding the project and there are several partners from ICT, travel and museum sectors.

The project creates working prototypes, which present historically important locations in new, interesting ways. Special focus is placed on augmented reality techniques, which mix digital content with real-life environments. Finding economical and efficient ways to make such content is also an essential part of the work. It is investigated what kind of business models would be feasible and attractive in museum context.

The target locations of the project are in the region of Turku, which is the former capital of Finland and has several historically interesting sites. We have already completed a mobile 3D virtual guide of a short-lived 16th century church in Turku. Other target locations include Luostarinmäki Handicraft Museum, which is the only preserved part of the 18th century wooden city of Turku, and the Louhisaari Manor, one of the rare palatial style manors in Finland. In these locations, the original residents' daily life and work will be presented using augmented reality solutions. We may also be able to reveal hidden details or let physically disabled persons look through walls of difficult-to-access rooms. In central Turku, old photographs will be used to give a virtual view of some buildings that have been demolished long ago.

We present the goals and production principles behind the prototypes implemented during the project. We also briefly discuss the challenges and opportunities of bringing augmented reality solutions to museum settings from the perspectives of both museum professionals and end-users.

Keywords: augmented reality, mixed reality, 3D modeling, museums

#### 1. Background

Augmented reality (AR) can be defined as real world environment that is augmented by computergenerated content, e.g. 3D models, images, sounds or textual information (Milgram & Kishino 1994). Augmented content is presented in real time, positioned accurately in relation to the real objects, and the user can interact with it. *Virtual reality* consists of virtual, i.e. computer-generated, content only, and a combination of virtual and augmented reality is often called *mixed reality*.

A wide variety of different AR applications exist. The simplest AR applications from the immersion perspective are so called AR browsers, which usually overlay contextual text information onto video stream through a mobile device. For example, an AR browser could show the directions to the nearest sightseeing attractions (see e.g. http://www.wikitude.com/). On the other end, there are highly immersive 3D applications, which basically surround the user with computer-generated content that is seamlessly integrated into the real-life surroundings.

In museums, AR technology can create realistic, immersive experiences that would be impossible to achieve with traditional means like printed media. Buildings and lost settings can be reconstructed virtually and historical events can be recreated. Such solutions can be used for educational purposes, and they may be able to e.g. increase the general public's interest towards historical sites and events. The use of augmented reality in the museums has been researched for several years, especially from the technological perspective, e.g. (Wojciechowski 2004; Miyashita 2008; Barry 2012), but the technology is still on the verge of wider adoption.

#### 2. Goals of the project

Futuristic History<sup>1</sup> is a research project conducted by the University of Turku and the VTT Technical Research Centre of Finland. The general goal of the project is to investigate the use of augmented reality technologies in museums and other historical sites. The project is funded by TEKES, the Finnish Funding Agency for Technology and Innovation, as a strategic research; this means that a roadmap for continuing the national research on the topic will also be formed during the project. The project will last from January 2013 to December 2014.

The project analyzes the current state of augmented reality in museum applications by developing augmented and mixed reality applications for tourism and museums. It is a multidisciplinary undertaking where several different aspects of the content production are being researched.

Content production is done in cooperation between people who know the history of the target location and those who can make an attractive application of it, such as writers, designers, software and marketing professionals. The project aims to find efficient ways for different professionals to cooperate. It is also important to find business models that are profitable. The new solutions should be attractive enough to increase the amount of visitors and produce more income to museums.

Ultimately, the project results should: 1) lead to more funding for the operating of historical sites, 2) encourage more people to visit historical sites, and 3) increase public awareness of historical knowledge and facts. Other local businesses may also benefit from the increased interest of a town or site. Finally, there is an opportunity for new business in the production of applications and related tools.

#### 3. Prototype implementations

The project will implement prototype applications concentrating on a few sites. These were selected based on general interest and potential for mixed reality applications. We also paid attention to having diverse sites to produce a varying collection of applications. The sites vary in their historical background and setting, and in the characteristics of augmented reality application.

**Holy Ghost Church:** The first implementation done in the project was a 3D model of the Holy Ghost Church in Turku and an application for virtual observation of the model. The construction of the original church started in 1588 and it was intended for the use of the Finnish-speaking citizens of Turku; there was already a cathedral in the town. The new church was damaged in a fire in 1593, and afterwards the ruins of the church were used as a cemetery until the church was demolished in the 1650s. The application produced, presented in Image 1, offers a virtual reality tour of the interiors of the church. The model and its production process are presented in more detail by Viinikkala (2013).

**Luostarinmäki Handicrafts Museum:** This handicrafts museum is in the only preserved part of the 18<sup>th</sup> century wooden city of Turku, as illustrated in Image 2. It consists of a number of houses and yards along a few narrow streets. The houses are furnished, so there is plenty of content available. For this location we are creating a game in which the visitor will be doing tasks to help with wedding arrangements. It will require searching for places and objects as well as communicating with people. Most of the game characters are digital, but visitors can also communicate with the guides and craftsmen present at the museum. The environment offers a lot of possibilities for the application of virtual content in the real environment. One goal is to record the work of the craftsmen, as, in some cases, very few people remain who know the old skills.

**Louhisaari Manor:** Finland has very few palatial style manors; Louhisaari, situated circa 20 km northwest of Turku, is one of them. While the estate had been belonging to the Fleming family from the 15<sup>th</sup> century, the palatial main building, presented in Image 3, dates from 1655. Visitors can enter the main building on guided tours only, which means that an application for individual use inside the main buildings. The new main building was originally at the seashore, but due to still continuing rising of the ground after the ice age, the shoreline is now several hundred meters away. The change of the view from the manor, the development of the gardens and the changes in surrounding buildings will be presented in the application that is being planned for Louhisaari. The daily life of servants and other local people will also be presented around the surroundings.

**Central Turku:** Turku is the oldest town in Finland, and it was the capital of the country until 1812. In 1827 fire destroyed most of the town center, which consisted mainly of wooden buildings. After that,

<sup>&</sup>lt;sup>1</sup> Futuristic History: user-centric mixed reality applications for presenting, recreating and restoring historical events and place.

the plan of the town center was renewed and wooden buildings were not allowed along main streets. Many of the 19<sup>th</sup> century buildings have, however, been demolished during the last decades of the 20<sup>th</sup> century. One application in the project will present some of these buildings, as seen in photographs from the19<sup>th</sup> and early 20<sup>th</sup> centuries, using augmented reality solutions.



Image 1: Holy Ghost Church Virtual Reality Application

Screenshot of the application running on iPad. The priest standing in the altar is a 2D video embedded into the 3D model. Real Finnish chant of the era is used as background music.



Image 2: Luostarinmäki Handicrafts Museum

Photograph of a street in the museum. In the pilot application the existing surroundings are augmented mainly with 3D models of 19<sup>th</sup> century people and domestic animals to illustrate the museum area as a city quarter. Image 3: Louhisaari Manor



Photograph of the main building of the manor. The manor has beautiful garden areas, which have changed significantly during the centuries. One way to utilize AR technologies is to illustrate this change.

#### 4. Challenges and opportunities of augmented reality in museums

Augmented and mixed reality have the potential to deliver attractive experiences and to raise interest about historical sites among the general public. Virtual content can offer realistic experiences of the events and objects of history. However, creating those experiences requires a lot of work and can easily fail.

**Quality of the content:** The content delivered to end-users must be high quality and attractive, but also affordable. At the same time, it should offer accurate information, especially about historical content. There can be fictive elements, but facts should not be distorted. Content creation is a cooperative process between collaborators, e.g. history experts on the target site, writers, software developers and game designers.

**Technical feasibility:** The content must run in the available hardware and be easy to use. Depending on the delivery model, support for many different devices may be required, e.g. when visitors use their own devices. Devices with the least performance capacity may set the baseline for available content quality in a technical sense, while higher performance devices could do heavier processing and support more complex features. Building different versions of the application for different end-user devices would increase the complexity and the price of the content creation process.

**Usability:** Tourism-related context implies that a large portion of users may use the particular application first time. Thus, the usability aspects become important: the application should be easy to learn. This problem may be decreased with a common platform on top of which different content applications are made. So, the user might already know the common ways of interaction even though the content for the particular location would be new.

**Delivery model:** How to deliver the content to the public? Lots of people already have suitable equipment - smartphones and tablets - so an approach is to offer content to be downloaded to the user's device. This, however, causes the need to support a potentially large variety of different devices, and delivering the - possibly large - application to the device is also a technical issue.

Another approach is to loan/rent equipment for the visitors at the site. This would guarantee the compatibility and performance of the hardware as well as solve the question of software delivery. On the other hand, a pool of rented devices is an additional cost, and in this approach the users can't use the application after they have returned the device. It may be a significant part of the business model to offer some content that is available before the visitor comes to a museum and after the visitor returns from the museum.

**Content production process:** Perhaps the major work in creating applications is the design and technical input of the actual content. Multidisciplinary augmented reality professionals are needed to produce quality content cost-effectively. However, the produced content is seldom static and therefore the local museum personnel most probably have to have basic tools and sufficient skills to update the content independently.

**Profitability and business models:** Augmented reality applications are specifically related to a certain geographical location. Therefore, especially in smaller museums, the production and the maintenance cost have to be optimized and the income streams and models carefully planned. Different revenue models, e.g. paid applications, freemium<sup>2</sup> models and application costs included in the ticket prices, all have advantages and challenges. Finding working business models for augmented reality applications is essential for the wider adoption of AR technologies in museums.

#### 5. Conclusions

The use of augmented reality in museum contexts has been researched but there are still many unsolved questions relating to e.g. technological challenges, content production processes and feasible business models. The Futuristic History project tries to solve some of these challenges and to pinpoint the most important ones for future research. This is achieved through several prototype implementations of augmented reality applications in two different museums, in a historical site and at the center of the historical city of Turku.

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## The Guardians: serious game design for enhancing awareness of cultural heritage preservation

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#### The Guardians

Abstract: The Guardians is a serious game designed to be played on mobile devices for promoting awareness of cultural heritage. The Guardians consists of five stages. First, players can navigate in the game space and view brief information about heritage around the world. Second, once the player selects a specific cultural heritage he or she can learn background information about the site. Third, the player has to take quizzes to verify their understanding of the site. Fourth, the player can protect or repair endangered cultural properties in a mini game. Fifth, the game system allows players to donate to the actual cultural heritage that they have saved in the game. After playing the game, players around the world can communicate and form on-line communities. They can share their learning and cultural heritage - protecting simulation experiences - and cooperate to preserve the actual endangered heritage. Results of The Guardian's usability test showed that most players understood the mechanics and intentions of the serious game. Players commented that The Guardians enabled active learning, which is one of the important factors in increasing involvement and engagement in cultural heritage. Furthermore, players reported that increased awareness of the site eventually made them want to learn more about other sites and preserve cultural heritage more generally.

Keywords: cultural heritage; serious game; knowledge; preservation; awareness

#### 1. Introduction

In this study a framework and prototype of a serious game, *The Guardians* was developed. The game was created to promote increased awareness of cultural heritage through gaming. The expected result of playing *The Guardians* was the promotion of a player's participation in cultural heritage preservation as a result of an increased awareness of its importance. Cultural objects are the basis of cultural memory which may be considered as an identity marker and distinguishing feature of a social or cultural group (Merryman 1989; Bessière 1998). Cultural heritage - including objects, monuments, inherited skills or symbolic representations around the world - is at risk due to weather, pollution, development and even tourism (Navrud & Ready 2002).

Without heritage, community identity is at risk; therefore preservation of cutural heritage is crucial. The one who protects endangered heritage is ultimately not a particular organization but an individual within a community. One of the best ways to preserve the legacy is to increase awareness of its importance. People's awareness is heightened when they know about the heritage, therefore educating the public about cultural heritage is important.

Some people feel that learning about heritage is tedious and protecting heritage is difficult or requires a lot of effort. This reserach suggests an easy and entertaining method of learning about cultural heritage for young adults. Serious games are a form of interactive computer-based games that have been developed to convey learning material (Deterding 2011). *The Guardians* is a serious game designed to be played on smart mobile devices.

According to Smartphone Ownership 2013 report,<sup>1</sup> 56 percent of American adults own a smartphone of some kind. As the report indicates, many people own mobile devices and research shows that mobile technology embedded learning offers learning in a natural environment (Schwabe & Goth, 2005). Therefore, playing serious games on mobile devices has the opportunity to provide effective learning. Furthermore, we have included a conceptual donation system in the game. According to Steinberg (1996), even for government registered National monuments, there is a tremendous shortage of funds for their upkeep and maintenance. We believe that learning about cultural heritage will increase people's awareness of the heritage which will affect people's willingness to donate and participate in endangered heritage preservation.

<sup>&</sup>lt;sup>1</sup> PewResearch Center, Aaron Smith, Retrieved Oct 12, 2013 http://pewinternet.org/Reports/2013/Smartphone-Ownership-2013.aspx

#### 2. Game Design

#### **Conceptual Framework**

Gameplay of *The Guardians* follows five stages. These stages illustrate a participation flow leading to cultural heritage preservation. The design goal of these stages was to educate players in natural and fun ways to heighten awareness of endangered heritage, eventually leading to active participation in preservation. Learning goals of playing the game can be evaluated by how much the players are willing to donate to preserve endangered heritage. Details and design rationales of each stage will be described in the following sections.



#### Step 3. Knowledge & Understanding

Take cultural heritage quizzes to verify learning results.

**Step 4. Engagement** Play cultural heritage preservation mini game.

#### Step 5. Participation (Optional)

Donate to the actual endangered heritage site for preservation.

Cultural Heritage Preservation

#### Stage 1. Interest and Discovery

This stage triggers player's interest in cultural heritage. The player can navigate in the game world and select an endangered heritage site or artifact of his or her interest. A good game scenario arouses deeper immersion (Park 2009). Immersive experience determines whether the player would continue to play or not (Chen 2007), therefore adapting good scenarios is also necessary for serious games. The scenario of the game is that there are four characters in a heritage preservation association, 'The Guardians', who protect heritage by participating in diverse missions. The game begins when the player selects one of four characters and becomes a member of The Guardians.





#### Stage 2. Knowledge and Learning

Since *The Guardians* is a serious game, one of the game's main intentions is to educate players. This stage includes context and background information about endangered heritage. For this prototype, four endangered heritage sites registered by UNESCO are available.<sup>2</sup> See Table 2.1. According to Moreno (2001), learners in a group with a pedagogical agent remembered more contents and had higher problem solving transfer abilities. Inspired by this study, we used a non-player character (NPC) Paul, who serves as the pedagogical agent and suggests guidelines to motivate players. To reduce cognitive load, no more than four lines of information is displayed per page.

Image 2.3: Information Display by NPC



Paul, the NPC, delivers information about heritage in friendly colloquial ways.

Table 2.1: Fou	r Endangered	Heritage	Sites	in the	Game
			000		

Name of Cultural Heritage	Country	Heritage Destruction Factor
Tombs of Buganda Kings at Kasubi	Kampala,	Conflagration
(Tombs)	capital of Oganda	White ants
Mehmed Paša Sokolović	Drina river, the border between	Flood
Bridge in Viešgrad ( <i>Bridge</i> )	Bosnia and Herzegovina and Serbia	
Rio Pinturas (Mural)	Patagonia, Argentina,	Humidity (caused by visitors)
Arirang (Folk Song)	Korea	Absence of successor

<sup>&</sup>lt;sup>2</sup> UNESCO (2013) World Heritage, from http://whc.unesco.org/en/about/, retrieved Oct 12, 2013.

#### Stage 3. Knowledge and Understanding

The players need to solve two levels of quizzes to verify whether they have understood the cultural heritage information they have learned. The quiz questions include general background information, destruction factors and protection methods. Correctly solving quizzes allows players to play minigames. We have designed different levels of quizzes to promote knowledge gain and change attitudes towards cultural heritage, which are in the cognitive and affective domain of Bloom's taxonomy of learning (Bloom 1956). We have adopted Wang's knowledge-level and comprehension-level quizzes in our game (Wang 2008). The knowledge level quiz involves recollection and recognition of cultural heritage sites, while the comprehensive level emphasizes a player's understanding of the heritage to consider deeper meanings. An understanding of the heritage sites after learning is likely to promote awareness of the legacy.



Image 2.4: Knowledge Level (Tombs of Buganda Kings at Kasubi)

Items involve a learner's recall or recognition of ideas and concepts (Çepni 2006)

Image 2.5: Comprehensive Level (Tombs of Buganda Kings at Kasubi)



Items emphasize a learner's understanding of ideas and concepts (Çepni 2006)

#### Stage 4. Engagement

We chose to encourage learning through doing. The players can engage with the heritage by playing mini-games which are designed to eliminate heritage destruction factors. Refer to Table 2.2 for the directions and contexts of each game.

Name of Cultural Heritage	Game Mission & Activity
Tombs of Buganda Kings at Kasubi (Tombs)	Defend tombs from catching fire. Cut pouring fireballs in half before they hit the tombs and burn them down.
Mehmed Paša Sokolović Bridge in Viešgrad <i>(Bridge)</i>	Prevent the bridge from deluging. Quickly push button to stop water from overflowing.
Rio Pinturas (Mural)	The ancient painting was damaged by frequent exposure to the public. Detect deformed parts.
Arirang (Folk Song)	Succession of Arirang is at risk due to lack to succesors. Player has to choose a region of Arirang after listening to several Arirangs.

Table 2 2.	Dotaile c	harapneha h	heritane and	d mini_aamee
	Details	n chuangereu	nemaye an	a mini-yames





The player needs to remove falling fireballs using the touch screen

Image 2.7: Rio Pinturas Mini-game



The left side is the original mural. The player needs to select five deformed parts of the mural within the time limit.

#### Stage 5. Participation

In the game, a conceptual donation system allows players to participate in the actual preservation of the heritage they have been 'protecting' in the game. The aim of the donation system is to extend heritage protection into the real world. Furthermore, a player's willingness to pay (WTP) is one possible reflection of the degree of a player's learning outcome and altered perspective.

#### 3. Usability pilot test

#### Pilot test procedure and result

To test if the design intentions of *The Guardians* were effectively delivered, we conducted a pilot usability test using the fireball cutting game. Each participant watched the introduction, studied cultural heritage, took the quizzes, played the mini game, completed the survey, and had an in-depth interview. The entire process took about thirty minutes. Eight participants (3 males & 5 females) tried the prototype and conducted a usability and user experience survey through SUS (Bangor 2008). The results indicated a usability level grade of B+, which means that the players could play the game without confusion. During interviews, the players answered that learning about cultural heritage sites and playing the game made them understand more about those heritage sites and increased their interest in them.

#### **Future work**

Many participants mentioned that the textual information display should be more interactive and the usability of the game, especially the feedback system should be improved. These are possible areas for further development.



Image 3.1: Prototype Pilot Test

#### 4. Conclusion

We designed a cultural heritage preservation serious game to raise people's awareness of our legacy. The learning system in the game develops knowledge and helps players to understand the importance of heritage preservation. Furthermore, the game system allows players to participate in actual preservation by donating. In the future, we will conduct an experiment to evaluate player's experiences on the entire game system and check whether game play had increased their awareness. Furthermore, the donation system is conceptual for this prototype, but we will modify the donation system to enable actual donation to endangered heritage preservation organizations for more active participation in cultural heritage preservation.

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### The other way round: from semantic search to collaborative curation

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Abstract: Society is becoming increasingly digitized. In a joint project of expert collaborators (Hochschule Darmstadt, University of Applied Sciences, TU Darmstadt, University of Technology, University + State Library Darmstadt, Software AG, media transfer AG, nterra GmbH, House of IT) the Städel Museum in Frankfurt (Germany) developed a cloud-based exhibit platform realising a concept we call "digital strolling". Redefining digital visits to a museum, the semantic search engine intuitively matches digitised multimedia content which is based on a complex system indexing unstructured and structured data related to our exhibits. The query process goes beyond typing a simple search string and browsing through a bewildering list of results. Digital visitors experience shift from "searching" to "finding" - from a narrow-minded matching of question and answer to a self-conducted process of learning and enjoying the jump into the rich and complex world of human nature seen through art. They can save their discovery paths, share and discuss them with others. This moves towards high-quality consumer curation. Though not being comparable to art historians' curations, it helps digital visitors express themselves better than submitting Facebook "likes" or pictures on Pinterest and alike. This method encourages cultural institutions to communicate with digital visitors as equals by transcending traditional barriers and promoting wide-ranging discussions of the content.

Keywords: digital exhibit platform, cloud-based, digital strolling, semantic search, collaborative curation, multimedia content, self-conducted learning

Founded in 1816, the Städel in Frankfurt is not only amongst the most well renowned art museums in Germany but is also the oldest private museum foundation there. The collection contains around 3,000 paintings, 100,000 drawings and prints, 1600 photographs and 600 sculptures. It encompasses more than 700 years of art history (from 1300 to the present). The founder sought a holistic approach, so the foundation also runs a library with around 100,000 books, and an academy for contemporary fine arts (Städelschule).

The Städel has become nationally recognized for its expertise in serving all age groups and every sector of society. Activities in the museum include: typical offerings for children; special programs for elder people and the unemployed; after-hour lounges where business people can meet, have a drink and listen to a lecture; activities and guidance for teenagers, where personal skills and competences are developed with a view towards professional life (Sommerakademie [summer academy]); along with special workshops and lectures held by non-art historians who talk about themes and artworks from the perspective of their own professional domain (Gastkommentar [guest's notes]).

Our audience now includes a broad range of visitors, from children and school groups to adults, families, students, and senior citizens from all geographical origins and sectors of society. The highly diverse needs of today's audiences require us to provide an equally diverse spectrum of presentation and communication offerings that combine education and entertainment. Not only must museum activities draw on different interests and levels of knowledge as a starting point for individual access, but they also must draw on various occasions and motivations for visiting a museum. Together with a wonderful aesthetic experience, the collection's interdisciplinary approach to communication

establishes a relationship between the art and its historical, literary, scientific, and political context. At the same time, it serves as the basis for topical debates concerning all social aspects of life.

Nonetheless, the Städel museum faces several challenges. Art museums are symbolic locations with alternative concepts of time and reality, they are places to pause, slow down, and focus - places where we can experience a unique work of art or even an entire collection in person. However, society is becoming increasingly digitized, and it is not stopping for the sake of physical cultural content. As a result, museums, like all institutions, are confronted by enormous changes in almost every area of life that are fundamentally redefining how they handle information, education, and culture. How can we attract people following the digital lifestyle? As the world is more and more seen through digital devices, we need to be able to make our unique content visible there. How can we deliver information in a way that addresses the different expectations and cultural backgrounds of digital visitors? How can we generate long-term interest in cultural heritage and make themes of art history relevant to modern life? How can we address diversification, on both a regional and global scale? How can we fulfil our educational mission as a public institution? How can we develop an information offering where users are able to find more than they were originally looking for? On an ideological level, we believe that - as every visitor is unique -; every museum visit, be it physical or digital, should also be unique as well. We seek to radically change the way a well-established art museum works today. We need to go from pure "acting" to "interaction", from "delivering content" to "creating content", and from streamlined offerings to personalisation.

An essential and unique selling point for this digitalisation strategy lies in the customised, needs-driven provision of content for future users. However, when extensive archives are simply made available digitally - unfiltered and without any specific communication - the benefits are usually restricted to visitors who are already well versed in the topic. The majority of our visitors do not know where to begin and what to search within the digital collection because they lack the necessary scholarly knowledge. Consequently, we must impart information to them through various means, similar to the experience of visiting a museum in person. This multifaceted approach provides digital visitors with a variety of options to access the collection. We link the nature of the experience with the museum's mission to educate and communicate, enabling unlimited access to the cultural content beyond the museum's walls.

Through a group of expert collaborators comprised of partners from academia (Hochschule Darmstadt, University of Applied Sciences, and the TU Darmstadt, University of Technology), business (Software AG, mtG AG, nterra GmbH), and the cultural world (the library at TU Darmstadt), the Städel Museum developed a cloud-based exhibit platform for its collection, for this exact purpose. Based on current web technologies, the application will be both usable on a desktop as well as on a mobile browser. This so called responsive design makes it effective, irrespective of screen size, resolution or device. The reasoning and search mechanism is located on the server side acting as an intermediary layer to the museum databases. Our goal is to allow potential visitors from all around the world to take a "digital stroll" through our collection, with links to multimedia content for individual artists and works of art and textual background information. This self-guided path through our collection, which is oriented toward visitors' individualised interests and learning needs, will reconfirm the relevance of the collection, of producing and sharing art, and, ultimately, of the museum itself. 'Digital strolling' redefines digital visits to a museum. Physically strolling through a museum means interacting with others, getting inspired and exploring new content. The Google Museum approach is not generic, as people get information on how an exhibit looks and where it resides. Transferring this information cannot replace the experience of facing the original artwork. Therefore, the value of visiting an online museum must be established on another level. The appeal of communicating culture digitally lies in the degree of insight and understanding that users are able to develop on their own by means of interactive technologies. Digital offerings should enrich the visitor's initial interest, deliver more than requested and ignite interest in new topics. The semantic search engine achieves this by intuitively matching digitised multimedia content which is based on a complex system indexing unstructured and structured data related to our exhibits.

Consequently, our exhibit platform offers a query process that goes beyond typing a simple search string and browsing through a bewildering list of results. Instead of restraining the search process to concrete art topics such as artists, epochs or specific artworks (which might require comprehensive previous knowledge), the user is able to follow his very own personal interests. These interests may include non-artistic domains such as science, nature, social life, and non-scientific domains such as moods or emotional qualities.
Search results become part of the navigation: they consist of pictures, texts, audio and video files presented in a visually attractive and interest stimulating grid of media tiles, scaled and positioned in accordance to their estimated relevance. The relevance is continuously computed by a knowledge-based reasoning mechanism and by evaluating user behaviour. While the user is strolling through the platform's offerings, the interface adapts itself continuously according to the user's search queries and content selection. As there is no average user, media content is presented based on explicit search results, semantic relations and personal interest. The user input is conducted in a user model to ensure that each user experiences unique visits.

Therefore, the artificial intelligence computes a relevance factor for each metric. Frequently searched keywords, favourite media and content types customize the content area continuously. On a rulebased system, the user's natural language input in terms of parts of speech, named entities and syntactical structure is analysed. For the purpose of specifying resulting topics and identifying their relationships, intelligent ontologies are used, built and expanded on. Based on these ontologies, an intelligent algorithm is being developed finding how subjects relate to each other. This is the technical basis of digital art education, which develops its impact in an associative, self-conducted and extremely personalised way.

In comparison to lexical searching, the visitor gets a nudge to new but relevant content without being aware of it before. It supports digital visitors finding a path through vast offerings of digitised exhibits. Semantic search brings up results that are intrinsically relevant. For example: if a user types "Richter", the platform does not only offer him the two artists from our collection named "Richter" (Gerhard Richter and Daniel Richter), but also a "Gerichtsszene" ("Richter" in German means "judge in a court"). This already offers a huge variety of possibilities to continue the search process, not only in the way the user originally intended, but also in other directions. Visually stimulated by unexpected search results, he may spontaneously change his mind and follow other topics he is interested in. Perhaps he had never heard of Gerhard Richter and navigates now towards several of his works in our collection. Being presented with more artworks by the same artist is a common feature of digital platforms in other Museums, but semantic searching is far superior in transferring valid principles of physical art education in the digital space. If the user continues his "Richter" search by clicking on the painting "Kahnfahrt" (Boat Trip) he will not only be offered other paintings of the same period, but also those who show a similar atmosphere like Courbet's "Wave", or they may be compared through their artistic methods, or even through a similar theme, even if the two paintings are hundreds of years apart from each other, as for example the "Embarquement to Cythera" of the rococo painter Antoine Watteau.

Digital visitors of our exhibit platform experience a shift from "searching" to "finding" things - from a narrow-minded matching of question and answer to a self conducted process of learning and enjoying the jump into the rich and complex world of human nature seen through art. Digital visitors can save their discovery paths, share and discuss them with others. This moves towards high-quality consumer curation thanks to the inner semantic logic, which is far more interesting than digital exposition, a tool which has never been proven successful in the field of digital offerings. Though not being comparable to art historians' curations, it helps digital visitors express themselves better than submitting Facebook "likes" or pictures on Pinterest and alike. This method encourages cultural institutions to communicate with digital visitors as equals by transcending traditional barriers and promoting wide-ranging discussions of the content, conducted in a much better way than when the museum acts as a proclaimer, announcing an overarching and immutable truth. In a later stage of the project, we will give curators from the museum the ability to offer their personal strolling paths as specially curated content. So, approaching the issue the other way round, we will end where others start.

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## The responsive museum

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Abstract: This paper reports on the ongoing work carried out by V-Must, a Network of Excellence, funded by the European FP in its efforts to rethink the virtual museum (VM). The Network has been active in identifying, and mapping tools, and services that define and support VMs in the heritage sector. V-MUST.NET is coordinated by CNR and includes 18 Partners from 13 countries, and Associated Members. The Network was launched 1st of February 2011 and continues through to 31st of January 2015.

Drawing on a series of reports and publications prepared by the Network, http://www.v-must.net/library/publications, we will continue to reflect on the VM from a variety of perspectives.

This paper looks at the responsive screen, dynamically re-sizing itself for numerous platforms, including: in-house large screens, PC, mobile, and tablet. We also critically consider the response of the user/visitor who will be encountering the Museum before, and after the visit as well as during the actual visit. What kinds of implications will this have on the visit and visitor, and how can the Museum prepare for these different kinds of scenarios?

Through a series of three case studies we attempt to define the VM as we re-visit the core concept of the museum ethos as it reaches out to meet its visitor. Introducing the visitor to the exhibition, even before the physical visit in an exceptionally well-honed marketing scenario, we will discuss the virtual bear hug, where the Arthur M. Sackler Gallery in Washington wraps its electronic arms around the future visitor to the exhibition Yoga: The Art of Transformation. The deluge of visitor/museum scenarios, including promoting the show over numerous social networks and enticing invitations to 'use' the exhibition in novel ways aims to introduce the visitors to the exhibition which opened October 19, 2013 - well before the red ribbon was cut. The second case study describes an engaging scenario of electronic delivery that accompanies the visitor during the visit and describes the CMA Collection Wall, a 40-foot multi-touch MicroTile Collection Wall that dramatically visualizes all the works currently on view in CMA's permanent collection galleries, plus some that are in storage, totaling over 3,800 works of art. The third VM scenario, Ask Jacques Lipchitz a Question, authored by the Israel Museum, Jerusalem can be enjoyed after the visit and serves, in a novel way, to augment and enhance the experience and maintain the connection between the Museum and the visitor opening up opportunities to 'meet the artist' and 'hear his voice', even after his own death.

Keywords: responsive design; ecomuseum, virtual museum

#### Introduction

The expression 'responsive design' is a term that we are hearing about more and more, but how does this relate to websites and in what ways can this concept possibly be connected to museums? Architects and engineers are experimenting with motion sensors that respond to the presence of the people moving within the environment; adjusting, for example, the room's temperature and triggering pre-synched systems to prompt ambient lighting. This approach to physical spaces is now referred to as responsive architecture<sup>1</sup> where embedded systems sense presence, and motion and prompt the environment to adjust in return. Physical spaces essentially enter into conversation with the people who occupy them, and respond in real time, accommodating them accordingly.

In a networked world, other kinds of systems need to develop different responsive solutions to deliver rich content to a range of platforms: large screens, pc's, mobile phones, tablets, etc... These systems also react in real time. Applying the same kind of responsive principle to optimize the viewing experience – easy reading and navigation with a minimum of re-sizing, panning, and scrolling – across a wide range of screen-sizes (from desktop computer monitors, to tablets, to mobile phones), this approach assures efficient delivery of content to all users, whatever the choice of platform.

This paper takes this approach one step further and explores what kinds of conversations are possible once the museum engages with audiences. Enabling access to exhibitions, collections, events and educational activities, it essentially facilitates public conversation around issues that concern the Museum. The responsive design approach, therefore, when applied to the Museum, serves to foster dialogue between the Museum and its visitors, inspiring the public to join in the exchange and encouraging truly reciprocal conversations. This paper discusses how the virtual museum (VM) opens up new possibilities to harness, and to enact reciprocal, user-driven scenarios, and furnishes new opportunities for the remote visitor to be able to interact with the physical museum in novel ways.

<sup>&</sup>lt;sup>1</sup> <http://en.wikipedia.org/wiki/Responsive\_architecture>

To explore the VM in the context of the responsive museum, we also reflect on the practice of new museology, not as a specific turning point in the history of museums, but rather as a marker of the ongoing, re-evaluation of the museum in relationship with its audiences.<sup>2</sup> New museology has at times implied a radical re-organisation of museum agendas, such as a move from an elitist, undemocratic space towards a more democratic space, the prioritising of the visitor rather than the object, or the reclaiming, or re-territorising of the museum as a space that could be owned by the community.<sup>3</sup> At the same time, a similar expectation of 'newness' is implicit in the term 'new media' when applied in the context of the museum. However, both terms have been repeated so often that they are at risk of becoming redundant and need to be re-appraised before applying them to the responsive museum. While the move from 'old' to 'new' media describes a modification of the technological platform, rather than a radical change in content - from traditional print distribution and terrestrial television, to webcasting, podcasting and electronic peer to peer communications over the Internet - the term 'new museology' is invoked to suggest changes in institutional ideologies. While this paper uses both of the terms to suggest a break from the corresponding 'old' agendas, it also questions whether the idea of 'newness' inherent in both of these expressions simply represents a modification of the platform of delivery, rather than a radicalisation of content, ideology or institutional agendas. We argue that new media iterations of museum agendas, in fact, often deliver applications that represent electronic versions of the old practices, and, with these applications the underlying ideologies of the inherited legacies are replicated and consequently re-distributed. The use of the terms that invoke the illusion of 'newness', therefore, may set up false expectations, especially when electronic environments are perceived as a panacea for archaic and inefficient systems.

In a presentation on e-government and the Information Society, Paul Timmers, Head of the Unit for E-Government in the European Commission, Directorate-General Information Society, argued that, while those who develop these initiatives, as well as those who will be using them, expect innovation, the emergence of new skills, and organizational implementation through the uptake of ICTs, are often based on, and essentially replicate, the old systems with all their inherent problems.<sup>4</sup> According to Timmers, in reproducing legacy systems, albeit in an electronic configuration, environments that articulate legislative practices - such as paying fines or taxes online or renewing a passport or driver's licence - that were cumbersome and outdated in their underlying assumptions, are often driven by the same organizational principles when transposed online.

#### The ecomuseum, new museology, and cultural diversity

Both the national and the universal museum have their own stories to tell, and each prioritises their collections and exhibitions accordingly with these agendas in mind. The theory and practice of the new museologists built on the ecomuseum, which emphasised a community–driven agenda, where the public was encouraged to take on an active role, and where a plurality of voices, rather than the single authoritarian voice could be heard. This section introduces new museology and its prioritising of cultural diversity, which, in contrast to the universal or national museum, actively encourages visitor participation, and visibly welcomes contributions from the community.

The museum is located within the reach of the community, and as each museum conceptualises 'its community' in specific ways these different perspectives inevitably determine the kinds of visits the public will experience when they visit. Whether the visit is purely educational or for pleasure, visitors will encounter the institutional narrative, and whether the visitor complies or not with this narrative, determines if he or she feels included or excluded from the experience. Describing the tools and processes by which concepts such as the 'museum' become self-legitimating, Irit Rogoff (1994, p.232) argues: 'the museum as a complex amalgam of ideological intentions operating through strategies of pleasure and gratifications, is equally the site of the production of cultural identities. Through numerous and varied practices cultural exclusions are reproduced and cultural "otherness" is constituted'. The display of meta-narratives and micro-narratives of cultural heritage in the gallery make the divisions of sub-cultures and para-cultures highly visible, therefore legitimising some kinds of cultural affiliation, while presenting other kinds of cultural practice as exotic or alien. When 'normative' displays of 'our' heritage, or 'our' shared memory, refer only to some members of society, not all

<sup>&</sup>lt;sup>2</sup> According to Patrick Boylan, the term 'new museology' was first introduced in the United States in 1958 by Mills and Grove in their contribution to S. De Borghegyi's book *The Modern Museum and the Community*. From compilation of museum definitions: Patrick Boylan, City University. <xa.yimg.com/kq/groups/.../Defining+Museums+and+Galleries.doc>.

<sup>&</sup>lt;sup>3</sup> See for example the various projects and agendas described in Hauenschild (1988).

<sup>&</sup>lt;sup>4</sup> The symposium was held at the Internet Committee Meeting, Israel Knesset (Parliament), Jerusalem, January 18, 2005.

visitors will necessarily concur with this message. Visitors who comply with the story line will readily engage with the narrative; alternatively, the exhibition message may be read in opposition, while at other times visitors may simply react indifferently.

While exclusion is often (although not exclusively) constructed as a derogatory or subordinate position, museum narratives often set up binary opposites to create cultural specificity, whether they are historical, ethnic, or geographical.<sup>5</sup> Karp (1991, p.375) referred to 'exoticizing' and 'assimilating' strategies that produce different kinds of responses to describe the different options open to the museum; these micro-narratives come together to construct the meta-narrative that visitors encounter when they come into the museum. As visitors enter the gallery, they do so with their own pre-figured, cultural empathies and alliances. See for example Doering's (1999, p.8) discussion on entrance narratives, or the internal story line. At times, the visitors embrace the narrative, while at others times the narrative is read against the grain, resulting in alienation and a sense of cultural exclusion.<sup>6</sup> Much effort goes into promoting social inclusion in the museum (see for example, the Group for Large Local Authority Museums, GLLAM Report, 2000, and the DCMS Department of Culture, Media and Science toolkit), and many museums' educational activities are now sensitive to the possibilities that some people may feel excluded.<sup>7</sup> The examples in this paper look at the narratives produced by the museum of the *new* museologists, those museums that choose to create true conversations through new media. We consider the ways that these kinds of museums produce community-driven scenarios and explore how these VMs mediate their messages to act as a site of production of cultural identity, with an agenda that promotes social inclusion.

While we are clearly discussing the kinds of experiences that are aligned to the Web 2.0 Museum, a term coined by Nino Simon in her popular blog and seminal publication<sup>8</sup>, the historical process of the new museologist conceptually prefaced the digital interaction of a community driven museum. The ecomuseum was introduced in the late 1970s and early 80s in France in a bid to reaffirm a sense of community through critique of the object-orientated model of the museum. According to Poulet (1994, p.71), the term was forged in 1971, during the ninth meeting of ICOM in Grenoble, when 'the idea of heritage [patrimoine] linked to specific communities and localities had begun to interest the French Ministry of the Environment and high officials in charge of the nation's physical resources'. The ecomuseum, Poulet argues, 'spawned a distinctive conception of identity, according to which the preservation of culture was a kind of social responsibility' (ibid.). The community of Le Creusot-Montceau-les-Mines, Poulet explains, was created in 1974 by Marcel Evard in collaboration with Rivière. Four distinct fields of activity were envisioned by the founders: remembrance; understanding [la connaissance]; a joint management and development of the locale by the inhabitants and a team of scientists; and finally, artistic creation (arts retreats; creative arts projects linked to local industry and technology) (1994, pp.71-72). Community-orientation and the active participation by the community as actors and even authors of the shared projects drove these kinds of moves. When inaugurating the Fresnes Ecomuseum in 1978, in a suburb of Paris, Georges Henri Rivière, the first Director of ICOM, outlined the underlying principles by which a community could view itself as 'an ecomuseum,' describing the ecomuseum as:

An instrument conceived, fashioned and operated jointly by a public authority and a local population. It is a mirror in which the local population views itself to discover its own image, in which it seeks an explanation of the territory to which it is attached and of the populations which have preceded it, through the discontinuity or continuity of generations. (Rivière 1978, quoted in Delarge 2001)<sup>9</sup>

The ecomuseum encouraged local cooperation and pro-active contributions of the community that determined exhibition strategies and educational agendas. For example, collaboration between Fresnes town and the community included several projects: a celebration that marked the local

<sup>&</sup>lt;sup>5</sup> See, for example, Frantz Fanon's (1967) description of how the category "white" is dependent for its stability on its negation of "black" where Fanon's binary Self/Other of the colonized and colonizer is projected onto the racially determined category of Black.

<sup>&</sup>lt;sup>6</sup> See Comolli and Narboni on reading against the grain in cinematic reading (1977), and Stuart Hall's model of mass communication which stressed active interpretation within the relevant codes of encoding and decoding (1999, pp.123-38).

<sup>&</sup>lt;sup>7</sup> Libraries, Museums, Galleries and Archives for All: Co-operating Across the Sectors to Tackle Social Exclusion, January 2001, http://books.google.co.il/books/about/Libraries\_Museums\_Galleries\_and\_Archives.html?id=3zKNYgEACAAJ&redir\_esc=y

<sup>&</sup>lt;sup>8</sup> http://museumtwo.blogspot

<sup>&</sup>lt;sup>9</sup> ICOM News, Volume 54 - 2001 N°1 <a href="http://www.chin.gc.ca/Applications\_URL/icom/managing\_change.html">http://www.chin.gc.ca/Applications\_URL/icom/managing\_change.html</a>>.

prison's centenary, and the presentation of *Rassemblance*, an exhibition that dealt with immigration. *Rassemblance* offered an opportunity for members of the immigrant population of Fresnes to portray one hundred years of immigration to France, gathering the photographic information that illustrated their own stories and their own heritage from their 'home' surroundings (ibid.).

The idea of 'a new museology' arrived in the UK at the end of the 1980s, soon after the ecomuseum had appeared in France. In the UK at this time, the museum community faced a crisis: funding was becoming scarce and museums were concerned with losing their direction.<sup>10</sup> The publication, The New Museology, edited by Peter Vergo (1989), included nine authors who introduced a series of radical challenges to the old view of a museum, calling for a reform of traditional museology, with a move towards community action. Andrea Witcomb (2003), an Australian-based, self-declared, new museologist describes 'New Museology', explaining that 'one of the ways in which contemporary museums attempt to challenge dominant views of the museum as site of power relations is to invoke and encourage new relations between museum and communities'. Witcomb suggests resolving the tensions through innovative curatorial practice, so that 'one way of avoiding romantic notions of community, while also recognizing that museums are engaged in dialogue, would be to think of museums themselves as communities' [original italics] (2003, p.79). She argues that this is demonstrated through her own curatorial practice at the Fremantle History Museum in Western Australia in a case study, Travelers and Immigrants (ibid.: 86). As a curator, Witcomb declares that she wanted the exhibition 'to be attentive to the problem of "voice" [...] and to reflect the meanings Portuguese-Australian people themselves gave to the objects as symbols of their own migrant experience'.

Attention to voice and authorship that depicts and structures community narratives could now be reshuffled in the light of emerging technologies, where VMs could present opportunities for voices to emerge from grass roots communities, perhaps for the first time. One of the first expressions of these kinds of platforms was *Moving Here*, the online stories of Caribbean, Irish, Jewish and South Asian people who left their homelands to move to England over the previous 200 years. This was one of the earliest examples of a new museological approach that was attentive to voices from the community and supported by new media, enabling new kinds of synergies to develop.<sup>11</sup> The online interface not only disseminated the archived histories from 30 museums across the UK in novel ways, but also offered opportunities for remote visitors to contribute their own micro-histories to the London community and their shared memory. Reaching out to the community in this way had its own historical antecedents, and represented a new chapter in the continuing evolution of the modern museum.

Clifford has described museums as 'contact zones', as discursive spaces where 'aspirations of both dominant and subaltern populations can be articulated through this structure, along with the material interests of nation and national tourism' (Clifford 1997, p.218). Clifford borrows the term 'contact zones' from Mary Louise Pratt, who in her book *Imperial Eyes: Travel and Transculturation*, defines the 'contact zone' as 'the space of colonial encounters, the space in which peoples geographically and historically separated come into contact with each other and establish ongoing relations, usually involving conditions of coercion, radical inequality, and intractable conflict' (Pratt 1992, pp.6-7, quoted in Clifford 1997, p.192).

For Clifford, however, the idea of a contact zone

can be extended to include cultural relations within the same state, region, or city – in the centers rather than the frontiers of nations and empires. The distances at issue here are more social than geographic. For most inhabitants of a poor neighborhood, located perhaps just blocks or a short bus ride from a fine-arts museum, the museum might as well be on another continent. (Clifford 1997, p.204)

Clifford's account of museums as contact zones 'argues for a democratic politic that would challenge the hierarchical valuing of different places of crossing. It argues for a decentralization and circulation of collections in a multiple public sphere, an expansion of the range of things that can happen in museums and museum-like settings' (ibid., p.214). While Clifford's discussions are set in the

<sup>&</sup>lt;sup>10</sup> See, for example, the research project and publication, *Art-Who Needs It? The Audience for Community Arts*, by Lewis, Morley and Southwood (1986) which attempted to find out whether the GLC's 1981-1986 programme to reach those groups traditionally excluded from the arts actually succeeded in broadening the base of arts provision in London. The authors concluded that in order for the arts and leisure activities to attract new audiences outside of the traditional white, middle class, highly educated elite public who traditionally benefited the public spending on the arts, councils needed to utilise and experiment with their existing cultural assets more imaginatively, by, for instance, holding town or city wide festivals, tempered with a marketing approach.

<sup>&</sup>lt;sup>11</sup> Moving Here, 200 Years of Migration to England, <http://www.movinghere.org.uk>.

basement of the Portland Museum of Art, Oregon, where curators meet with Tlingit tribal elders to discuss the Northwest Coast Indian Collection, the ensuing interaction that focused on custodial responsibilities to the clan's cultural heritage has implications for museum collections around the world. Clifford argues, 'the objects of the Rasmussen collection, however fairly or freely bought and sold, could never be entirely possessed by the museum. They were sites of a historical negotiation, occasions for ongoing contact' (ibid., p.194). Clifford's contact zones represent democratic spaces which draw attention to custodial responsibilities and relationships of reciprocity between the museum and the communities they serve, and where the community-driven agendas and potential resources are distributed rather than fixed in the hierarchical structures of the conventional museum. While most collections, held in custodial responsibility by museums on behalf of the community, would not be as spiritually imbued as those negotiated by the Tlingit tribal objects from the Northwest Coast Indian Collection in the Portland Museum of Art, all objects that are owned by the museum are in fact owned by the community and may be understood as sites of crossing.

Thinking about the museum as community clearly demands a radical adjustment to traditional museum practice. According to Bennett:

Much of the language of community might imply a critique of the more abstract relationships of government or of a state. What stands behind the ecomuseum are the activities of government which, in establishing such museum and training their staff, developing new principles for the exhibition of cultural materials and a host of related tinkering with practical arrangements [...] equips it to be able to develop itself as a community. (Bennett 1998, p.202)

When community action is amplified in the ways suggested by the ecomuseum, the new museologists and Clifford's contact zones, it could serve to reverse the traditional role of curator and visitor, transferring agency from the museum back into the community, and setting up new synergies of coproduction. While not actually redistributing the artefacts themselves, thinking about the VM as a contact zone suggests that these kinds of co-coordinated, online activities could offer new opportunities to share the knowledge, histories, and interpretations of objects. The ubiquitous electronic networks connect centre to periphery even when the distance is only a bus ride away, enabling opportunities for discourse and essentially replacing the producer/consumer model of the museum/visitor relationship with new co-productions of resources driven horizontally across the networks. The innovative nature of these networks, however, may be deceptive, especially when they serve to perpetuate the legacy of the past. When VMs simply replicate entrenched ideologies, the technological innovation is predicated on archaic principles, and their emancipatory potential is forfeited. Employing new media in the museum, therefore, must be seen as complex and ambiguous, and in describing these enabling technologies, V-Must identifies both those VMs that illustrate the emancipation of the rigid taxonomies of the traditional museum, as well as those that simply enable the museum to re-enact out-dated positions. The role of V-Must is not to critique either of these approaches, rather to identify and map out the different narratives the VMs encapsulate.

To conclude with Clifford's utopian vision of the museum as contact zone, he argues that:

within broad limits, a museum can accommodate different systems of accumulation and circulation, secrecy and communication, aesthetic, spiritual, and economic value. How its "public" or "community" is defined, what individual, group, vision, or ideology it celebrates, how it interprets the phenomena it presents, how long it remains in place, how rapidly it changes – all these are negotiable. (Clifford 1997, pp.217-218)

V-Must's arguments for a VM are speculative and not prescriptive; we can only retrospectively describe the dynamics and ideologies of this space that is perceived. We would of course prescribe an uncompromisingly democratic space that encompasses plurality and embraces cultural diversity if we perceived our role to influence things in any way, we still wouldn't ignore the reality where some VMs still clearly remain locked in fossilised legacies that still do not open their doors to everyone. To end on a more optimistic note, however, we argue that the trend is towards a greater openness, and without wishing to sound visionary or futuristic, we sense that museums, in a post Web 2.0 world are working towards a more open approach. In some cases they are actively integrating the micro-histories of their public into the meta-narratives of national histories, and accommodating broader audiences who come to the museum with their own agendas. Terms like the 'digital divide' have been replaced with ideas of social inclusion, and agendas developed to enhance cultural diversity and pluralism are gathering ground. To evaluate the role of VMs in this progression, the following examples represent how some experiences reiterate the legacy ideologies of the traditional museum, while at the same time other

platforms have opened up unique opportunities for open discussion and an opportunity to welcome all voices from communities across all contact zones.

The following section discusses three scenarios of the VM. In their own way, each describes the relationship between the museum and the visitors; each one highlights the progression from physical visit to virtual and the different kinds of opportunities that they afford the user/visitor. Whether they represent the truly democratising approach that the New Museologist advocates or not, these kinds of scenarios do offer the potential for re-shuffling the cards from a traditional museum approach to one that is more in tandem with the Web 2.0 world.

# Yoga: The Art of Transformation: before the visit, the VM and the marketing scenario

Visitors to the exhibition Yoga: The Art of Transformation that opened at the Arthur M. Sackler Gallery in Washington October 19th, 2013 may well have heard of it months in advance. Launching the exhibition across the Smithsonian's blog, via their E-newsletter, Twitter, YouTube Channel and over Facebook, the Museum had ample time to spread the Yoga vibes to potential audiences. Introducing the visitor to the exhibition and inviting them to 'use' the exhibition in novel ways served not only to introduce the visitors to the exhibition, but also to become directly involved in promoting it. Crowdsourcing the museum audience in this way amplified the exhibition's message and served to draw in potential visitors to the exhibition. The term 'crowd sourcing' is used in connection with a whole range of online activities, and generally describes the ways in which the public - that is you and I - are harnessed by others to do their work for them. This is a dynamic give and take relationship where it seems that some are giving while others take. Crowd sourcing sets up all sorts of novel power relationships: in some scenarios individuals act out of pure altruism (doubtful); with others it seems that there is one side gaining more than the others (usually by those who are doing the outsourcing); in yet other scenarios there are those who are prepared to be resources for their own-altruistic pleasure. As they say, 'it's complicated!' (Hazan 2011) Jeff Howe<sup>12</sup> was the first person to use the term when he described the concept of crowdsourcing in Wired Magazine as how smart people find ways to tap the latent talent of the crowd.

The cozy invitation to 'Get Involved with Yoga' included invitations to the numerous events, symposia, workshops, gallery tours, performances, demonstrations, festivals and family activities planned around the exhibition – fairly standard procedure for museums these days. But what made this call to action outstanding was the warm embrace of not only the museum visitors but the entire yoga community. 'Thank you so much for your interest in Yoga: The Art of Transformation, the world's first exhibition of yogic art' the museum intoned, 'we are honored that so many people in the community have contacted the Freer|Sackler, wanting to get involved'. In addition to the social network promotion, the curatoral staff distributed videos, slideshows and even printable posters to pin up in their own yoga studios, in coffee shops, schools, or other gathering places so that the community could share a little of the magic of 'the world's first exhibition on yogic art' at the Smithsonian in Washington.

<sup>&</sup>lt;sup>12</sup> http://www.wired.com/wired/archive/14.06/crowds.html



#### Get Involved with Yoga: The Art of Transformation!

Thank you so much for your interest in *Yoga: The Art of Transformation*, the world's first exhibition of yogic art. We are honored that so many people in the community have contacted the FreerlSackler, wanting to get involved.

We've outlined a number of ways in which individuals and organizations can participate, including sponsoring a program, promoting the exhibition online, and dedicating a yoga class to supporting the show. Please look over the opportunities here, and then complete the <u>online form</u> to let us know how you would like to become part of yoga history.

Promote the Exhibition | Attend Special Events | Support Education Programming | Online Form

#### Promote the Exhibition to Your Friends and Networks

Exhibitions don't come to life until they are filled with people enjoying the shared experience of learning, wonder, and art. We ask for your help in spreading the word about *Yoga: The Art of Transformation*. Encourage your members, staff, and friends to visit the Galleries. Reach out to your community through social media and together learn more about yoga's diverse histories.

Here's how:

- Sign up for our newsletter through the <u>FIS online portal</u> to receive the latest updates on exhibitions and programs.
- Share information about Yoga: The Art of Transformation and related programs through your email networks and newsletters.
- Follow @FreerSackler on <u>Twitter</u>, connect with us on <u>Facebook</u>, and show your excitement using the hashtag #artofyoga.
- Link to the Yoga exhibition webpage (asia.si.edu/yoga).
- Organize a group to visit the exhibition. Enjoy an in-depth exploration of Yoga: The Art of Transformation with a docent tour, available from early November through January 26, 2014. Please submit a tour request at least four weeks in advance using the <u>online form</u>. Tour groups can include up to 15 members. Find out more on our <u>tour reservation webpage</u>.

We can advise on written content and images for your promotional projects. Please send questions to



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Serenity | Help create tranquil

wer | Bring yoga classes to

\$200.000.00

\$125.000.00

Smithsonian's

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DONATE NOW

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0 \$65

Screenshot: The Art of Transformation website, Sackler Gallery, Smithsonian Museum, Washington, <a href="http://www.asia.si.edu/support/yoga/default.asp">http://www.asia.si.edu/support/yoga/default.asp</a>

But the call to action and the community embrace didn't end here, the museum also outlined a number of ways in which individuals and organizations could participate, including sponsoring a program, promoting the exhibition online, and dedicating a yoga class to support the show. Visitors were invited to look over the opportunities offered, complete the online form to let them know how they would like to become part of yoga history. Here was an invitation to crowdfund the exhibition that included works of Indian art, including temple sculptures of tantric goddesses, film clips of early twentieth-century yogis, and colorful manuscripts of ascetics journeying across the countryside.

In order to assist the Museum to 'trace yoga's central tenets and profound meanings over 2,000 years' the museum launched their crowdfunding campaign, aimed at the yoga crowd, asking them to 'donate now' to enrich their understanding of yoga and Indian culture. For a mere \$25 visitors could support 'Serenity', for \$65 they could 'Help create tranquil galleries'. The 'Power' donation of \$65 'brings yoga classes to the museum'. For \$150 you receive your share of 'Bliss by sharing of concerts, workshops & festivals'. \$500, that is if you are feeling particular enlightened, brings you 'Transformation' which 'Turns knowledge into books'. Finally opportunities to donate \$1,000 to choose 'Flight' promises to Transport yoginis across the world.

At the time of writing this paper (one week before the opening), the Museum had already raised \$176,415 towards their goal of \$200,000 and if they reached all their other crowdsourced goals in the same way, they were well positioned to open up their doors to welcome their very first visitor.

Through a simple search on Kickstarter,<sup>13</sup> there are currently 260 Museum projects, including some that are already fully funded including *CUBIST*, a desktop game that builds a 'grand and inspiring' new Modern Art Museum<sup>14</sup> including its interior sculptures or "installations." Out of cubes, or more precisely, dice! CUBIST was 160% funded, with \$16,007 pledged with 236 backers.

# *Collection Wall*: the electronic delivery that accompanies the visitor during the visit

While some museums offer the traditional small screen gallery guide, either on mobile devices offered by the museum for the duration of the visit or over BYODs, which stands for "Bring Your Own Device", content follows the visitor as he or she moves around the gallery or exhibition. Other museums use different sizes of screens or responsive tables located on the gallery floor that call up collections or present a virtual tour at the visitor's call. The second case study briefly describes an engaging scenario of electronic delivery, opened on January 21, 2013 that accompanies the visitor during the visit to Gallery One, the 13,000-square-foot atrium at the Cleveland Museum of Art (CMA). *Collection Wall*<sup>15</sup> vividly visualizes all the works currently on view in CMA's permanent collection galleries, as well as those that are held behind the scenes in storage. All together over 3,500 works of art are on display which adds up to more than 23 million pixels to play with!

According to the Museum's website:<sup>16</sup>

The Collection Wall is the largest multi-touch screen in the United States—a 40-foot, interactive, microtile wall featuring over 3500 works of art from the permanent collection, most of which are on view in the galleries. The display changes every 40 seconds, grouping works by theme and type, such as time period, materials and techniques, as well as 32 curated views of the collection.

Pitched essentially as an orientation experience, the interface facilitates discovery and dialogue both with the collections and with other visitors, allowing them to download existing tours, or create their own tours which they can then take out into the galleries on iPads. The *Collection Wall* in this way serves to personalise the visit, and allows visitors to appropriate the objects and works of art; connecting with objects in ways that are bespoke and therefor meaningful for them.



Cleveland Museum of Art, (CMA) Collection Wall

For those who can't make up their mind they can spend a little time at the wall and wait for it to change its curated view. To discover one of the groupings of objects from the collection, organized around curated themes like "Love and Lust," "Funerary Art," and "Dance and Music." the collections have also

<sup>&</sup>lt;sup>13</sup> http://www.kickstarter.com/projects/search?utf8=%E2%9C%93&term=museum

<sup>&</sup>lt;sup>14</sup>http://www.kickstarter.com/projects/167427101/cubist-build-an-inspiring-new-art-museumwith-dice?ref=search

<sup>&</sup>lt;sup>15</sup> http://www.clevelandart.org/gallery-one/collection-wall

<sup>&</sup>lt;sup>16</sup> http://www.clevelandart.org/gallery-one/collection-wall

been organised by medium or geographical region, all called up on the fly from the CMA's digital asset management system. The museum describes this experience as a:

huge interactive tool [that] allows visitors to see the permanent collection as a living organism, changing depending on the prism through which you view it. The Collection Wall further functions as a giant group and individual touchscreen interactive, and allows visitors to touch the objects represented on the wall to make discoveries. Visitors follow their curiosity through a visual interface that links each artwork to a series of associated artworks, giving visitors the opportunity to browse and explore relationships from object to object. (Alexander, Barton, and Goeser 2013)

Having made their selection, visitors save their favorites onto their iPad by placing their device on one of eight docking stations, which identify an iPad by detecting an RFID chip on the back of its case. Visitors can download it for free to their iPads, or pre-loaded iPad 4s are available to rent on location for a nominal fee of five dollars. In addition, the visitor's favoriting, and sharing activity explains the museum, creates metrics that enable museum staff to understand what artworks visitors are engaging with, creating a feedback loop with the museum.

Once out and about in the gallery with their bespoke tour uploaded to their personal device, visitors can use one of the three additional functions as described by staff at the CMA:

The "Near You Now" function allows visitors to browse and find digital interpretations of works of art they like based on proximity. Content is designed in short segments of audio and video, allowing visitors to choose what they want rather than committing to a long, linear narrative. Visitors can hear from curators, educators, and community members to discover the continuing traditions that bring art to life.

The "Tours" function allows visitors to have a more structured experience in the galleries, taking a tour curated for the block of time they have available. They can walk through the galleries with CMA's director to discover his favorites, or they can follow a theme that carves a focused path through the museum's galleries. The two hundred most recently saved Visitor-created tours are also available.

The "Scan" function uses image recognition to allow visitors to scan two-dimensional art objects to trigger texts or videos to pop up on the iPad screen. The immediate delivery of this additional interpretive content enables visitors to delve more deeply into the app to learn more about a work of art.

In this scenario it is difficult to separate whether it is the screen that is responding to the visitor or the visitor to the screen, but what is clear here, is the symbiotic accommodation of the museum to its audience, and the potential for optimising the visit, and, in doing so empowering the visitor to take on an active role that is tailor made to him or her during the gallery tour.

# Ask Jacques Lipchitz a Question: the VM as encountered after the visit that serves to augment and enhance the experience and maintain the connection between the Museum and the visitor

The third VM scenario, *Ask Jacques Lipchitz a Question*,<sup>17</sup> authored by the Israel Museum, Jerusalem<sup>18</sup> and developed by STARC, at the Cyprus Institute is an experience that can be enjoyed after the visit. Recalling the Lipschitz works explored during the Museum visit, the platform serves, in a novel way, to augment and enhance the experience and maintain the connection between the Museum and the visitor through opening up a unique opportunity to 'meet the artist' and 'hear his voice' – even after his own death.

<sup>&</sup>lt;sup>17</sup> http://www.imj.org.il/lipchitz

<sup>&</sup>lt;sup>18</sup> Digitization for the IMJ presentation of the conversations: Mr. Hanno D. Mott, New York for the family of Jacques Lipchitz. Interviewer and video producer: Bruce W. Bassett, 1971-2002. With the assistance of the Computer and Information Systems Department © The Israel Museum, Jerusalem.

# Jacques Lipchitz



Screenshot: Ask Jacques Lipchitz a Question, The Israel Museum, Jerusalem

Jacques Lipchitz (August 22nd, 1891 - May 16th, 1973) was interviewed by Bruce Bassett during the summers of 1970 to 1972, at Villa Bosio in Pieve di Camaiore, Italy. Over this web-based platform, visitors are invited to hold a conversation with Jacques Lipchitz by asking questions, searching through his ideas, or by following term tags and then listening to his video clips as he answers your specific query.

A pioneering artist of the 20th century, Chaim Jacob Lipchitz (1891-1973) was born in Druskininkai, Lithuania. In 1909 Lipchitz moved to Paris to study at the École des Beaux-Arts and at the Académie Julian, and also attended drawing classes at the Académie Colarossi. Whilst in Paris he became acquainted with Pablo Picasso, Amedeo Modigliani, and Juan Gris. Lipchitz frequented museums and became deeply interested in ancient and non-western art, and began collecting various artifacts. Following the Nazi occupation of Paris, Lipchitz escaped to New York, where he continued to sculpt until his death. He is buried in Har Hamenuhot, Jerusalem.

In addition to the project's online presence, the platform is on permanent exhibition in the Lipschitz Gallery in the Israel Museum, Jerusalem and Lipchitz Exhibition at Museum of Palazzo Pretorio, Prato, Italy.<sup>19</sup>

Maintaining the connection between the museum and its audience essentially means building a longterm relationship. In this way the VM can provide ideal opportunities to strengthen their links. Whether or not the actual visit inspires visitors to return and learn more, these kinds of platforms create longterm connections and augment the physical visit with echoes of the art and artworks, in this case with the artist's own voice lingering on, even after his own death.

<sup>&</sup>lt;sup>19</sup> http://www.palazzopretorio.prato.it/pagina2\_home.html

#### Conclusion

One of the main challenges of the VM in the context of new museology - resonating with the debate of the "new archaeology" of the 1970s - is the breaking down of the barriers of agreeable narratives and romantic stories about the past. In the context of archaeological research, researchers are now engaged in "hard core" sciences in order to reveal the past including chemical analyses, physical investigations, statistical methods, etc... The museum still displays artifacts along traditional trajectories – canonical narratives, chronicling the historical past in pre-determined meta-narratives. The VM now offers new opportunities to reset these paradigms.

VM is not (only) about innovative technologies, the main challenge lies in daring to dream, that museums are more than collections of objects, charged with ideology (cultural, elitist, intellectual, richness, prestige, etc...). By the willingness of curators, museum directors or politicians to promote culture, virtual museums can, and should be, true cognitive technologies, platforms of situated learning environments, (cyber) social spaces of interaction, where people meet and learn from each other, through the experience of each other, and through interaction with each other in a new iteration of Clifford's "contact zones". Being digital, VMs can link the Chinese citizen with the Swedish or the South-African with the Russian. In this way, everyone's voice has equal power and intensity, and it's up to the visitor, and perhaps it's their duty, to contribute their own knowledge to the "global" experience of VM.

VM allows almost anything and can digitally "materialize" almost everything. It is up to the curator or perhaps the "digital curator" (a hybrid between a dreamer, a social scientist, an art historian and a computer expert) to explore and fully benefit from the new (social, cognitive and cultural) space. VM is enabling a voyage into a new, and yet unexplored world...

Space: The final frontier These are the voyages of the Starship, Enterprise Its 5 year mission To explore strange new worlds To seek out new life and new civilizations To boldly go where no man has gone before

(From the original *Star Trek* science fiction television series. It refers to the mission of the original starship *Enterprise*. The complete introductory sequence, narrated by William Shatner at the beginning of every episode of *Star Trek*, Desilu Productions, and by Paramount Television from 1968-69).

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### **Time Trails**

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Abstract: Time Trails is a collaboration between Royal Albert Memorial Museum and Art Gallery (RAMM), 1010 Media, University of Exeter, and the Exeter City FC Supporters' Trust (2013). The project researched the use of trails as a means to encounter and respond to RAMM's collections outside the museum in conjunction with content and branding provided by other partners, most prominently Exeter City FC Supporters' Trust. Drawing on research into trails (Ingold 2000 and 2007) and into trajectories as a way of designing mixed reality environments (Benford and Giannachi 2011), and focussing in particular on the orchestration of time, space, and roles, Time Trails investigated the curation of encounters with hybrid collections and archives via the creation of a number of chronological trails (e.g. Roman, Tudor, World War 2) and thematic trails (e.g. health and sport) that lead visitors through the city of Exeter. These trails can be further annotated by users via social media. Time Trails explored how users benefit from engaging creatively with hybrid collections outside the museum; how trails can be used by schools, the tourist industry, and local communities to raise cultural awareness and bring together diverse user groups. The framework developed from this project identifies the benefits of creative experiences of museum collections outside the museum, allowing organisations to engage audiences with objects which are not on display; learn how to stimulate creativity, reflection and self-documentation and facilitate free-style mobile learning in mixed reality environments; increase audience reach with social media to encourage participation among users who do not habitually visit museums; reconnect objects with the locations they were originally associated with and relate locations to different values; promote well-being by encouraging walking and collaborating with organisations that work with cultural tourists and local communities, including children who are at risk of disengaging from education.

Keywords: trails; digital heritage; mapping; trajectories; social media; mobile learning

Time Trails saw the Royal Albert Memorial Museum and Art Gallery (RAMM), 1010 Media, The Centre for Intermedia at the University of Exeter and Exeter City FC Supporters' Trust, collaborate to develop a web app prototype. This is based on RAMM's existing tours website, modelled on the Exeter Time Trail website, which is widely used by the BBC and Usborne, through which users can explore RAMM's collections via three kinds of tours: Museum tours, located at RAMM, linking various objects on display; Exeter tours, based on specific historical periods or themes; and Devon tours, linked to exhibitions and encouraging the exploration of Devon's wider heritage. Time Trails, which was developed in 2013, offers users a mobile learning experience allowing them to engage creatively with history, heritage, collections and archival materials through a series of time-based trails. These can be experienced both inside and outside the institutions that hosts them, whilst 'on the go', and include trails curated by RAMM (e.g., historic trails, such as our Roman, Tudor, Victorian, and a World War Two trails or thematic trails, such as life-style and sport trails), as well as trails curated by project partners, such as two Exeter City FC Supporters' Trust trails designed by Barrett and Giannachi in collaboration with staff from the Exeter City FC Supporters' Trust. Users can annotate these trails through social media and generate their own trails.

The Time Trails project drew on research into the use of trajectories for the design of mixed reality experiences (Benford and Giannachi 2011) and research into trails (Ingold 2000 and 2007) to investigate the value of following and generating trails to explore collection and archival materials outside of the institutions that host them. By mixed reality experiences we mean ones that span physical and digital environments (Milgram and Kishino 1994) and often entail forms of interactive,

distributed, and subjective performance (Benford and Giannachi 2011), in the sense that users of such environments are encouraged to perform actions or embrace forms of more or less minimal role-play. In particular, we utilised aspects of the trajectories framework, which was developed by Steve Benford and Gabriella Giannachi to provide a means to design and interpret mixed reality experiences (Benford and Giannachi 2011). For Benford and Giannachi trajectories define "predicted and actual itineraries through mixed reality experiences" (Benford and Giannachi 2011, p.15). The predicted, or canonic, trajectories express a desired set of routes participants may follow, and the actual, or participant, trajectories, show how participants choose to behave whilst on the go. We thought that the trajectories framework would allow us to plan how users may behave as they embrace a variety of more or less active roles (e.g. spectating, interacting, acting, documenting, doing, etc.) to deal with the shifts necessary in reflecting on and/or documenting one's experience of the overlaying of physical spaces with information about heritage received whilst on the go.

We decided to use maps for the visualisation of canonic trajectories and to facilitate orientation; mapping as a practice for knowledge generation that would be captured through self-documentation; and trails to encourage subjective forms of mobile learning. We used maps for orientation as we know they constitute 'graphic representations that facilitate a spatial understanding of things, concepts, conditions, processes or events in the human world' (Harley and Woodward 1987, p.xvi). We know that whilst maps are necessary orientation tools, they tend to express a canonic and holistic representation. We wanted to encourage users not so much to be passive receivers of knowledge, but rather to act as knowledge producers. We therefore wanted them not only to use maps for orientation but actively embrace the practice of mapping, which involves the production of knowledge 'on the go'. Reflections about this process could be captured through the use of social media which would also make possible the sharing of new knowledge to a broader user group. Finally, we used trails to facilitate subjective forms of mobile learning.

Our thinking in terms of the differences between these terms was influenced by the work of anthropologist Tim Ingold, who explains the distinctions between wayfinding, map-making and mapping that informed our understanding of the relationship between maps, mapping and trails. For Ingold wayfinding is 'the movement of people as they come and go between places' (2000, p.234) and mapping, the production of knowledge as one goes (2000, p.231), is a form of 're-enactment of those movements in inscriptive gestures' (2000, p.232). The map, he notes, captures neither, as it remains a representation. For him it is in fact wrong to assume that the 'structure of the map springs directly from the structure of the world' (2000, p.234). This ultimate 'carthographic illusion' (2000, p.234) has to do with the differences between networks and surfaces. In discussing a number of studies that show that Inuit people perceive their territory as a network of lines and itineraries rather than a surface (Collignon 1996, p.98; Aporta 2004, p.12), Ingold notes that while the British Royal Navy would follow specific points on route to a destination, moving 'across' a surface, the Inuit people moved 'along paths' (Ingold 2007, p.75). Whereas the map, which constitutes a means to facilitate transportation, can capture the former, the network of lines and paths formed by the latter remain too complex and subjective to be visualised on a map. We wanted to use maps for the purpose of navigation, and record predicted or canonic trajectories on them, but we also wanted to capture information about participant trajectories, documenting the subjective practice of mapping. This distinction between maps, mapping and trails formed the core of our framework. While maps or cartographies show a 'bird-eye's view' (Gibson 1979, pp.198-9), i.e. they show what claims to be an 'objective' reality, a representation that may be useful for transportation and orientation, trails show paths, making visible aspects of wayfinding, and allow the capture of mapping processes that document the unfolding of 'subjective' points of view. While maps represent more or less canonic and holistic world-views, useful for the telling of a history, trails constitute individual stories that document a subjective experience or path through a broader history, which may be represented by the map. Our vision for Time Trails was to build a tool that would allow the use of maps to capture what occurs whilst mapping, therefore empowering users to narrate individual stories in relation to and as part of a broader history.

Two projects played a significant role in shaping our thinking in terms of how walking could be used to stimulate mobile learning. Both adopted physical meandering as a performative strategy to change users' perception of places. These are Serendiptor and Dérive app. The former, developed by Mark Shepard at V2, combines a rooting service offered through Google Maps with instructions for action and movement inspired by Fluxus, Vito Acconci and Yoko Ono. For the Serendiptor team, the app will help users to 'find something by looking for something else'. Likewise, Dérive app, developed by a team led by Eduardo Cachucho, uses Situationist strategies to allow users to explore urban spaces 'in a care-free and casual way'. Interestingly, the Dérive app team postulate that 'active engagement of communities in their urban spaces unleashes in them new understanding of their urban surroundings',

hereby allowing users 'to see their urban spaces in a different light'. In line with these projects, we wanted to adopt physical meandering, which we knew through our research into Blast Theory's performance-work *Rider Spoke* (2007) can stimulate mental meandering (Benford and Giannachi 2011, p.188), to facilitate mapping and, through the production of knowledge involved in mapping, make users aware of their presence in relation to their changing relationship to places and the digital heritage that is associated with them. This led to the adoption, in one of our trails, the Exeter City FC Supporters' Trust trail, of basic tasks as a means to generate affordances that would encourage users to narrate their own memories in relation to their experience of a number of locations.

Other projects helped to shape our understanding of how to encourage users to attach their own memories to places. One such project is Findery, developed by a team in the San Francisco Bay Area, which allows users to leave notes, photos or videos to comment on specific destinations. Another such project is History Pin, developed by We Are What We Do in partnership with Google, which allows users to share stories about places. The History Pin has been adopted by a number of organisations which have used it in projects such as Olympic Memories, encouraging the gathering of photos and memories from the Olympics throughout the ages; Year of the Bay, capturing events occurring in the San Francisco Bay Area; and Putting Art on the Map, which facilitates the exploration of Imperial War Museum's collection of artworks on a Google Map. All these projects show that pinpointing memories and stories to locations, and using maps as a means to prompt the telling of personalized stories in relation to these locations, is an increasingly popular strategy to produce engagement with local history. Most crucially, they show the value of mapping, generating trails and even map-making as strategies for remembering.

Another project utilizing mapping as well as map-making to reflect about place and art is Artmaps, a collaboration between the Centre for Intermedia at the University of Exeter, University of Nottingham and three departments at Tate, Tate Online, Tate Research and Tate Learning, which aimed to give users the possibility of exploring artworks in the Tate collection in relation to the places, sites, landscapes and environments that informed or led to their geotagging. The web app, which also uses a map as interface, can locate their user and bring up works in the Tate collection that are geotagged in relation to places near them. Users could then look at these works on the map and/or explore them in situ, reflecting on how what they see in the works relates to their surroundings. Alternatively, through a search function, they could explore works in any locality. The original aim of the project was for the apps to facilitate crowdsourcing so that Tate's knowledge of the artworks' geolocation could be improved on. Additional functionalities now prompt users to self-document their encounter with the work through text, photography, video and sound (see Cardiff, Sinker and Beaven 2013), allowing Tate to build a growing understanding of how users interpret artworks in their collection whilst on the go. Also influential on the development of Time Trails as a tool to reflect about artifacts and art in situ was Moor Stories, a collaboration between the Centre for Intermedia at the University of Exeter, RAMM and 1010 Media, which generated a web app that aims to facilitate creative encounters between objects in RAMM's collections pertaining to Dartmoor (primarily flints, pottery, drawings, paintings, wood and stone carvings) to prompt the documentation of memories about them among the communities that live where the objects were originally found. Whilst Moor Stories was more specifically oriented towards the telling of stories (whether creative, fictional or factual), it still offered a valuable model to understand how to prompt users to reflect about a particular location in relation to an artifact or artwork. Both Art Maps and Moor Stories projects allow users to contribute individual knowledge to a canonic interpretation and, by using social media, to share this knowledge with broader user communities. Both also make it possible for Tate and RAMM to present users with novel ways of encountering their collections, including items not ordinarily on display, and facilitate more creative and performative engagements. Finally both projects 'exploded' the idea of the museum as a public space by physically moving the exhibition space, alongside its interpretation, outside of the museum and distributing within users' everyday life environments.

Finally we looked into the operation of a number of platforms which facilitate trail creation, such as viewranger, allowing users to generate and share trails primarily to talk about journeys and experiences, and EveryTrail, allowing users to generate trails, and add texts and images to them. Other apps that specifically use trails to facilitate the exploration of places through art and history include 7 scenes whose project website notes that as 'the smartphone is quickly becoming our primary access to cultural information', people increasingly 'use apps on their phone to find cultural landmarks, to take tours exploring the city, to learn more during exhibitions and to share experiences' in order to 'experience cultural heritage' in novel ways. 'Tourmaker' is another such tool which allows users to select a genre which determines if the user can navigate freely or is restricted in any way; produce a story, which is meant to generate expectation; choose a configuration, which determines a tour's time

limit; specify localities, dragging and dropping texts, photos and sounds; and finally publish and share their tour. 1001 Stories about Denmark, likewise, aims to collect stories from the Iron Age settlement Sorte Muld ('Black Soil') on Bornholm to the Black Horse Cavern in Copenhagen in the form of trails which can be walked, cycled or driven by car. In this case the histories behind the trails are written by historians and heritage experts, though they can then also be annotated by users. What interested us about these projects was the idea that a Time Trails app could act as an orientation tool, a search tool, and a publishing tool to tie canonic trajectories (or locative stories created by users) to participant trajectories (documentations of engagement with these stories produced by users).

Following a period of research and development with our stakeholders, which saw us consult with two primary schools in Exeter (St Sidwell's Primary School and St David's Primary School), Exeter City Red Coats Guides, and various members of the Exeter City FC Supporters' Trust, 1010 Media developed the Time Trails web app together with a "find me" tool that allows users to identify their location by utilising geocoding so that their location may be imported into a trail and become a destination. Once a tour is selected, the tool identifies the user's location through GPS and places them on the map as a green dot, if connectivity is good, or an orange dot if it isn't. If the user is in the proximity of a trail, they can start it and progress through as many locations as they have time for. These are numbered to give the idea of a trail, which implies direction and sequencing. Alternatively, the app suggests that the user views the locations as a list. Once a location has been viewed the icon on the map that represents the location turns from red to green, though these data can be erased so as to take the tour again. The interface, which initially showed a map view, was changed to a hybrid view to create an enhanced sense of being in a location. Street view can also be used, and all settings can be erased so as to experience the tour afresh.

A number of trails used content from RAMM's collections (such as a Tudor trail to coincide with an exhibition on Elizabethan art scheduled for October 2013 and a World War Two trail) and two utilized Exeter City FC Supporters' Trust content (one was written for the general public and one was written specifically for the children taking part in the Football in the Community Kick Start programme which supports children who are at risk of disengaging from education by delivering a personalized learning programme). The RAMM trails used the existing trails of the Exeter Time Trail website, with the exception of the World War Two trail which was designed by Will Barrett specifically for this project. Both Exeter City FC Supporters' Trust trails were designed by asking stakeholders from Exeter City FC Supporters' Trust to identify a set of locations in Exeter and at St James Park, the stadium that is home to Exeter City Football Club, through which one could narrate the history of both the Club and the Trust that owns it. Whereas in the RAMM trails locations are tied to where objects in RAMM's collections were initially found, the locations forming part of the Exeter City FC Supporters' Trust trails are tied to oral histories, only occasionally, referring to artefacts by which to remember them. Each of the interpretation texts of the longer Exeter City FC Supporters' Trust trail is meant to prompt an affordance facilitating users' in relating themselves to the physical sites and the stories narrated through them, and thus position themselves within the broader history of the Club and Trust in Exeter whereas the texts in the shorter trail, written for the children taking part in the Kick Start programme, did not contain affordances and feedback was gathered at the end of a structured mobile learning programme through a role play exercise that saw the children trying to persuade a member of the team to sign up for Exeter City FC.

Below are examples of texts from the Tudor trail, the World War Two trail, and the Exeter City FC Supporters' Trust longer trail that refer to a set of locations in proximity to each other:

**Doors from the High School:** These complex doors of oak came from the Exeter Free Grammar School, which stood on the High Street close to the Eastgate. The site is now occupied by River Island. With their radiating 'shell' motif head, row of face-masks and stud-like motifs, the doors are especially similar to the door of Nos 10-11 Cathedral Close, and more generally to Nicholas Baggett's door to the Guildhall. It has been claimed that they date to 1593 but they may equally belong to the foundation of the Grammar School in 1633.

**Exeter Cathedral and the Close** by William Lionel Clause (1943) (© Royal Albert Memorial Museum & Art Gallery, Exeter): Presented by HM Government War Artists' Advisory Committee. The Cathedral escaped the bombing with only limited damage in 1942, but many of the buildings of the Cathedral Close and South Street were demolished or badly damaged. This pen-and-watercolour view by the war artist W.L. Clause looks towards the Close, showing the state of the Cathedral and Close following extensive demolitions of badly damaged buildings.

**Jimmy Rigby shop:** Jimmy Rigby (b. 1886) was part of the side that travelled to South America in 1914. Exeter City was selected to do so by the Southern League that felt they represented a 'typical English football team', the tour contained a number of memorable games and incidents; none more so than the 2-0 victory over Argentine Champions, Racing Club de Buenos Aires, a match which had to be temporarily abandoned when the secretary of the South American side brandished his revolver towards the ref in frustration at City taking the lead! Jimmy Rigby, who early in his career combined playing whilst working as a cotton spinner in the textile industry, later owned three shops in this area which were run by various members of his family. There was one here at Sidwell Street, near where Sainsburys currently is, one at the top of Paris Street, and one near the Old Tiverton Road roundabout. The shop here and the one near the Old Tiverton Road roundabout were destroyed during the 1942 Blitz on Exeter. Rigby was a director of Exeter City for many years.

It is clear from these examples that the texts aim to offer interpretation about artefacts, in case of RAMM's trails, or offer a perspective over a broader history, in case of the Exeter City FC Supporters' Trust trail, whilst drawing attention to the discrepancies between the past and present uses of these sites and, possibly, interpretations of historically significant moments according to different points of view. Examples such as the one below, tied to the football stadium where Exeter City FC play, drawn from the Exeter City FC Supporters' Trust trail, also reveal how the team attempted to prompt user engagement through tasks, affordances and questions:

Exeter City FC's first match was held here at St James Park on 10th September 1904. The team won 2-1 against the 110th First Royal Artillery. The winning goal was scored by Sid Thomas, whose career with the club would go on to last over 70 years not only as a player, but also a secretary, director, chairman and lifelong president. When ECFC turned professional in 1908, St James Park was developed to meet the standards of the Southern League. Despite a few games played elsewhere, this has been the home of Exeter City FC for over 100 years. Once there was a large gate here, the Kendall Gate. On a Friday in late February 1981, when we had an FA cup run, hundreds of supporters slept overnight on the pavement by that gate, so when the shop opened on the Saturday morning to sell tickets for the quarter final match away to Spurs we would not miss out. Were you there that night? Can you remember what you felt the first time you came here?

Whilst these locations form part of different trails, each written according to a specific chronology or history, brought together, they generate a hybrid 'live' map visualising the changing history of Exeter over time in the eyes of diverse communities.

We hope to have shown how the combined use of maps for the visualisation of canonic trajectories and for orientation, mapping as a practice for knowledge generation that would be captured through reflection and self-documentation, and shared via social media, and trails to encourage subjective forms of mobile learning, has created a novel way to not only encounter and interpret but also write individual histories into the broader history of a community. Initial testing of both RAMM and Exeter City FC Supporters' Trust trails showed that, as in the case of the Art Maps project, users who encountered collections outside of the museum frequently wished to go back to the museum to encounter the 'original' artefacts. This suggests that Time Trail offers a novel way to 'exhibit' artefacts, in the case of RAMM, and locate and write up lost or misplaced histories, in the case of Exeter City FC Supporters' Trust. Using the content of the Exeter City FC Supporters' Trust trail in the context of the Kick Start programme also proved a valid way to stimulate creativity and reflection whilst facilitating free-style mobile learning among children who may have become disaffected with conventional learning. This, alongside the use of social media to disseminate knowledge produced on the go, allows organisations to increase audience reach and encourage reflection about digital heritage among users who do not habitually visit museums or may have disengaged from learning. In all cases, Time Trails makes it possible for users to reconnect objects with the locations they were 'originally' associated with, thus allowing them to re-engage with objects and histories that had been taken away from them, changing their perception of locations encountered in everyday life through the embedding of information that could increase digital heritage's aesthetic and emotional value for diverse kinds of user communities.

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# Exploring the challenges for collaboration between museums and ICT design companies

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Abstract: To collaborate across organisational contexts is not an easy task, but to do so and to succeed can be vital for reaching creative and innovative results. This paper is an empirical exploration of contextual challenges for collaborative museum design, focusing on the interplay between museums and ICT design companies. Based on empirical findings, two kinds of challenges are presented as particularly interesting in relation to this context: Structure related challenges, and value and practice related challenges.

Keywords: collaborative design, ICT design, exhibition design, design processes, ICT design companies

#### Introduction

It is just what is so great about this process we are in now. It is now we take all the difficult decisions. It is now we draw all these difficult lines. And then we boil and boil and boil on the exhibition concept that we can almost compare with a stew. It is not necessarily the stew that will be served. We boil and boil and boil and boil and boil so it eventually ends up as a broth. And we include that broth as a requirement for the exhibition. So all these discussions we have been through, should we do this or that, will simply raise the level of the entire final competition. [...] So it's okay that we are frustrated now and that we think it is difficult. It is part of the process. (Project manager (M), collaboration 2)

I hear the project manager use this broth metaphor several times and with good reason. He is managing the development of a new cultural historic museum and using the metaphor, he pinpoints the quintessence of collaborative design. To put together a great variety of ingredients (skills, perspectives, viewpoints, opinions) and boil them into a delicate, balanced broth. This is easier said than done. Design practice can be complex and messy (Stolterman 2008; Schön 1983) and even though this complexity and messiness might be essential for innovative and creative design to happen, it can also be overwhelming (Stolterman 2008). As the saying goes: too many cooks can indeed spoil the broth.

The aim of this paper is to explore empirically some of the contextual challenges for collaborative museum design, focusing on the interplay between museums and ICT (information and communications technology) design companies. Every day museum visitors around the world are met by audio guides, touch screens, mobile applications and so on – filled with text, sound, video, games and other content – with the intention of improving the museum experience. However, in a Danish context, many museums lack the resources and know-how needed to develop ICT. In order to go down the digital road, museums establish partnerships with ICT design companies in which curators, educators and other museum professionals collaborate with external interaction designers, creative directors and developers (Skot-Hansen 2008).

In recent years, a great deal of the literature and research concerned with collaborative design practices at museums has focused on collaboration and co-design with users and communities, for instance building on the notions of the 'participatory museum' (Simon 2010). Even though this is an important area to look into, I argue that collaborative design practices taking place between museums and ICT design companies deserve more attention. Collaborating across organisational contexts is not an easy task, but to do so and to succeed can be vital for reaching creative and innovative results (Sawyer 2007).

In what follows, I focus on two kinds of challenges for collaborative design between museums and ICT design companies: structure related challenges, and value and practice related challenges. These categories build on analysis of data from longitudinal case studies of two distinct Danish museum projects where the collaboration with ICT design companies played an essential role. Hence, the categorisation is primarily based on empirical findings and represents an initial exploration of the field.

#### Cases

Two distinct cases of collaboration between museums and ICT design companies serve as the basis for this study. In order to protect the anonymity of the parties involved, the cases are called 'Collaboration 1' and 'Collaboration 2' in this paper. In addition to this, the participants are named by their job title and affiliation: 'M' for museum or 'D' for ICT design company. The cases were chosen on the basis of two criteria (Neergaard 2007):

1) The cases are similar in relation to the participants' intentions regarding collaboration. In both cases, the intention was to collaborate in all phases of development of ICT, both in relation to design and construction (Löwgreen & Stolterman 2007). This contrasts some classical customer-provider relationships where, for instance, the design is developed inhouse and construction is outsourced. The criterion was applied to make sure that collaborative design actually did take place or was at least intended to take place.

2) The cases are diverse in relation to museum subject area and scale. This enables me to compare challenges in diverse settings in order to point to possible common patterns in the context.

Collaboration 1 was a collaboration between an art museum and an ICT design company. The two organisations received funding to collaborate on the development of three ICTs for three different exhibitions, the process stretching over approximately 18 months in total. The case, then, consisted of three subcases (subcase 1, 2 and 3), which provided a unique setting for the participants to reflect on and refine the collaboration on a continuous basis.

Collaboration 2 took place within a much bigger setup, namely the development of a new cultural historic museum. Hence, developing ICT was not the primary focus, but it was considered important to integrate thoughts about ICT from the outset of the development. Two phases, or subcases, in the process were particularly interesting in relation to the collaboration between museums and ICT design companies: In the first phase, an initial idea group (subcase 4) worked together over approximately 4 months with the aim of generating ideas for the museum and refining its purpose. Different creative companies and individuals, museum staff, archaeologists and other individuals with relevant knowledge participated in this phase, including an ICT design company. Later on, an exhibition design group (subcase 5) was setup to develop more concrete exhibition guidelines to be used as foundation for an architecture competition. In this process, stretching over approximately 6 months, ICT design companies were not involved directly in the group, but inputs from such companies were gathered in a more informal manner.

#### Method

I followed the two cases for approximately 18 months by means of ethnographic methods of observation, semi-structured interviews and document collection. My objective was generally to "follow the people" (Marcus, 1998) or more precisely the practice (Nicolini, 2009) of collaboration. I observed meetings (approx. 100 hours), produced and collected over 500 pages of field notes, documents, written correspondences and other materials and conducted 11 semi-structured interviews with selected participants.

In Collaboration 1, I conducted 7 interviews. I interviewed the project managers from the museum and from the ICT design company separately after each round, resulting in 6 interviews plus 1 interview with the overall project initiator (the project manager from the museum) after the project was complete. In Collaboration 2, I conducted 4 interviews with the project manager, the facilitator, an archaeologist from the museum and an interaction designer from an involved ICT design company after the last meeting in the idea group (subcase 4). In the interviews, the focus was on the current projects, but participants were also encouraged to compare the current projects with previous good and bad experiences of collaborations between museums and ICT design companies.

The resulting data sample was analysed with inspiration from mapping strategies where challenges are mapped and related to each other (Clarke 2006). In the mapping, two kinds of challenges stood out as central for me in relation to context. These challenges are presented and discussed next.

#### Challenges

Many challenges were touched upon in the data material. In this paper, I primarily draw out the ones that were specifically interesting in relation to the context of museums and ICT design companies collaborating. Also, I focus on the challenges for collaborative design to take place and not the challenges in the actual design practice of designing ICT for museums. The challenges can be categorised in two themes: Structure related challenges, and value and practice related challenges.

#### Structure related challenges

Creative director (D): Both of them are mobile apps and we have been quite experimental. You find out both what works, but usually it is more important to find out what does not work. And in the last stage we will have to look at, can any of these things, any of these experiences, be reused or should we start from scratch?

Project manager (D): Should it be mobile?

Creative director (D): Should it be mobile?

[...]

Project manager (D): It could actually be good to consider this fundamentally. Because already in the first workshop [first meeting in subcase 1], we were talking about something completely different. But it had to be mobile because of the fund application. But now when it is the solution that will be implemented permanently, it might actually be good to take a step back and consider whether it really is what is wanted. (Project manager and creative director (D), collaboration 1)

In the Danish context, museums typically need funding to be able to initiate development of ICT. This seems to pose a significant structural challenge for the collaboration between museums and ICT design companies, because the museums typically have to specify some thoughts about the product and technology when applying for funding. As the project manager (M) in Collaboration 1 says:

When you apply for funding, it is that technology infatuation that sells a project. So there are some challenges in that I think. (Project manager (M), collaboration 1)

When the actual collaboration is initiated, the application can turn out to be an unfortunate restriction. As noted in the above citation, the participants in Collaboration 1 talk about different solution formats in the very beginning of the project, but are bound to work with a mobile solution format because of the fund application. Collaborating in three cycles helps them overcome the challenge because they can argue that they have tried out the specified format in the first two rounds. In the last round they get the chance to collaborate about developing a more appropriate format.

In Collaboration 2, the structure related challenges are an even bigger issue. Much more money is involved in building a new museum and therefor the actual production has to be put out to tender. Competition rules state that competition among suppliers must be fair and all possible suppliers must be treated in the same manner. Engaging in dialogue with ICT design companies and other possible suppliers in the early design phases therefore becomes troublesome. Both the project manager and the ICT design companies involved are very attentive to the rules in Collaboration 2 and the project manager suspects the ICT design company in subcase 4 to hold back on ideas to avoid troubles with the competition rules:

So I also think they have been holding back a little because they are afraid that if they make too much completely new thinking and put their fingerprints on it in the idea phase then they will be struck by the procurement rules. That they then cannot bid on the job in the end. They have implied that a little. (Project manager (M), collaboration 2)

In subcase 5, the project manager originally planned to involve staff from ICT design companies in the group, but partly because of the rules, he instead collects inputs from these on the side in informal chats. The project manager argues that the museum should be built from 'the inside out' and inputs from expertise on ICT are therefor important from the outset – both to inform an architecture competition and to be used in fund applications where, as in Collaboration 1, some thoughts about the product and technology have to be formulated. The project manager in Collaboration 2 wants to initiate a dialogue with ICT design companies and other creative industries from the outset, but this effort is challenged by the structure of procurement and competition rules.

These structure related challenges could also be relevant in other contexts of collaborative design. What makes it particularly challenging in relation to a museum context is that the mission of museum communication can be said to be to create meaningful and engaging visitor experiences (Falk &

Dierking 2013). ICT, then, has to make sense. Therefor, collaboration between museums and ICT design companies from the outset is vital to develop technology that is not just technology for the sake of technology, as an interaction designer (D) says to me:

Technology for the sake of technology, I think that is completely wrong. You should do it because it actually gives a better experience or a better understanding of something or provides a deeper meaning that is. (Interaction designer (D), collaboration 2)

This is also crucial because museums generally have low resources for technological development and the ICT solutions therefor have to make sense and be interesting for a very long time.

#### Value and practice related challenges

While structure related challenges set up some barriers for initiating collaboration, value and practice related challenges surface when collaboration is actually taking place. As a project manager (D) says, two different worlds meet in the encounter:

There is probably always the challenge. [...] that it is two worlds that need to communicate, to understand each other. And it has not been so problematic in this setup, or what should I say, as big a challenge, but there is something about understanding how each other works. (Project manager (D), collaboration 1)

Hence, we find ourselves in an arena where, in the extremes, the world of the privately owned ICT design company clashes with the world of the public museum institution, where commercialism clashes with idealism and non-profit, where high-tech and experimentation clashes with classics and conservatism, where new clashes with old. Viewed stereotypically, we are dealing with very different types of organisations and battles could be expected as these different worlds collide. However, this is far from the case in the two collaborations under study. On the contrary, there is great interest in understanding and respecting each other's worlds and learning from each other. But some challenges related to different values and practices do surface.

Firstly, in both collaborations under study, the project managers from the museums express the view that the performance of the ICT design companies does not fully live up to their expectations. In Collaboration 2, the project manager feels that the company does not bring enough original ideas to the table and he suspects that it is because of commercial reasons – they want to be able to bid on the project later on. In Collaboration 1, the project manager (M) considers the problem to arise due to lack of experience:

It is clear that people are not very experienced in this field so therefore they promise something that they cannot actually keep. (Project manager (M), collaboration 1)

Because the technological field is ever-changing and experimental, the initial ideas or promises about technology may not always prove to be as strong as they seemed. So museums tend to have great expectations about technological creativity and possibilities, expectations that ICT design companies cannot always fulfil. But this situation may also arise because ICT design companies are very focused on the meaningfulness of technology. In both collaborations, the ICT design companies continuously stress the importance of defining the reason for technology before defining technological form. Also, they value that the good idea, the meaningfulness, is not just something they provide. They find it important that the idea is developed in collaboration. The ICT design company in Collaboration 1 see themselves as "midwifes" (creative director, collaboration 1), helping the ideas to grow and not just providing ideas. At the same time the museums seek help to think out of the box technologically, as is visible in the following citation from a meeting in Collaboration 1 (case 2):

Exhibition developer (M): I just simply do not have the ability to think as much out of the box as we actually could, I think. So therefor it is perhaps you [looking at the staff from the ICT design company] that, to the extent that you can, have to say, 'we will do this', with consideration to some of what we want. And then we just provide the content. Because I actually think that you are much better and know a lot more about what will work and things like that.

Project manager (D): Well I think that would be a fine way to do it, but it's just important that you are clear about the overall purpose, so we know where we are going. (Exhibition developer (M) and project manager (D), collaboration 1)

In line with this, the ICT design companies are very conscious about focusing and simplifying when designing. In Collaboration 1, the ICT design company continuously argue that, for instance, the aim and the target group should be specifically defined, while the museum tend to want to work more openly and exploratorily with the definitions. This openness is also seen as difficult to handle in bigger

settings, especially because of the many people involved with different opinions, as an interaction designer (D) tells me:

A general issue about working with museums is this about how many cooks are involved in a project. Which I think is a huge problem. [...] It just confuses things and decisions are made too late and people don't really know what a decision means. (Interaction designer (D), collaboration 2)

Dealing with this diversity is challenging, as the project manager in the introducing citation on page 1 points to. There is a need to boil down a lot, so that the product does not point in a thousand directions. At the same time though, the result, the broth, has to be delicate and balanced, getting the many opinions and viewpoints to mix in a tasteful manner.

This is particularly challenging in a museum context, because museum staff are generally described as idealistic and passionate about their collections and about their work. While the ICT design companies may find them very interesting to work with, they also find them full of strong, often opposing, opinions. According to the facilitator in Collaboration 2, subcase 4, museum staff are often not so used to collaboration:

This is said with the utmost love, but museum people do not understand themselves as part of an organisation, they do not have a picture of themselves as employees with a leader for example. They understand themselves as people who go to work with passion and who have the most important jobs in the world. [...] They are not used to collaboration. (Facilitator (M), collaboration 2)

Also, museum staff are described as unused to processes where they do not have control over the outcomes, expressed here by the project manager (M) in Collaboration 1:

But I also think it might be something to do with the expectations you have and how you understand a collaboration. And if you are afraid of being in a process and daring to let the results [pause]. Well, it is perhaps not so common in the museum world not to have control over what you are doing. (Project manager (M), collaboration 1)

So if museums are not used to collaborating and being in a process, it is indeed a challenge for the ICT design companies to collaborate and be in a process with them. This challenge may be increased by the fact that the ICT design companies museums collaborate with do not always have stable work practices. When I asked the ICT design companies about the design methods they use, it was clear that they are not used to being explicit about how they do things. As a project manager (M) tells me, she is confused about their methodology:

They say that they work in a particular way, but then they do not do that or that is not my experience at least. The method they use is fine of course, but it is something other than what they expressed they would do. (Project manager (M), collaboration 1)

As the project manager (D) explains in the following citation, this may be because they want to treat every project as unique, but it may also be because they, as a rather new company, has not established clear working models:

We do not have a model that we work by. For good reason because each and every project we do is different. So we do not have a toolbox we just take out and then say, 'now we do this and this and this'. It very much depends on the client and the project. And then it is perhaps also because we are a fairly new company so we have not developed a toolbox. (Project manager (D), collaboration 1)

#### Conclusion

To sum up, the contextual challenges for collaborative design between museums and ICT design companies could be categorised in two ways: structure related challenges, and value and practice related challenges.

Structure related challenges can set up barriers for initiating collaborative design. In the Danish context, museums typically need funding to be able to initiate development of ICT and the necessary specification about product and technology in the fund application can turn out to be an unfortunate restriction when the actual collaboration begins. Also, engaging in dialogue with ICT design companies and other possible suppliers in the early design phases can be troublesome because of competition rules when production has to be put out to tender. This is particularly challenging in a museum context because the use of technology has to be meaningful to match the general mission of museum communication. To define this meaningfulness knowledge about both the museum and ICT is needed.

While structure related challenges can set up barriers for initiating collaboration, value and practice related challenges surface when collaboration is actually taking place. On one hand, museums have

great expectations regarding technological creativity and possibilities, and they seek help from ICT design companies to think out of the box technologically. On the other hand, ICT design companies stress the importance of defining the reason for technology before defining technological form. Furthermore museum staff are described as not being used to collaboration and to being in a process, while the ICT design companies they collaborate with are not explicit about their methodology. While museums might need some directions about designing collaboratively, ICT design companies might not be so good at explicating such directions.

In regards to both kinds of challenges, it is crucial how interaction is managed and dialogue facilitated across the organisational contexts. To return to the citation in the very beginning of this paper, it is the quintessence of collaborative design to get the right ingredients and to make sure they are boiled together tastefully so the broth will not end up being spoiled. In this paper, the focus has been on exploring the challenges for collaborative design and I have only touched lightly upon how the challenges could be met. Further work needs to be done to examine this more thoroughly. Also, it could be interesting in further research to compare other cases in both a Danish context and more international contexts.

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