THE SOCIAL AND SOCIOTECHNICAL INTERACTIONS OF VISITORS AT A DIGITAL MUSEUM EXHIBITION

The Montreux Digital Heritage Lab

TANIANA SMIRNOVA

DOMINIQUE VINCK

In the 21st century museums are exploring digital opportunities. New types of activity have appeared alongside new devices for virtualization, a new communication environment and new forms of art and exhibitions. In this article we analyze the changing nature of museum activity and study the dynamics and transformations related to the use of digital technologies. How do these technologies participate in the social and sociotechnical interactions taking place in museums? What are the effects of new technologies on museum practices? To explore these questions, we conducted a field study of the "Montreux Jazz Heritage Lab II" project. This museum space was never organized according to classical museum standards and thus vividly demonstrates the dynamics of the changes taking place today in museum projects adopting a digital development path. Our ethnographic observations focused on different project-related aspects: museum attendance, visitor behaviour, interaction between visitors and with staff, technical problems and communication processes. This work has provided quantitative and qualitative data allowing us to explore social and sociotechnical interactivity in a museum space and the participation of digital technologies in museum visits. The devices used in the lab studied showcase processes for individualizing the visitor experience.

DOI:10.3166/LCN.13.1-2.45-68

1. Introduction

Over the past few years humanity has extended its experience of digital technologies. These new technologies have led to the emergence of new activities, new types of devices (e.g. mobile devices), new communication environments (e.g. virtual spaces) and new forms of art (e.g. digital arts). In the 21st century, new museums are digitized. Visitors use smartphones and the Internet when preparing to visit and when actually visiting a museum. Concepts such as "mobile applications", "virtual museums", "immersion" and "three-dimensional visualization" are part of the vocabulary of both museum professionals and visitors. A digital toolkit for museums is gradually being created. It allows museum specialists to provide visitors with much more information about the items they see on display hence encouraging them to take a new look at cultural heritage.

Visiting museums remains a popular leisure activity (Hanquinet and Savage, 2012), and museums continue to benefit from high attendance rates. In large museums across the world, the daily number of visitors can climb to tens of thousands. This is the case of the Louvre (Paris, France), the National Museum of China (Beijing, China) and the National Museum of Natural History (Washington, D.C., USA)[1]. The Special Eurobarometer 399 (2013) on "Cultural access and participation" demonstrates how competitive museums can be in terms of taking up our leisure time[2]. According to this barometer, visiting cultural sites is the fourth most popular cultural activity for European citizens aged 15 years or older after watching TV, reading books and going to the cinema. Visiting museums holds fifth place. Therefore, the number of people passing through museums is very high and since museums are involved in digitization processes they can be viewed as ideal spaces for studying people's interaction with digital devices and the digital environment. This brings us to the question of how digital technologies contribute to the social and sociotechnical interactions of museum visitors?

To answer this question we conducted a field study in the "ArtLab" museum belonging to the EPFL (the Swiss Federal Institute of Technology in Lausanne). We focused on the "Montreux Jazz Heritage Lab II" project (which stemmed from the initial HeritageLab). This allowed us to make observations and collect data that might be useful in gaining a better understanding of the interactions between a museum setting and museum visitors.

---

1. Themed Entertainment Association (2015), TEA/AECOM 2014: Theme Index and Museum Index, pp. 20-21.
2. The survey was conducted in 2013 across 27 European countries.

2. Literature review

Discussions on digital technologies in museums often go beyond museology, calling on other areas of scientific knowledge such as sociology, computer science and communication science. Theories, research tools and methodologies are not confined to one specific scientific discipline. Thus, understanding the effects of digital technologies and visitors' experience and interactions within a museum space requires the use of a broad range of research tools. An interdisciplinary approach is needed to understand what specifically occurs at the junction between museum activity, digital technologies and processes in society. Thus, our research took place within the framework of science and technology studies (STS), which combine tools from different field of knowledge. This framework allowed us to study various questions and hypotheses from different angles. The diagram below reflects the multidisciplinary nature of this research (see figure 1 "Museums and digital technologies: clusters of research fields"). It highlights three clusters (museums and cultural heritage, societal dynamics around communication and new technologies) in which various disciplines interact (museology, computer science, sociology, and communication science).

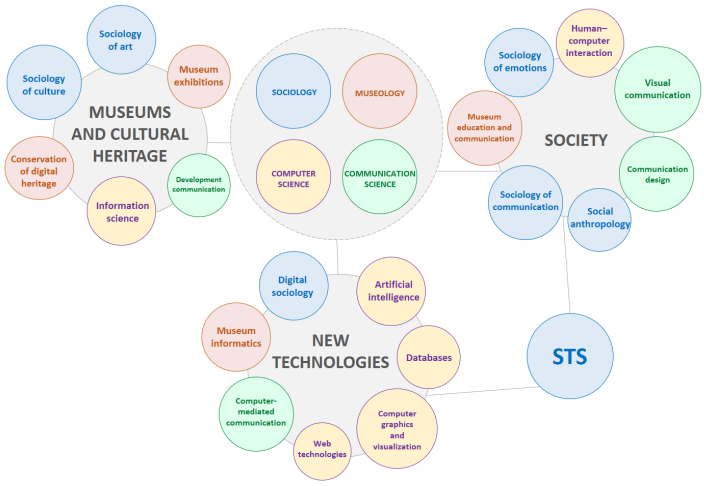

Figure 1. Museums and digital technologies: clusters of research fields

The diagram shows that cultural heritage problems do not only concern museologists but also researchers working in the sociology of culture, the sociology of art, communication science and computer science. The

interactions between museums and society are of interest to both sociologists and specialists of human-computer interactions or visual communication. The opportunities offered by digital technologies attract the attention not only of computer science, but also of digital sociology, museum information technology and computer-mediated communication.

Some researchers believe that today cultural heritage is experiencing a new stage in its development (Din and Hecht, 2007; Black, 2012; Parry, 2013; Corrado and Moulaison, 2014). Indeed, digital technologies are influencing culture and cultural heritage (Vinck, 2016). Over the past decades a process has emerged and has transformed museum practices through computer devices and the web. Museums are adapting new technologies to museumification (Kaulen, 2012). In addition to artefacts, museums have begun to work with virtual objects raising discussions about their role as they create and distribute electronic images of their collections (Bertacchini and Morando, 2011). At the same time, many publications relating to technological innovation in museums have focused on digital applications in museum exhibitions (Thomas and Mintz, 1998; Lehn and Heath, 2005). In their publications, the authors often use a large number of specific examples from an exhibition practice to demonstrate the scope of digital integration in the museum area and to show the risks and benefits of this process (Lebedev, 2007). Museums now use new tools to actively interact with their visitors (Falk, 2009; Simon, 2010; Andreacola, 2014; Decker, 2015; Kamolpattana *et al.,* 2015) and actively explore virtual space (Marty, 2007; Dziekan, 2012). Researching visitors' experience in virtual museums has become a new research goal for understanding human behaviour and people's interest in culture (Minghetti *et al.,* 2001; Soren 2005). The appearance of digital technologies in museums has generated discussions among researchers about their role for society in the Internet age. All of these publications show that the advent of digital technologies has brought about changes in cultural heritage. These changes affect both the internal processes of museum development (emergence of new ideas and projects, possibility of storing artefacts, etc.) and the external processes (positioning of their image in society, communication with visitors, etc.). Gradually, new scientific discussions have emerged from the museology framework requiring the involvement of other scientific disciplines.

Sociologists have mainly focused on the socially organized settings in which museum projects are produced (MacDonald, 2002) and then experienced by visitors (Heath and vom Lehn, 2004). These settings show how social interactions have a constant influence over what visitors choose to look at, together with their attitude towards exhibitions and the way in which they explore and examine particular objects and artefacts. In fact, this interest of

sociologists in artefacts and human creative expression has led to the emergence of a specific branch of sociology: the sociology of art (Becker, 2006). Becker defines a social world as consisting of all those people and organizations whose activity is necessary to produce the kind of events and objects characteristically produced by that world. The world is social. It is built on conventions that can be found in objects and which are especially present in the features of museums. Bourdieu and Darbel's classic study of European museums (1969) notes the role of human cultural capital (knowledge, skills and experience) in the perception of museum material. The authors use the concept of "correct perception". This may or may not be achieved by visitors depending on the cultural skills they have acquired through education. Subsequent studies reveal a dependency between perception and human cultural capital. For example, in his paper about listening to music (Menger, 1986), Menger demonstrates the key influence of specific social factors on the consumption and perception of music.

As for contemporary museums, today these are adopting ideas from the social sciences and their design approach is visitor-centred (Falk and Dierking, 2016). This has led to the emergence of participatory museums (Simon, 2010) and inclusive museums (Vuokko, 2011). Thus, the contact between an individual and cultural heritage in a museum space tends to be considered as a social and sociotechnical process. In this process both the social characteristics and the technical setting can change the nature and the specific aspects of the visitor's experience.

Sociological research that strives to understand visitors' interests, aims and motives is therefore an important stage in the development of exhibition projects. The goal of such research is to understand visitors' emotional responses (Goffman, 1959) and hence gauge the dynamic processes involved in the transformation of cultural institutions and the role of the public (Ughetto, 2017), visitors' experiences (Dubois, 2017), social interactions and negotiations between actors in a museum (Heath, Dirk, Osborne, 2005). Interactionists emphasize the way in which individuals interact through language, gestures, movement, etc. Based on the heritage of STS and on the actor-network theory, research focusing on demonstrations underlines the importance of the sociomaterial setting and the involvement of the body (Rosental, 2017).

In this research paper we shall focus on visitors' actions and interactions in the Heritage Lab. In particular, we shall explore the interactions between visitors, the interactions between visitors and staff and the interactions between visitors and the exhibits from the moment the visitors enter the museum to the moment they leave. Thus, our contribution will focus on the social and sociotechnical interactions taking place within the digitized museum space.

3. Digital environment of the ArtLab museum

The ArtLab museum, which was set up in the EPFL in 2016, is in many ways an illustration of the digital processes taking place in modern museums. This art-science museum includes three spaces under one roof: the permanent "DataSquare" exhibition for EPFL demonstration research projects; the "Experimental exhibition space" for temporary exhibitions, mainly of art; and the permanent "Montreux Jazz Heritage Lab" digital exhibition presenting the audio-visual collection of the music festival. ArtLab is not a conventional museum with a traditional collection of artefacts. It was originally planned as a project designed to use digital technologies to help the visitor to understand artistic performance and artefacts. It creates a digital environment through a variety of digital equipment and digital collections. Visitors are digitally equipped with, among other things, their own personal smartphones. This new approach to the museum environment organization reflects the direction in which modern museums are heading as they introduce more and more digital tools to store and present cultural heritage. ArtLab allows the "virtual" world to interrelate with the "real" world of visitors. It demonstrates how visitors come into contact with digital artefacts in a public environment. The publicness of this space tends to impose certain behaviour on the visitors, on their understanding of the artefacts presented and on other aspects relating to a museum visit. The visitors have to make do with the advantages and drawbacks of this public space. In the case of the HeritageLab, for example, they have to wait in a queue or ask permission to access a musical composition. On the other hand, visitors promptly receive information and support from the museum staff while benefiting from other privileges too.

The ArtLab museum is interesting because it has become the basis for implementing both traditional museum exhibitions (for example, the exhibition of French artist Pierre Soulages "Noir, c'est noir?") and non-standard projects relating to classical museology, such as an exhibition space presenting digitized cultural objects. Heritage digitization has become an essential part of the ArtLab's activities: the HeritageLab project is the result of the digitization of the Montreux Jazz Festival musical heritage; the "Venice Time Machine" stems from the digitization of a huge number of cartographic, visual and textual artefacts of the city of Venice; the "Kung Fu Motion" project is based on the digitization of martial art movements forming part of dynamic traditions. The increasing digitization of artefacts extends the availability of heritage and encourages us to take a fresh look at various aspects of our past and present. On the other hand, this digitization also raises questions about the value of artefacts and visitors' needs in terms of physical sensations. These may differ

according to whether they are looking at the original artefacts or the visual representations of these artefacts.

The novel digital technologies used for the ArtLab projects are a source of attraction for visitors. The encounter with virtual artefacts is a first experience for many visitors to this museum, thus considerably amplifying the wow-effect. It is hard to say whether the attraction generated will continue when some of the technologies used cease to be new. This raises a key question about the conditions required to maintain visitors' interests.

4. Methodology used for visitor observation and data collection

The HeritageLab (figure 2) is a permanent exhibition whose purpose is to provide public access to the archive footage from the Montreux Jazz Festival. This archive includes a database with over 5,000 concerts (14,000 tapes, 11,000 hours of video, 6,000 hours of audio and 80,000 photos). The festival takes place annually in the town of Montreux (Switzerland).

Figure 2. The HeritageLab exhibition hall
(picture © Damien Barakat, source: https://metamedia.epfl.ch)

The creators of the HeritageLab designed it to be a unique place, one of a kind among the Montreux Jazz Cafes, some of which are also located outside of Switzerland (e.g. Paris, Singapore), forming a network of cities around the world. However, there is only one HeritageLab and it is located in Lausanne. It comprises a 5.2 by 5.5 meter room with digital equipment (a special screen, numerous speakers, software for database management and sound distribution,

and remote controls) where visitors can watch digitized video recordings of the Montreux Jazz Festival. Visitors can use an interface to access the digitized objects making up the festival's audio-visual heritage. These objects often offer high video and audio quality. When the exhibition guides talk with visitors, they often refer to the "three principles behind the development of this booth". The first principle is the demonstration of video content on a special screen. It allows visitors to become visually immersed in the archive materials, as if they were right next to the stage. The screen's sophisticated geometry enhances the three-dimensional visual effects of the images. The second principle is based on the booth's surround sound designed to boost the immersive effect. Each video can be listened to in different modes so that visitors can compare the different degrees of sound processing. The third principle is embodied in the side walls of the booth where mirrors display information about the selected track through a LED underlay. The project creators chose to implement these principles in order to provide visitors with public access to the festival archives but also to simulate their immersion in a real festival and create the atmosphere of a concert.

It is not currently possible to create similar HeritageLabs in other cities. This is primarily to do with music and video playback copyright. In Lausanne, the project is officially considered as research. Indeed, it would be illegal to use the video recordings in other ways, for example commercially. This is why a web site or mobile application for watching the recordings on the Internet cannot be created. The project's research status thus lends importance to the museum building space and the museum hall space. It is usually considered that a virtual space does not have a specific origin or geographic location. It is to some extent disseminated, spread across the strands of the World Wide Web. In the case of the HeritageLab, we are dealing with a digital project, located in a real space, with specific geographic coordinates and the limited conditions of real life (rules, laws, copyright, etc.).

Tatiana, one of the authors of this research paper, was able to work directly on the project from November 25, 2016 to April 2, 2017, while the other author, Dominique, contributed to the research through a series of ethnographic studies. In November and December, Tatiana was present at the HeritageLab two times a week from 5 PM to 9 PM on Thursdays and Fridays. In January she continued her work. Sometimes she would come three times a week, adding Tuesday to her weekly schedule. In February and March other days were added for observation. From a research point of view, it was useful to come to the HeritageLab for observation as often as possible. The observation slots helped us to understand the dynamics of attendance and visitor's interests and to measure statistical data. Tatiana's main duties at the

HeritageLab were: switching the demonstration video recordings on and off, providing visitors with information about the project, showing visitors how to select a song, and dealing with technical problems as they arose. She was also in charge of making sure that nobody took photos or videos. Her personal goal was to perform scientific monitoring and observation. She tried to record everything happening around her: visitors' interest, traffic, weather, her own mood, questions, problems and comments arising, the atmosphere in the cafe and so on. Of course, it was not possible for her to capture all the details since her observation was directly related to her own personality and to her ability to see and feel what was happening.

Tatiana is Russian but she mostly observed people who were French-speaking and English-speaking. She probably missed a number of culturally-embedded details relating to the visitors' behaviour and conversation. Communicating in a foreign language, particularly in French, was one of the most difficult aspects of her observation. Indeed, she started working at the HeritageLab only 8 months after she started learning French. This is why she often asked visitors to repeat questions or asked them to speak in English. As of the first day of her work there, she used a printed list of set phrases in English and French to help her, as well as texts about the HeritageLab designed to provide visitors with information.

Her communication with foreign visitors in the HeritageLab led to an interesting result. Although she did not always understand certain phrases or words, she did grasp the general meaning of what was being said to her. She realized that information from other, non-linguistic sources helped her to understand. For example, a visitor gesturing towards an interface allowed her to narrow down the number of potential versions of the question posed. Analyzing what she saw on the screen allowed her to pinpoint a problem or ask a question. The situation was quite different when visitors were more garrulous. For example, she once had a long conversation with a visitor:

> *There was an interesting visitor. A woman of advanced age sat in the HeritageLab for one and a half hours. I helped her choose five songs from the festival, which she had visited in the past. We had a long conversation in French. She was talking about politics, about her attitude to Russia, because I said that I was Russian. She knew the names of all Soviet leaders by heart. She wanted to talk and listen to music. She happily sat in our space. When she left HeritageLab, I felt that she was in a very good mood* [3].

3. Project observations "Montreux Jazz Heritage Lab II". Oral report of November 26, 2016.

Although she did not understand the pronunciation and meaning of many of the words used by this lady, she felt drawn to her as a person and an interlocutor. While she failed to grasp everything that was said, she was convinced she understood thanks to other channels of perception: e.g. eyes, intonation and tone of voice. She felt the lady's speech not through words and phrases, but through her senses and her emotions. We propose to use this experience to illustrate the fact that many communication processes are linked to the atmosphere. This is made up of many different elements, one of which is the immersion of the senses in a message.

A standard HeritageLab evening could be broken down into three main phases: the switching-on of equipment, the work with visitors and the switching-off of equipment. On average, it took 10 minutes to switch on the equipment. It took Tatiana less and less time everyday as she came to be more and more familiar with the instructions and the connections between different pieces of equipment. Nevertheless, she always tried to arrive at the HeritageLab 30 minutes prior to its opening so that she had some room for manoeuvre in case of an emergency. As a rule, it also took an average of 10 minutes to switch off the equipment.

At the project launch stage, technical failures were frequent. Time was needed to test the complex assembly of equipment, identify errors in visitors' requests for video clips, and identify further points to be developed. The observation reports describe quite a few cases where the equipment broke down and Tatiana needed to find a solution quickly. Understanding the complete HeritageLab switch-on/switch-off process helped her solve technical problems and also answer a number of visitors' questions.

In our opinion, the size of the HeritageLab room was ideal for observation. The main space formed almost a square (figure 3). When Tatiana first entered the HeritageLab, she had the feeling that she was inside a speaker playing loud music. Since the room was small, she was able to take in the entire space with just one look. After a few days of observation, she was able to detect any changes to this area, even small ones. For example, she could tell whether a sofa had been moved or the interface turned to face a different direction or whether there were any new fingerprints on the mirrored walls. It can thus be said that this particular observation area was perfect for picking up details. Tatiana did not want to make visitors uncomfortable by staring into their faces or asking them too many questions. She aimed to observe the visitors without bothering them with her observation work. All the details she identified thus played a very important role. For instance, by observing the way visitors moved the chairs around, she was able to find the most comfortable layout. With this new layout, a group of people could sit down in the HeritageLab quickly and

without blocking the screen. This layout proved to work for a group of 10-12 people. In her experience, this was the maximum number of visitors to the HeritageLab from a comfort standpoint.

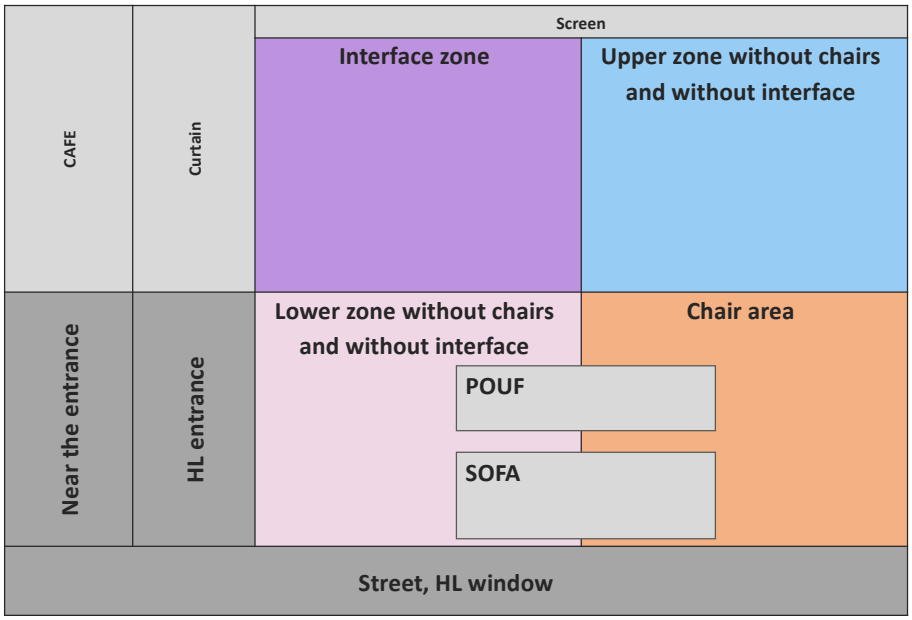

Figure 3. Observation zones in the HeritageLab

She also divided the HeritageLab space into 4 areas: the Interface zone, the Upper zone without chairs or interface, the Lower zone without chairs or interface, and the Chair area (figure 3). This split helped to control visitors' movement. Tatiana felt that the visitors stayed at some points longer than at others. This assumption was confirmed by the results of the first statistical calculation performed. For example, during one observation period, a small number of visitors stepped into the Upper zone. She had rarely seen people here when she was ~~present~~ suddenly entering the room. This tells us that in the absence of an observer or other third party, people feel freer to move around as they please.

Tatiana prepared two kinds of reports: an oral report and a written report. She recorded her oral reports on a dictaphone. She did this in Russian as it made it easier for her to find the right words to describe an event or sensation and provide details. On the other hand, in these oral reports she did not

monitor her grammar as strictly as in her written reports. This allowed her greater freedom of expression. The written reports set events in a table. Their main focus was incoming visitors (number, location in the room, questions, preferred order of songs, gender, age, language, etc.). In her written reports, Tatiana tried to set parameters that could be noted down on the paper quickly and read clearly. These two types of report complemented each other allowing Tatiana to record as many details as possible. The visitor observation period for the HeritageLab project was from November 25, 2016 to April 2, 2017. There were 44 days of observation in total. Over the course of these 44 days, Tatiana recorded 44 oral reports and drafted 44 written reports. In what follows, we shall consider some specific observation examples and results.

5. Participation of digital equipment in social interactions

Digital equipment played a dominant role in the HeritageLab. Indeed, without it the project would not have existed. Once visitors crossed the threshold of the HeritageLab they were surrounded by digital equipment throughout their visit. Just after entering the HeritageLab, visitors immediately turned to the screen, their attention being drawn to it owing to its size and shape and the images being shown. After being captivated by the screen during the first few minutes of their experience, visitors then began to look around and notice other details inside the room. Tatiana pointed all new visitors towards the interface, inviting them to order a song. Visitors who were already familiar with the project did not need to be encouraged to use the interface.

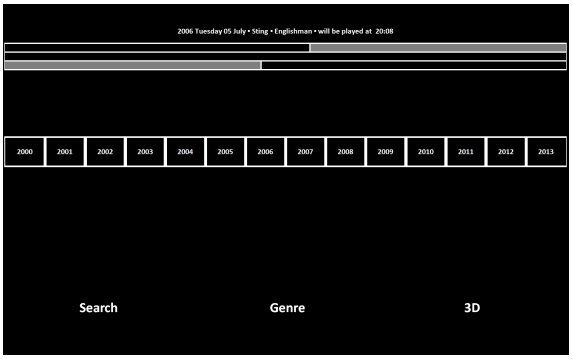

Figure 4. HeritageLab interface for ordering video clips

As an audience watched a video, their attention would be held by the mirror walls where song titles or posters were displayed. Although constituting important spatial elements, the speakers rarely captured the visitors' gaze. There were quite a lot of speakers in the HeritageLab (about 10), but they were not conspicuous. Only the most inquisitive visitors asked Tatiana questions about them, about how they worked for example, but this was a very rare occurrence. To a certain extent, from the moment they stepped inside the HeritageLab, visitors could sense the digital equipment all around them using their eyes, ears or hands. The most interaction with visitors took place in the interface zone, i.e. the area where they selected (ordered) a video clip (a song). The interface (figure 4) was made up of a panel with embedded software. Its screen provided visitors with the timeline of the Montreux Jazz Festival from 1967 to 2016. This timeline reflects the chronological scope of the HeritageLab database. Visitors could then click on a specific year to view the dates of concerts. They could then select a date and an artist. Once they had selected an artist's name they were then able to choose a song. At the bottom of the interface, below the timeline, different controls could be used to do a song search. Visitors could, for example, search for video clips using the virtual keyboard based on the English alphabet. They could also use the music filter in the "Genre" section or choose one song from a list of tracks in 3D. Not all artists having taken part in the festival can be found in the database due to copyright restrictions. In the interface area, Tatiana had to communicate with visitors and explain the principles of the HeritageLab. In this zone, visitors who were part of a group often discussed different order possibilities (with us or with each other). They might remember the date they went to the Montreux Jazz Festival and want to find a specific concert. They often asked their companions what they thought about the order or asked Tatiana whether a specific song was in the database. Many questions were about how to choose a song and when it would be played in the HeritageLab. In a way, the digital interface formed a zone for active discussions. An analysis of visitors' movements in this area shows that it was the most popular place in the HeritageLab. To illustrate this, the diagram below (figure 5) outlines visitors' movements on January 19, 2017. The diagram shows that 17 people (out of 25 visitors in all) entered the interface area.

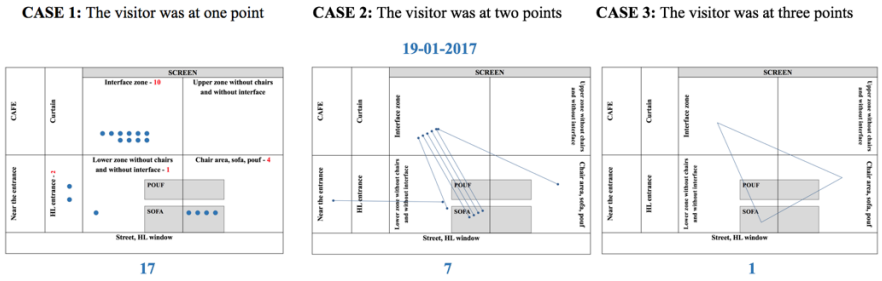

Figure 5. Visitors' movements in the HeritageLab on January 19, 2017

The screen's sophisticated geometry was used for music playback. It also stimulated a different kind of interaction. The speakers transmitting the sound worked together with the screen. At the start of a track, visitors needed time before they could become individually immersed in the content they saw and heard in the HeritageLab. A little way into the track, the material they heard and saw gave rise to discussions. The visitors shared their impressions or made remarks. They expressed their opinions either briefly, using only a few words (such as "This is interesting"), or in the form of a small monologue comprising a number of recommendations. Tatiana noted that single visitors often began a dialogue with her by asking for explanations. During group visits in the evenings, when all the participants knew each other, she often observed that people began to behave more freely during certain video clips. They might start singing and dancing in the HeritageLab.

When they were creating the exhibition, the curators considered the age categories likely to come to the museum. The HeritageLab project was designed for an adult audience. When children came, they sometimes found that watching the video recordings of concerts was boring. Clips lacking bright colours or active movement made them restless and they would then distract the adults and prevent them from watching the clips. In an effort to improve the children's experience, Tatiana set a list of songs more likely to capture their interest. These video clips contained amusing characters in bright costumes. The music in these clips was more dynamic, energetic and cheerful. Here is a typical example from a report:

> *There are children in the cafe. I once again set up the music track for Muze's "Merci" as an experiment. In this video clip, there are many different characters, dressed in bright animal costumes. I noticed that this song captured the interest of the*

children sitting in the cafe. They looked at the cafe display and talked about the clip and asked their mum questions [4].

In fact, groups with children rarely came to the HeritageLab. During the observation period only 59 children visited the project. It is worth noting that boys came 1.4 times more often to the HeritageLab than girls. The reasons for this gender imbalance have not yet been identified. Groups with children always displayed specific characteristics. In these groups, the adults focussed their attention on the children, followed their behaviour, tried to entertain them and explain the project to them. Small children (under fives) tended to move around very freely in the HeritageLab space. They were quite happy dancing, jumping and running. They were not afraid to touch the surfaces of the walls or the interface with their hands, although their parents tried to prevent them from doing this in case they damaged anything:

> *In the HeritageLab there is a family of four: two children with their mother and father. They are watching and ordering video clips. One child is dancing. He is quite an active child. The parents watch him, checking that he does not crash into the walls. I try not to interfere with his freedom because he is quite far away from the equipment. He dances and enjoys the loud music. He is not bored at all* [5].

The presence of expensive equipment in the HeritageLab might have resulted in greater control over what visitors were allowed to do. Many museums impose restrictions: "do not touch", "do not make a noise", "do not take photos with a flash", "do not run", etc. However, the HeritageLab applied few bans. It was forbidden to enter the HeritageLab with food or to take photos although visitors were allowed to enter with drinks. The list of restrictions could have been longer but our team strove to ensure that visitors were as free as possible. Tatiana allowed children to be active when she saw that they were being properly supervised by adults. Sometimes children came into the HeritageLab from the cafe without any adults and started to run around too much. At such times, Tatiana tried to distract them with simple questions and engage them in conversation. She allowed people to behave noisily if they were alone inside the HeritageLab, noting that they tended to be quieter when she was present. She moved the sofa and chairs around to provide a more convenient layout for visitors. When visitors started to take photos she politely asked them not to but always with a smile. Visitors never complained about this. Instead they apologized and stopped using their camera. According

4. Project observations "Montreux Jazz Heritage Lab II". Oral report of January 13, 2017.
5. Project observations "Montreux Jazz Heritage Lab II". Oral report of January 19, 2017.

to Tatiana, people came to the HeritageLab to relax and have a good time. Constant restrictions make museum visits tense and less exciting. While Tatiana did exert a certain amount of control over what happened in the HeritageLab, she did not show this control to visitors. When she felt that visitors were calm she sometimes left them alone. When she remained in the space or watched visitors as they searched for music in the database, the visitors were more hesitant. Consequently, once she had explained the project, she felt it was better to leave them for a few minutes alone with the interface. In other words, she did not psychologically encroach on their space or interfere with their choices. Nevertheless, this approach did not work with all visitors.

The presence of museum specialists in an exhibition space can create a particular atmosphere and mood for visitors (Forrest, 2013). Museum employees can set up a friendly atmosphere that is comfortable for viewing an artefact. On the other hand, they can also create an atmosphere of austerity by imposing restrictions ("Do not touch anything!"). When museum staff do not fully communicate with visitors, the atmosphere can become apathetic. In short, the aims and moods of a museum specialist are passed on to visitors and ultimately determine their impression of the project. Digital devices cannot replace the effect of museum staff.

> *A robot and a machine can switch the equipment on and off. The equipment can adjust itself automatically. But the presence of a human being in an exhibition is important for a visitor's mood. I regret that I cannot speak perfect French and create an atmosphere of fun. I communicate with visitors in their language, but I cannot convey emotions to the full. It upsets me a little bit. Ideally, I believe that a person who works in a place like the HeritageLab should create a fun and energetic space. Because people come to the cafe and want to talk, have a discussion and be part of the action. This project, I think, should be "very noisy" for people, because music and concerts require movement and drive. In Russian I would do this easily. In French, unfortunately, it is still very difficult for me*[6].

Tatiana tried to create an atmosphere of hospitality for visitors. For example, she knew it was better to smile when they entered and to offer them help or tell them the story behind the project. She tried to choose video clips according to visitors' interests. As a mediator, her role regarding the interaction between the visitors and the digital technologies was important. A museum mediator is a member of staff or a regular visitor who knows a project well. It is someone who transmits the values underlying an exhibition, someone who acts as a narrator or translator. A mediator helps new visitors to quickly understand

6. Project observations "Montreux Jazz Heritage Lab II". Oral report of November 26, 2016.

a project and prevents technical mistakes from being made. Digital technologies are the mediator's tools; they provide the story with a subject.

In short, the HeritageLab's digital equipment created extensive contact between people as conversations and discussions about the video clips were launched. It is worth noting that these conversations were not superficial. They did not only concern technical failures, as discussed in one article about computer-based exhibits (Heath, Lehn and Osborne, 2005). The discussions and the contact established revolved mostly around the project, people's interests in music and the festival itself. This shows how digital technologies can actually participate in the information exchange between visitors. However, simply observing the visitors' satisfaction and their interaction with the digital devices was not enough, it was also necessary to focus on the interactions between visitors. Tatiana felt that many visitors liked the HeritageLab. Most left the space with smiles of gratitude on their faces. They often said that they liked the project very much.

6. Individualization processes

As already outlined, an important design feature of the HeritageLab was access to digitized objects belonging to audio-visual heritage, i.e. making it possible for visitors to choose a song and see the clip on the special screen. Being able to personally take part in the creation of the HeritageLab playlist was an attractive feature for many visitors. About 40 percent of visitors participated in ordering video clips by engaging with the interface. The video clips shown in the HeritageLab could also be seen on displays located in the Montreux Jazz cafe. This made the experience very convenient for visitors. They could sit at a cafe table and see when their video clip was due to play and then go into the HeritageLab to watch it at the right moment. However, some visitors, generally the most elderly, were afraid of digital equipment. They did not dare to interact with the interface. Nevertheless, being in the HeritageLab was also seen as an opportunity and so the more hesitant visitors asked Tatiana to order musical compositions for them. For group visits, one person was often delegated to order a clip. The other group members simply passed on their ideas. All the children who entered the space worked on the interface while being supervised by adults. The adults showed the children where to click and what they were allowed and not allowed to do. Unlike some adult visitors, the children never seemed afraid to touch the digital equipment, e.g. the interface:

> *Two visible failures occurred today. The first, when a little boy put his finger on the display. He wanted to touch it. His dad was choosing a song and the boy also wanted to participate in the order. This yellow icon, which appears on the display when it is*

> *touched, amused him. Unfortunately, after that the screen blocked and it was impossible to order new songs or do anything else on the display. I expressed my regret to the visitors about the problem and rebooted the system when the song came to the end* [7].

In fact, the interface for ordering video clips was an important asset of the HeritageLab. It created an interactive environment for communication with visitors. However, visitors' actions on the interface were limited by the developers' intentions. There were several interface operating modes. The "Administrator" mode with advanced functions could be used to jump to any song on a playlist at anytime. This mode was only accessible on specific days for special guests. Tatiana was informed about this ahead of time. Normally, she used the "Standard" mode with limited functions. When visitors ordered video clips these were added to the playlist. Visitors therefore had to wait in a queue before they could watch the clip. This restriction was introduced to prevent technical failures but it clearly limited the system for visitors as they were required to wait for their song to be played.

Many of the examples cited above underline the positive effect of the interface in terms of interaction between people. It acted as a trigger for discussion between visitors, either about the next video clip ordered or how the interface itself worked.

> *A group of six people came to the room. The women choose music, listen and talk. Certainly in this company the interface has become a strong unifying force because they are discussing musical compositions and search variants. Clinging to it they found new topics. It is clear that the choice of songs is interesting for them. It energizes them. They want to communicate, listen and be in this space. They do not sit very much now. Mostly they stand. Four women stand near the interface. Two women stand in the HeritageLab centre. They talk and look at the big screen. Given how they communicate it seems that they are either colleagues or friends who have long been acquainted* [8].

The above report extract reflects the individualization processes at work. When groups came to the lab, a "leader" always emerged to take change of the ordering process. This person had to do right-hand "clicks" (tapping on the display) and confirm the order. A group might have a long-lasting discussion but a leader had to leave this discussion and concentrate on the interface

7. Project observations "Montreux Jazz Heritage Lab II". Oral report of January 6, 2017.
8. Project observations "Montreux Jazz Heritage Lab II". Oral report of December 15, 2016.

system. A leader had to decide what he/she wanted to find in The Montreux Jazz Festival database. He/she had to decide how to search for the song: either by selecting it according to a year on the timeline or doing a search by artist's name. He/she also had to decide whether to opt for a 3D song, use the virtual keyboard or a genre filter. All these actions required a certain level of concentration. This confirms our idea that the interface actually minimized opportunities for other visitors to participate and put a strain on collaborative activities. Another visitor or visitors might help the leader using gestures or words, for example to explain to the leader where to click on the display. If several visitors touched ("clicked") on the display together, this led to a system failure and Tatiana had to reboot the HeritageLab digital equipment. She did not observe any conflicts or arguments between visitors when this happened. Usually people tried to remain calm. Thus, all work with the interface was mostly specific to one individual.

Another aspect of individualization related to the decision to play music loudly. This prevented the opportunity for comfortable conversation. When this occurred, people remained silent and focused on the big screen. They watched the video and listened to the music. Sometimes groups might move to the beat of the music, exchanging smiles with each other. Tatiana always tried to adjust the volume. When new visitors entered the HeritageLab, she switched the sound off to be able to talk about the project. If there were already other visitors in the HeritageLab, she talked about the project at the HeritageLab entrance and then invited the new visitors to come in. When she saw that people were having a lively discussion about video clips, she also lowered the sound to facilitate the exchange.

Another form of individualization was observed in visitors' musical preferences. There were video clips that really demonstrated the HeritageLab's full capabilities. For example, all the tracks in the "3D" section had good sound and image resolution. Thanks to their excellent quality, they were appreciated by different categories of visitors. Tatiana often switched on these clips when new visitors entered the HeritageLab. When people stayed a long time, they tried to relocate the songs which held meaning for them in their everyday life. Tatiana often observed that elderly people left the HeritageLab when electronic music ordered by young people was played. Perhaps this style was uninteresting to them. It can thus be said that visitors stayed longer in the HeritageLab when their favourite music was being played. On the other hand, they quickly left the room when they found a video clip was not to their taste.

The space designed for users to individually work with the festival's database system should also be mentioned here. This was a specific area equipped with computers and iPads located outside the HeritageLab on the

opposite side of the Montreux Jazz cafe. The area offered two computers with headphones in individual rooms while two iPads were installed on cafe tables allowing users to watch video clips while they ate. These devices provided access to the Montreux Jazz festival archive information system. Using key words or dates, users were able to search for specific concerts or songs. Compared with the HeritageLab text interface, designed for quick searches and playback, this system was more colourful as it offered many images and photos. In this zone, there were no employees making comments. The whole space was designed for visitors to work with the system autonomously. As she passed through the cafe, Tatiana sometimes made a note of how many people were in the computer and the iPad zone. People might be working there on their own or in groups. Tatiana often saw single visitors entering a computer room to work with the information system individually, as they might do in a library. Some visitors used the system to select music tracks, which they then jotted down on a sheet of paper before ordering them in the HeritageLab. This is yet another example of how digital technologies can enhance both collective interaction and individualization. In many ways, these processes depend on people, such as museum project creators or specialists, who are able to act as intermediaries in the dialogue between digital technologies and visitors. Depending on the project's goals, different visitor behaviours can be encouraged.

7. Conclusion

Participating in the HeritageLab project provided us with some practical material pertaining to the use of digital technologies to present cultural heritage. This material sheds light on the social dynamics at work when a visitor meets a digital artefact. Observing the visitors was a fascinating process. Many interesting people came into the HeritageLab. All behaved and communicated very differently. Each visitor was unique in his or her own way. However, from our viewpoint as observers, they were all united by one thing, i.e. the space created by the museum exhibition. This space forced visitors to perform similar actions.

In different projects digital technologies can play different roles (Parry, 2013). In the HeritageLab, the digital technologies used acted as mediators for the transmission of information between the authors and the visitors. The lab was designed to provide a specific scenario with a clear technical layout. People could use this tool and understand the information it contained in different ways. For some visitors, the technologies were seen as a means of learning, about a specific style of music for example. Others were interested in exploring what the digital equipment had to offer. For other visitors, the project

represented an opportunity to visit a museum and follow a cultural program. Whatever each visitor got out of their trip to the museum, they all entered into social and sociotechnical interactions and collaboration inside the HeritageLab. We observed these social and sociotechnical interactions through a number of external signs such as their language or gestures. Unfortunately, we did not have the opportunity to observe the visitors once they left the HeritageLab. An interesting project would be to explore how visitors use the information they acquire in the future. What do visitors remember about the HeritageLab over the course of time, and what do they forget? How do they tell their friends about the project? What details do they note? More generally, what are the overall subsequent effects of this project for each visitor?

As already underlined, digital technologies play a special role in the perception of cultural heritage. They offer new features, in terms of design, content and atmosphere, in the dialogue between the visitor and the museum. This research further confirms that museums are undergoing a specific period in their history with the advent of digital technologies (Nol, 2007). This period involves changes to the nature of the social and sociotechnical interactions taking place. Following our analysis of the quantitative data collected, a number of questions remain unanswered. For example, why did women come much less often to the HeritageLab than men? Over the entire observation period, only 470 women came as opposed to 745 men. Thus 1.5 times more male visitors than female visitors were observed. It is interesting to note that this imbalance was different on Sundays when the number of women visitors sometimes exceeded that of men. This fact is all the more interesting when we consider that a number of studies show that generally women go more often to museums than men[9]. In the future it may also be interesting to compare qualitative indicators such as visitors' motivation, mood and interest along with quantitative indicators such as visit duration, visitors' movements, etc. Exploring these factors may help to understand the differences between categories of visitors in greater detail. It would be interesting to see whether an exhibition can have a genuine impact on visitors' moods and their contact with other people and to study the factors and circumstances behind people's decision to visit museums.

We have seen that visitors to the museum use the digital equipment alone. This also leaves a number of questions unanswered. When does individualization increase or decrease? Is there a connection between

9. As noted in the "Special Eurobarometer 399: Cultural access and participation" (2013).

individualization and the characteristics of an exhibition? How does individualization affect a visitor's impression of an exhibition?

The topic of digital projects in museums is an extensive one with various aspects requiring study. Looking at digital equipment in a museum can help to understand some of the processes unfolding in modern society. As social institutions, museums continue to reflect specific choices as they present artefacts of particular importance for individual and collective consciousness. Digital technologies have called many long-standing museum principles into question. For example, what is more important, the original museum piece or its digital image in the form of a 3D copy? Do we need to use the "new" to present the "past"? What role do museums play today, that of custodian, informer, interpreter or something else? There are also questions about the extent to which the development of modern museums should be based on digital technologies. Should their "digital" aspect be a reflection of their innovativeness and originality? As we have seen, digital technologies are not only technologies or tools, they also act as mediators. They introduce something to the dynamics of visitors' actions and behaviour, affecting the way in which visitors interact with devices, surrounding spaces and sounds, and with other people, including staff. Because of these digital technologies, visitors engage in a sociotechnical exploration of what a museum has to offer. As we have seen with the HeritageLab, this leads to appropriation: some visitors are drawn towards the music and famous concerts, others towards the technological innovation and yet others towards the general pleasurable atmosphere. Visitors are offered a very rich experience as they are invited to test the technologies and understand their possible role in the life of the people who participate directly or indirectly in preserving heritage for future generations.

Bibliography

Andreacola F. (2017). Musée et numérique, enjeux et mutations, *Revue française des sciences de l'information et de la communication* sur : http://journals.openedition.org/rfsic/1056

Becker H.S. (2006). *Les mondes de l'art*, Paris, Flammarion.

Bertacchini E., Morando F. (2013). The future of museums in the digital age: new models of access and use of digital collections, *International Journal of Arts Management*, vol. 15, n° 2, p. 60-72.

Bourdieu P., Darbel A. (1991). *The love of art – european art museums and their public*, Cambridge: Polity Press.

Decker J. (2015). *Technology and digital initiatives: innovative approaches for museums*, Rowman & Littlefield.

Din H., Hecht P. (2007). *The digital museum: a think guide*, American Association of Museums.

Dubois A. (2017). How to understand engineering sciences with the techniques of the body: The case of the bridges collection of the Musée des Arts et Métiers explained by circus acrobatics, *Social Science Information,* vol. 56, n° 2, p. 254-269.

Dziekan V. (2012). *Virtuality and the art of exhibition: curatorial design for the multimedial museum*, Intellect Books.

Falk J.H., Dierking L.D. (2016). *The Museum Experience Revisited*, London and New York: Routledge.

Falk, J. H. (2009). *Identity and the museum visitor experience*, Walnut Creek, CA: Left Coast Press.

Flichy P. (2004). L'individualisme connecté entre la technique numérique et la société, *Réseaux*, vol. 2, n° 124, p. 17-51.

Forrest R. (2011). Museum atmospherics: the role of the exhibition environment in the visitor experience, *Visitor Studies*, vol. 16, n° 2, p. 201-216.

Goffman E. (1959). *The presentation of self in everyday life*, Harmondsworth, Penguin.

Hanquinet L., Savage M. (2012). Educative leisure' and the art museum, *Museum and society*, vol. 10, n° 1, p. 42-59.

Heath C., vom Lehn D. (2008). Configuring interactivity: enhancing engagement and new technologies in science centres and museums, *Social Studies of Science*, vol. 38, n° 1, p. 63–91.

Heath C., vom Lehn D., Hindmarsh J. (2001). Exhibiting interaction: conduct and collaboration in museums and galleries, *Symbolic Interaction*, vol. 24, n° 2, p. 189–216.

Heath C., vom Lehn D., Osborne J. (2005). Interaction and interactives: collaboration and participation with computer-based exhibits, *Public Understanding of Science*, vol. 14, n° 1, p. 91–101.

Kamolpattana S., Chen G., Sonchaeng P., Wilkinson C., Willey N., Bultitude K. (2015). Thai visitors' expectations and experiences of explainer interaction within a science museum context, *Public Understanding of Science*, vol. 24, n° 1, p. 69-85.

Kaulen M.E. (2012). *Museification of historical and cultural heritage in Russia*, Moscow: Eterna.

Klimpel P. (2013). Where do museums stand in the digital age? Private companies, heritage institutions and the civil society, *Nemo annual conference*, Bucharest, Romania, November 2013, p. 9-13.

Lebedev A.V. (2007). Information technologies and a modern museum exposition, *The Russian expert review*, vol. 6, p. 30-35.

MacDonald S. (2002*). Behind the Scenes at the Science Museum*, NYC, Berg.

Marty P.F. (2007). Museum Websites and Museum Visitors: Before and After the Museum Visit, *Museum Management and Curatorship*, vol. 22, n° 4, p. 337-360.

Menger P.-M. (1986). L'oreille spéculative. Consommation et perception de la musique contemporaine, *Revue française de sociologie*, vol. 27, n° 3, p. 445-479.

Minghetti V., Moretti A., Micelli S. (2001). Reengineering the museum's role in the tourism value chain: towards an it business model, *Journal of IT & Tourism*, vol. 4, p. 131-143.

Nol L.Y. (2007). *Information technologies in museums*, Moscow: Publishing Center of the Russian State University for the Humanities.

Parry R. (2013). *Museums in a digital age*, Routledge.

Rosental C. (2017). Modes of Exchange: The Cultures and Politics of Public Demonstrations. in K. Chemla and E. Fox Keller (eds). *Cultures without Culturalism: The Making of Scientific Knowledge*, Durham, Duke University Press, p. 170-195.

Simon N. (2010). *The participatory museum*, Museum 2.0.

Soren B.J. (2005). Best practices in creating quality online experiences for museum users (with Canadian Heritage Information Network), *Museum management and curatorship*, vol. 20, n° 2, p. 131-48.

Special Eurobarometer 399 (2013). *Cultural access and participation*, http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_399_en.pdf

Themed Entertainment Association (2015). *Report TEA/AECOM 2014: Theme Index and Museum Index*, p. 20-21.

Thomas S., Mintz A. (1998). *Virtual and the Real: Media in the Museum*, Washington, American Association of Museums.

Ughetto P. (2017). Scholars and poor communicators? Old Masters exhibitions as a scientific practice and communication activity for art museum curators, *Current Sociology*, vol. 65, n° 3, p. 376-394.

Vinck D. (2016). *Humanités numériques : la culture face aux nouvelles technologies*, Paris, Le Cavalier Bleu.

Vuokko H. (2011). Interaction and performativity in digital art exhibitions, *Nordisk museologi*, vol. 1, p. 98-105.