

Enhancing the visitor experience at MAMCO, Geneva's Modern and Contemporary Art Museum with digital tools

**Bachelor Project submitted for the degree of
Bachelor of Science HES in International Business Management**

by

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Disclaimer

This report is submitted as part of the final examination requirements of the Haute école de gestion de Genève, for the Bachelor of Science HES-SO in International Business Management. The use of any conclusions or recommendations made in or based upon this report, with no prejudice to their value, engages the responsibility neither of the author, nor the author's mentor, nor the jury members nor the HEG or any of its employees.

In addition, the study conducted leading to this report was set out to resolve a specific issue faced by the MAMCO Geneva Modern and Contemporary Art Museum, therefore this report presents a solution-oriented research that is applicable to the current state of the problem as 2022.

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Executive Summary

MAMCO is Geneva's Modern and Contemporary is Switzerland's biggest museum of modern and contemporary art and one of the most important. While the overall appreciation of the museum is positive, the museum has identified some areas of possible improvement. Some visitors have complained about the difficult understanding the exhibitions, the bad access to information and difficulties navigating the museum, therefore the research started as an answer to unmet needs of visitors.

This study is aimed to provide a solution to improve the customer experience visiting the museum and provide proof that a custom-made digital tool could improve visitors' experience discovering the exhibition and navigating the different spaces.

The first part aims to understand the structure and functioning of the museum and understand its visitors, therefore different seances of observations and timed observations were executed, during those sessions, we learn that most of the visitors do not utilize the provided information support and that the proposed order of the visit is largely ignored, mainly because there are not clear directional indications at the museum.

The research focuses then on selecting and developing a prototype of a pertinent digital tool that could address the issues faced by visitors. The selected support was an audio-guide that works in conjunction with chronological numerated QR codes, this ensures better access to the information and an easy way to follow a predetermined pathway.

The study describes the design and development of the prototype that was tested in a real setting at the museum, the codes were strategically located in one part of the exhibition, and a test group visited this part of the exhibition with the prototype and the rest of the exhibition without the prototype.

The final part analyses the result of the debriefing exercise after the prototype test, and the subsequent development of a survey and metrics to analyses visitor satisfaction.

Based on the results from this study, we can conclude that a custom-made digital tool, can improve the customer experience at Geneva's Modern and Contemporary Art Museum by improving information accessibility, providing pertinent and interesting information, improving the navigation at the museum.

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1. Introduction

1.1 **A brief presentation of MAMCO**

MAMCO is Geneva's Modern and Contemporary Art Museum, with its 3'500 square meters of exposable surface, is Switzerland's largest museum of modern and contemporary art, and one of the most important.

Today it hosts a collection of over 6'000 artworks (without counting numerous editions and artists' documents). Most of those artworks are from the period between the second half of 20th century and the beginning of the 21st century.

Since its opening in 1994, MAMCO, has devoted itself to the art of our time, the museum layout exposes in parallel its temporary exhibition and the permanent collection, developing an original form of museography, presenting the ensemble as a "global exhibition" (*MAMCO - About us*, 2022), despite the covid crisis, the museum was visited by over 27'000 visitors in 2021. (MAMCO Visitors statistics, 2022)

While the overall perception of the museum from the visitors' perspective is positive, the museum has identified some points of improvement, as visitors have repeatedly expressed that the information provided does not respond to their needs and that is difficult to follow the exhibition in the right order.

MAMCO is expecting a transformation over the coming years, this transformation will start in 2026 and it will change the skin of the museum, aiming to create the conditions to comply with the requirements of a modern institution, in regards to subjects such as insulation, temperature control, humidity control and all the needed infrastructure to accommodate the most transcendent artist of this century (Dumont, 2021). Is in the context of this transformation, that would be pertinent to explore new ways to improve and transform visitors' experience and their interactions with the museum.

This study explores how visitors interact with the museum provided supports and is aimed to understand if a custom-made digital tool can improve visitors' experience while visiting the museum, by designing and testing a prototype of the selected digital tool.

1.2 The problem statement and situational context

Working at the reception desk of MAMCO, my co-workers and myself were frequently confronted by visitors that came up to me to express dissatisfaction towards the museum, mainly concerning the difficulty of understanding the concept behind the artworks, the lack of explanations and difficulties to orientate within the museum.

Up to this point, many initiatives have been taken to provide good access to information, for example, “flying guides”, people educated about the exhibition that can offer personalized explications to the visitors, QR codes that can be scanned with a smartphone, a website describing the collection of the museum, and a semestral journal with information about the latest exhibitions.

Nonetheless, from the visitor’s perspective, the information proposed could seem overwhelming, as they need to change from one source of information to the other, therefore many visitors do not take full advantage of the information support or get lost in all the different sources of information, creating a perceivably “broken experience”. Moreover, when there is a high flux of visitors, the “flying guides” are not available to respond to the demand from the visitors creating a gap between the demand from customers and the proposed resources.

In addition, there is a precedent from a study conducted in 2008 by Lisa Kaczmarek, regarding the clarity of the information panels at the museums, reported that among the participants of the study, many of them considered that the information displayed was not clear enough, reaching 20% for the technical information panels, and 16% information panels. (Kaczmarek, 2008, p48)

1.3 The objective of the research and research question

The research is aiming to understand MAMCO’s visitors, and the visitor experience with observation techniques, timed observation techniques, and analysis of secondary data. Secondly, to create and test a prototype of a digital tool, that could deliver an improved experience over the currently provided information supports. Finally, based on the test and insights from the testers, we aimed to answer the following research question.

Can a custom-made digital tool, improve the customer experience at Geneva’s
Modern and Contemporary Art Museum?

1.4 Structure of the study

The first part of this report composed of the previous paragraphs, acted as an introduction to the study.

In the second, part the literature review, we will explore first, the theoretical foundation for this study, we will go through the role of museums in societies, the latest trends in digital technologies, the role of digital tools in customer experience. Then, we move into a deep analysis of MAMCO, the history, collection, structure, and the provided information supports.

The third part is dedicated to the methodology used to understand MAMCO's visitors, its interactions with the museum, and identify points of improvement. Secondly, to explain the methodology used to create the prototype of a digital tool and the metrics used to assess its utility in improving visitors' experience.

The fourth part provides the analysis of the results of the study. This part is divided in two sub-parts. First, the study will go over understanding MAMCO's visitors and drivers of dissatisfaction. Then the study will attempt to answer our research question by analyzing data collected after the testing of the prototype with a survey and a focus group.

The fifth part is dedicated to the discussion, limitations of the study, recommendations for the institution, and possible points of improvement.

The sixth and final part of the study, the conclusion, provides a recapitulation of the study and the main takeaways.

The study is accompanied by an appendix, that goes deeper into subjects that are not directly addressed in this report.

2. Literature review

2.1 Museum's role in the contemporary context

In the last decades, many technological innovations have reshaped the way people interact with each other and with their environment. Social ideologies have changed self-perception, and new ideologies have reshaped the identity of new generations, leading to sociocultural changes. In an ever more connected world, all those changes have transgressed all the spheres of society and are shaping today, the way people consume and interact with history and art.

What do customers expect when visiting a museum? Should museums be a place that exhibits artifacts, artworks, and conduct research, or should museums behave as an active member of society engaging in societal issues? Should museums be “a place of learning” like universities and laboratories or should be considered as a part of the entertainment industry?

As we can see museums today are facing many challenges. To begin, the sense itself of what a museum is or should be is currently being challenged.

ICOM the International Council of Museums, which is the most important international organism gathering museums and professionals of museums around the world, is currently having discussions re-define what a museum is. The current definition was updated in 2007, and defines a museum as follows.

“A museum is a not-for-profit, permanent institution in the service of society that researches, collects, conserves, interprets and exhibits tangible and intangible heritage. Open to the public, accessible and inclusive, museums foster diversity and sustainability. They operate and communicate ethically, professionally and with the participation of communities, offering varied experiences for education, enjoyment, reflection and knowledge sharing”. (Robinson 2021, p2)

2.2 The modern and contemporary art museums

As the complexity of defining what a museum should be, is already challenging, trying to explain the role of modern and contemporary art in that context is even harder. Modern and contemporary art, as the name implies, refers to a period that is relatively recent in history. The challenge of trying to define and explain modern and contemporary art, represents the unavoidable temptation to define what is currently happening, but how could we define something without having the possibility of stepping backward? to what extent is positive or wise to provide explanations about a history that might not yet fully developed?(Kuiper, Lowry, 2022)

2.3 Museums from cultural centers to mass entertainment

Regardless of formal definitions, visitors know what they want, when they visit a museum. They are not only going to enrich their cultural background or to discover a new artwork or antique piece, but they are also going for the “museum experience”.

As we mention before whether they like it or not, museums have become a part of the entertainment industry. It is common to visit at least one museum when visiting a city, and museums are among the top attractions for culture seeking tourists. Fifty percent of tourists visit at least a museum while discovering a city (van Aalst, Boogaarts 2002, p. 196).

On the latest decencies cities around the world have started to understand the importance of museums as cultural and touristic attractions. Ever since the creation of Pompidou in the 70's in Paris, and the subsequent development of the surrounding areas, we have seen clusters of museums pop up in the most important cities, usually revitalizing old areas and generating new urban centers. Museums' clusters not only bring tourist but also attract commercial development like restaurants, gift shops, and commercial centers, they also rise property values in their surroundings and allows cities to present themselves as a “Cultural cities”.

Nowadays museums need to couple with visitors' expectations, therefore they need to understand their role as a part of the entertainment/touristic industry, and provide a tailored experience, mixing the cultural experience, the educational experience, and the entertainment, that cannot be underestimated. Hannigan (1998) calls this process which he describes as ‘the joining together of educational and cultural activities with the commerce and technology of the entertainment world’ as ‘edutainment’ (van Aalst, Boogaarts 2002, pp. 195–197). Aiming to provide the best experience to their visitors, museums have emerged as places to experiment with new technologies and provide an entertaining and educational experience. (Más, Monfort 2021, p. 11)

2.4 The importance of adopting digital technologies

The last century has brought structural and ideological changes, transforming many museums, from collection-driven, to visitor-driven institutions (Elgammal et al. 2020, p. 49), moving in the process from an exhibition thought for experts and researchers to a more social space where everyone is invited, and the dialogue and socializations are encouraged (Fernandez-Lores, Crespo-Tejero, Fernández-Hernández 2022, p. 3)

Is in this context that museums need to modernize their offering to an ever more demanding and larger customer base. Aiming to attract new visitors and create a memorable experience, museums today are integrating new technologies such as, robots, artificial intelligence, and automation. Many museums understood the opportunities that digital technologies could offer to their visitors, by personalizing their interaction, favoring accessibility, and expanding their target audience. As institutions become more visitor-oriented museums need to move beyond their basic tasks of collection, research, and exhibition, and aim to provide experiences, as experiences seem to be the main determinant of visitors' satisfaction, and wiliness to repeat the experience or recommend it to another person. Is for this reason that visits are becoming more interactive and museums are experiencing with advanced technologies to deliver an experience beyond the traditional museum visit. (Ellamae, Islam et al. 2020, p. 49). In the last decades, the development of tools such as the internet has allowed museums to establish a strong relationship with information and communication technologies renewing the experience, changing the outdated concept of a museum of the nineteenth century and bringing them to the contemporary era. (Más, Monfort 2021, pp. 12–14)

In 2012 Saldaña and Celaya conducted a study in 136 museums in Europe entitled "Museums in the new era", The study dives into the motivation of museums to incorporate digital technologies. The study concludes that 65.6 % of museums aim to attract new audiences and to enrich the experience with digital tools, for example with QR codes and touch screens, 62.5 % are interested in improving online communication and positioning strategy with social networks, 56.3 % aim to improve accessibility to the institution, while other motivations were also the improvement of procedures for the preservation of artworks, the management of the collection, its promotion and digitalization, and personalizing the experience at the institution while encouraging interactions. (Saldaña, Celaya, p. 23)

The digitalization started just after the internet became widely used, as museums recognized the importance to attract new visitors and improve engagement. In our days most of the museum have a digital communication strategy in place, like for example social media, newsletters, virtual communities among others. All those digital technologies have become an indispensable tool for the management of museums (Kabassi, 2019) and today might be considered the norm. Therefore, in this report we will dive into the newest technologies that are being used in museums and that may be capable of enhancing visitors experience, and not in technologies related to the digital communication strategy, as today it is largely considered a must for museums, and are already widely used around the world, including at MAMCO.

2.5 Enhanced visitor experience

The concept of memorable experience is relatively recent in the context of museums, and it focuses on the role that emotions play in creating memories, as people might forget elements that are related to the location or time of a particular event, but rarely forget elements related to the feelings, that are elements frequently recalled and remembered (Kim, Ritchie, Tung, 2010)

An enhanced visitor experience, also refers to the increased satisfaction for the visitors, and satisfaction can be defined as “consumer’s subjective judgement resulting from observations of attribute performance” (Baker, Crompton, 2000, p. 789), satisfaction can be a good mediator between the experience and the behavioral intentions, being a good measurement of consumer fulfilment. Satisfaction can be understood as well as a trade-off between what the customer is giving, compared against to what he is getting, and the surplus could be understood as satisfaction. (Elgammal et al. 2020, p. 50), as people tend to select experiences that they enjoy, and reject experiences that do not meet their expectations (Elgammal et al. 2020, p. 64) museums should aim to improve customer experience.

2.6 New trends in digital tools

2.6.1 Mobile devices and smartphones

Mobile devices are small personal devices that can fit on the palm of the hand, that can provide the computational power needed to run programs and develop mobile applications, those mobile application have the power to enhance the visit by expanding museums spaces.

For museums the use of mobile devices represents a good opportunity for innovation as reduces the investment needed in hardware, like for example audio-guides, in contrast, it demands the creation of quality content and the optimization of the institution resources.

Mobile devices are an excellent tool, they have a high-end hardware that can provide access to media content, camera enhance content, audio content, among others and are very user friendly.(Más, Monfort 2021, p. 16)

2.6.2 QR Codes

QR codes, or quick response codes are used in conjunction with mobile devices and offer the possibility to enrich the information quantity and quality by containing or redirecting the user towards an information source. The visitor can scan the code with a mobile device and access a wide variety of content, this content can be for example audio-visual material, text, audio, images among others. (Más, Monfort 2021, p. 17)

QR codes before 2019 were not widely known or used in cultural institutions, mainly because a big part of the public was not aware or familiar with their use and utilization. Nonetheless, the covid crisis might have made this technology widely used as it was used for covid-passes, restaurant menus and the authentication of documents. (Azmaadi, Hamid, Hanafiah 2022, pp. 484–486). Today this technology is finding its place in museums, as it allows to provide a greater amount of information and richer information without overcharging the walls of museums in a way that could distract or interfere with the proposed visual content at the museum.

QR codes have shown promising results improving satisfaction in museums, in a study conducted at Alborania Museum of Malaga aiming to measure the improvement in the transmission of environmental education and satisfaction with the use of QR codes, the results were very positive. The study concludes that the use of codes QR improved the knowledge of the visitors, as well as their level of satisfaction. (Aguilera, Caballero 2019, pp. 31–32)

2.6.3 Virtual and augmented reality

Virtual reality or (VR) allow the user to experience a virtual world in an immersive experience generated only by digital content. This experience is usually delivered with the utilization of augmented reality goggles, audio and digital content. (Más, Monfort 2021, p. 17)

Augmented Reality (AR) is usually delivered with a phone tablet or goggles, AR devices are portable and personal tools that could enhance the information available for each user, by combining two different types of information. First, physical information, things that are present in the real/physical environment. Secondly, digital information, information that is contained within the electronic device and that can only be accessed through the electronic device. An AR device has the capacity to process both inputs and convert them into a unique representation that merges the physical and digital world, so the user can experience an interface that overlaps layers of virtual content to the physical environment. (Más, Monfort 2021, pp. 17–18)(He, Wu, Li 2018, pp. 127–128). The use

of VR and AR technologies can be used in museums to recreate. Digital environments, expand on reality and create a more immersive experience (Serravalle et al. 2019, p. 3)

2.6.4 Touch-tools screens, and audio-visual scenography elements.

Touch displays and screens are a useful tool that allows museums to physically interact with the visitors in an intuitive manner, in an environment that was previously very restrictive to touch inputs.

Audio-visual and scenography elements, relate to the creation of spaces that mixes a digital environment with the real elements where the visitor can feel part of the recreation (Más, Monfort 2021, p. 19)

2.6.5 3D screens, Holograms, and spherical projection

This kind of technologies allows the integration of 3D objects in a real setting, it is usually supported by fog screens and projectors. It provides great potential for museums as it can mix digital content with the real landscape without the utilization of any device from the visitor perspective (Más, Monfort 2021, p. 21) it also allows several users to experiment the same setting generating a coherent experience for groups.

2.7 MAMCO in depth analysis.

Over the next pages we will explore the history of the museum, the specificities of the building and its current exhibitions and its business structure.

2.7.1 History of the building prior MAMCO

The MAMCO was established in an old industrial building constructed in 1942 that used to belong to the Société Genevoise d'instruments de physique (SIP), the place was used as an atelier to construct a large variety of products and was used by the firm until 1988, when they decided to move the production to new factories better equipped outside the city. (Frommel, Benedict, 2012, pp. 11–13). Traits of this industrial past are still visible in the building, for example, on the big windows that could be removed to displace large objects, on rails on the floor that were used to transport heavy equipment, the coating of the floor, made of an alloy of concrete and sawdust used to control humidity, and the iconic grey-green color that used to cover all the walls of the museum, but that today can be only seen on the lift and some windows.

2.7.2 The beginning of MAMCO

The beginning of the museum goes back to the year 1973 when the “Association du musée d’art modern” (AMAM) was founded. The association’s goal was the creation of an art collection for Geneva’s Canton. The association managed to convince Geneva’s Town of the importance of having an art center in the city. Finally, with the contribution of private sponsors and the canton of Geneva, MAMCO opened its doors to the public in 1994. (*Les Amis du Mamco*, no date)

2.7.3 Museum current distribution

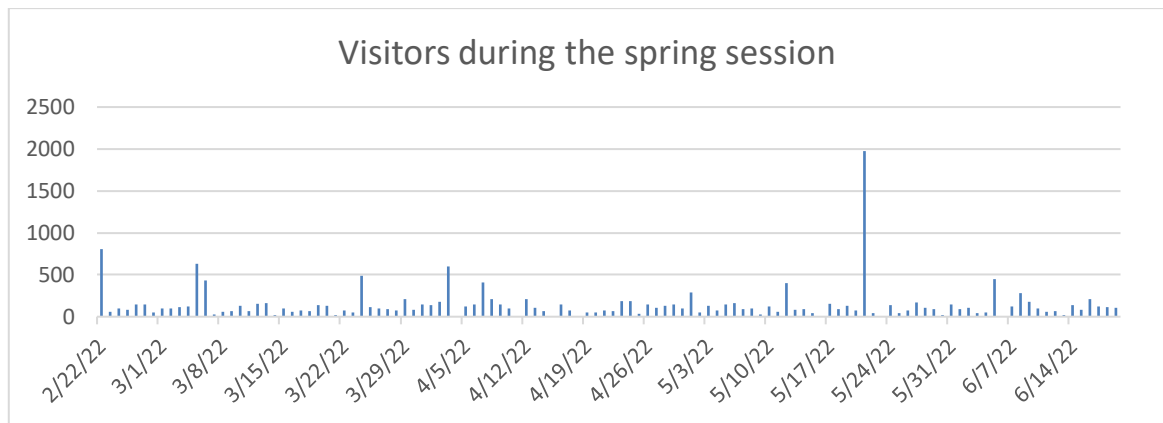
The MAMCO is located inside of the Bâtiment d’Art Contemporain (BAC), on the building D (constructed on 1958) building that houses different art-related spaces like the Centre d’art contemporain (CAC), the Centre de la Photographie (CPG), and the Commun. (*Mamco / Informations pratiques*, no date)

The building measures 53.30 meters long, by 19.5 meters wide. The area dedicated to the museum occupies a surface of over 3500 square meters, divided on 4 floors. The high of each floor varies between 3.6 meters and 4.35 meters (Kaczmarek, 2018, pp. 10–14). In addition, non-accessible to the public, there as an underground level, this is used as a warehouse, and it host a living space comprised of a kitchen and some amenities that can be used by the personnel of the museum, principally by the guardians’ team. Also, on the fourth floor there is a space, non-accessible to the public, that hosts office spaces for the administration and for the “Archives” that is a collection of books and documents aimed to the preservation and study of artworks.

2.7.4 The current exhibition distribution

The current exhibition corresponds to the “Spring Season” and took place from the 22 of February of 2022, until the 19 of Jun of 2022, and hosts artworks from different artists. Verena Loewensberg (Retrospective), Geralo de Barros, Jo Baer, Jackie Winsor, “&” (exhibition organized by John Armleder), Denis Oppenheim, and Angeles Marco, among others.

The exhibition was on view for 115 days and it was visited by 16901 people averaging a 150 visitors per day, if we consider only the days that the museum was opened. The distribution of visitors is fairly distributed during the whole cycle, except for some days that driven by a special event organized by the museum, like “Nocturnes” or “Vernissages” the affluence of public was much higher.



2.7.5 MAMCO, what is currently being offered as information supports

The information supports the result of the collaborative efforts of different departments of the museum, mainly the direction, curators, communication, cultural mediation, the artists, among others.

MAMCO being specially interested in the conservation and documentation of its collection, puts special attention to the creation of content, texts, audio-visual material, and publications, those publications in many cases are free of charge or publicly available over the internet, like for example the MAMCO Journal. There are also books and other publications that can be purchased in-place (*MAMCO - Shop - Publications* no date)

Is from those texts, that are originally created with documentation objectives, that a version more accessible to the public is offered at the museum through different information supports. The visitors could expect to find the following information supports at the museum:

2.7.5.1 The MAMCO Journal

The MAMCO journal is a semestral publication in the form of magazine or journal that explains the exhibition “on view”, and that can be acquired free of charge at the reception desk of the museum. Previous journals, concerning past exhibitions can be purchased at the reception desk for 5CHF. The MAMCO Journal is presented by the institution as follows,

“MAMCO Journal aims at presenting the topics we have selected through the year, the concepts that were elaborated during the preparation of the exhibitions, and the results that have (or have not) been presented to the public” (MAMCO Genève - MAMCO Journal - 2022 no date)

As for today May 2022, the current exhibition is presented on the journal N°9. The latest journal is a 70 pages long booklet, presenting mix of texts, interviews, and pictures. The publication is structured in different sections. The “On view” corresponding to the main temporary exhibitions. The “Preview”; part of the highlights of the previous exhibitions, and some additional information like interviews and anecdotes.

2.7.5.2 The Information panels.

Information panels are the main source of information for visitors, they are very visible panels, attached to the walls. They are mainly found in two formats, the big information panels (100x70 cm approx.), that are used to introduce a topic or exhibition, and small information panels (42x30 cm approx.) mainly used to deliver further explanations about a particular artwork or artist, all the panels are displayed in English and French.

2.7.5.3 The Technical information plaques

The technical information plaques are smalls information plaques (8.5x5 cm approx.) that contains factual information about the name of the artwork, the date of production, the artist’s name, the material used, the precedence of the artwork, among other information.

2.7.5.4 The Flying Guides or “Guides Volantes”

The flying guides are a most personalized way to discover the museum, they are professional guides, deeply knowledgeable about the exhibitions, formed to answer all sort of questions. They can be found walking around the different museum’ floors with a distinctive pink badge, de-facto there is only one for each floor, and are only present the weekends and the special events, such as the exhibitions openings, nocturnes (special opening at night), or any other event.

2.7.5.5 QR Codes

The museum has started to implement QR codes to add information for specific artworks. Those QR codes are easily scannable with the camera application of any smartphone, and direct the user, who needs a functioning internet connection, to the MAMCO website where additional information can be found in the form of text, audio, or video. The QR codes are largely reserved for a few artworks and are presented in the same format as the technical information plaques (8x5.5 cm approx.), while the code itself its only (4x4 cm).

2.7.5.6 Additional paper support

The paper support are detachable sheets of paper, brochures or flyers that can be used to complement information. Once the most popular way to complement the information is today largely being replaced by other information supports. This trend was accelerated even more with the covid crisis that pushed people to avoid physically sharing and touching paper supports.

2.7.5.7 Additional information

Over the last few years, the museum has digitalized its collection, today over the half of the museum's collection can be accessed on the website of the museum. (*MAMCO - Collection - Catalogue*, no date) This is an important source of information for those who need to go in detail about the artworks. The efforts for digitalizing the collection started several years ago, but the covid crisis accelerate this process, as the museum was partially closed during this time, allowing the direction to concentrate their efforts on this digital inventory. (*MAMCO Genève - Expositions - Inventaire* no date)

2.7.6 Services & Facilities

Restroom facilities: Visitors have 2 options for restrooms facilities. One, on the common space of the ground floor, shared with the other institutions of the building, there is a room dedicated to women and men, and a private toilette for parents with babies or people with reduced mobility. The second restroom facility is located on the first floor of the museum, there are 2 rooms, one for each gender, and the spaces are decorated with artworks.

Internet connection: The museum provides wireless connection; this network can be accessed with a numerical password that the visitor can find on their purchase receipt or requesting a code at the reception desk. This wireless network has some drawbacks as it does not offer a stable connection across the museum. The quality of the signal drops significantly when the user gets away from the wireless router.

Gift-shop: A Small gift-shop can be found on the ground floor next to the reception desk, it offers books, artist publications, post-card, museum merchandising, posters, and some exclusive artworks. The visitor can purchase directly at the reception desk

2.7.7 How MAMCO positioned within the industry and the late trends in digital technologies.

MAMCO has taken important steps towards the implementation of digital tools in their exhibitions, for example digitalizing their collection, and integrating digital content that

can be accessed with QR codes. In addition, they count with a strong presence on social networks and numerous subscriptions to its newsletter. Nonetheless, there are some areas of improvements that will be discussed on this report.

Having discussed the importance of digital tools for museums and cultural institutions, the role that information accessibility plays in the visitors' experience, and dived into the structure, exhibitions on view, and information supports provided by the MAMCO, the following part of the report focuses on the methodology used to create a functional prototype of a digital tool, capable of improving the visitor experience.

First the report focuses on understanding the visitors journey at the museum, its interactions, and possible points of improvement. Afterwards the report dive into the testing of the prototype and the creation of metrics aimed to understand if the visitor experience can be improved with digital tools.

3. Methodology

3.1 Preliminary study, diving into the problem

Objective: Find areas of research and gather qualitative data, understand a problem, drivers behind the problem and obtain authorization to conduct research

3.1.1 Find areas of research and gather qualitative data with focus groups

Brainstorming sections on focus groups.

From December 2021 to the early weeks of January 2022, several focus groups were conducted with members of the surveillance team. Those focus groups were conducted taking a role as a part of the guardians' team, the groups involved from 3 to 5 people discussing elements that affects customers satisfaction. The participants were not informed of the goals of the discussion and the discussions were conducted in a casual manner where they spoke openly and without constraints, and I acted as a moderator redirecting the conversation if needed and taking notes.

During those sessions the focus was set on elements that cause discomfort to the customers, the questions that the visitors asked the most, and elements that could be improved.

The discussion focused on elements within the scope of this study, elements that are feasible, as for example many visitors ask for a restauration facility, but current limitations at the museum made this element unsuitable for this study.

3.1.2 Getting the authorization to conduct research

Two interviews were conducted, one first one on the mid 10 of Janvier 2022 with the responsible of the reception desk at the museum, to propose the project, discuss technicalities and ensure access to a key information. A second interview was conducted on the 12 Janvier 2022 with the chief curator of the museum, to define the scope and to have guidance about previous research initiatives at the museum, the interviews were considered confidential in nature.

3.2 Understanding Visitor Journey, interactions

Objective: Conduct observation techniques, generate a protocol to measure how people use the information supports at MAMCO, and based on that, decide what would be the more pertinent digital tool to be developed.

3.2.1 First observation phase: General observation (Mars 12-13)

I conducted the observations from the role of a member of a security team, this was done with the objective of blending into the museum personnel. This involve wearing the official security team MAMCO t-shirt and respecting the schedule of the guardians. The observation began 30 minutes before the opening of the museum and ended 30 minutes after the closing on the museum, I freely moved across the different spaces at the museum taking notes.

3.2.2 Generation of a protocol to measure visitors' interactions with the museum and museum personnel (April)

This involved the creation of a protocol from a spreadsheet on Google Sheet, formatted to be easily accessible with a smartphone. The spreadsheet is formatted to gather information about the time visitors spend at the observation floor, from the beginning to the end. Also includes a clickable option to individually measure time that they spent in front of the different information panels, a clickable option to individually measure time that they spent with the flying guides, and checkbox to count if the visitors follow the right orientation, use the QR codes, use the MAMCO Journal, and additional paper support.

It also gathers perceived demographic information like (gender and age), and quantitative factors such as the number of participants. Finally, there is a black space aim to freely write any additional comment.

The spreadsheet is automatically uploaded to an on-line database, automatically analyzed and an automatic text is generated.

On the following page the optimized Google Sheets for data collection is explained in detail.

3.2.2.1 Google sheets optimized to time visitors' interactions with the provided support.

It is important to mention that only columns A, B and C are visible to the user, the rest is part of the automatic analysis.

	A	B	C	D	E
1	Début de la visite		16/08/2022		
2	Etage	1er			
3	Visiteur(s) arrive	<input checked="" type="checkbox"/>		17:48:14	
4	Départ dans le bonne direction	<input checked="" type="checkbox"/>			
5	Profil visiteurs (max 5)	Gender m/f	Age (approx.)	Gender m/f	Etage
6	Visiteur 1 (suivi)	Masculin	18-35		
7	Visiteur 2	Feminin	18-35	Masculin	1er
8	Visiteur 3			Feminin	2e
9	Visiteur 4			Age (approx.)	3e
10	Visiteur 5				4e
11	Support d'information utilisé	Suivre uniquement 1 visiteur	<13		
12	MAMCO Journal	<input checked="" type="checkbox"/>	13-18		2
13	Support Papier	<input type="checkbox"/>	18-35		
14	Petit panneau avec le nom des oeuvres	<input checked="" type="checkbox"/>	35-65		
15	Code QR	<input type="checkbox"/>	>65		
16	Grand Panneaux (Poster)	Commence	Fin		00:02:38
17	Panneau 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	17:48:42	17:51:19
18	Panneau 2	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
19	Panneau 3	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
20	Panneau 4	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
21	Panneau 5	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
22	Petit panneaux (A4)	Commence	Fin		00:02:53
23	Panneau 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	17:56:02	17:57:44
24	Panneau 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	18:00:14	18:01:25
25	Panneau 3	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
26	Panneau 4	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
27	Panneau 5	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
28	Guides Volants	Commence	Fin		00:00:00
29	Visite 1	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
30	Visite 2	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
31	Visite 3	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
32	Fin de la visite	<input checked="" type="checkbox"/>			18:04:06
33	Commentaires	C'est possible d'ecrire en bas	Floor		
34			Time in		
35	Statistiques de la visite		Good direction		
36	Utilisation des Grand Panneaux	00:02:38	17%	Visiteur 1 (suivi)	Masculin18-35
37	Utilisation Petits Panneau	00:02:53	18%	Visiteur 2	Feminin18-35
38	Temps avec les Guides Volants	00:00:00	0%	Visiteur 3	
39	Temps de la visite	00:15:51	100%	Visiteur 4	
40	Conclusion: Le jour 08/16/2022, 2 visiteur(s) sont parcouru le musée, Parmi eux, 1 femme(s) et 1 homme(s). La visite a eu une durée de 15:51 (min:sec). Pendant la visite les visiteurs ont utilisé les suivants supports d'information; MAMCO Journal, Petit panneaux avec le nom des oeuvres, Grands panneaux d'information (02:38 min:sec), Petits panneaux d'information (02:53 min:sec), Guides volantes (00:00 min:sec).			Visiteur 5	

In this example the two visitors a male and a female of around (18-35) years old, entered to the concerned floor at 17h48, and leaved at 18h04

The visitor that will be designed subject of the observation (reference person) is the one in red, visiteur 1

During their visit they used the MAMO Journal, Technical Panels, Big information Panels (3m38s), and small information Panels (2m53s) to discover the exhibition.

3.2.3 Second observation phase: Timed observations and data gathering (4-5 of June)

The same provisions as the observation phase 1 were taken into consideration, but some additional steps were added.

The observation has for objective to fully cover two journeys of observation at the museum, staying half day in each floor. Saturday 4th, from 11h to 14h15 on the first floor, then from 14h45 to 18h00 on the second floor.

On Sunday 5th from 11 to 14h15 on the fourth floor, and then from 14h45 to 18h00 on the third floor. This ensures at least 3 hours of observations at each floor.

The observation phase started when the visitor, or group of visitors, enters the selected floor.

From that point the selected participant or participants were followed, information was gathered from a safe distance with the protocol previously explained.

There is not particular sampling method concerning the selection of visitors, the first visitor to enter in the observation floor, will be the subject of the observation.

Once the observation had started, the observer will follow the participant until they leave the floor, and I will continue with the next observation as soon as the next visitor(s) arrive, the objective is to gather the most observations within a day.

If the observation concern more than one person, one person will be selected as “reference person” of the observation. This person will be one time the first person to enter at the concerned floor, during the following observation will be the last person to enter at the concerned floor, and repeat the selection process, this was done to minimize personal bias choosing the reference person.

This observation period and the corresponding data gathering process allowed me to create a dataset named Timed Observations, a condensed version can be seen on the annexed documentation

3.2.4 Expanding on data collection

This part of the research aimed to understand quantitative factors related to demographic, age group, gender, ethnography, language, and any other important factor to create the prototype of a digital tool

MAMCO visitor's statistics: It is one of the most reliable sources of information, this database is automatically generated, by the ticketing device, and associated software when a ticket is issued.

This dataset contains information about each issued ticket and the associated information, either for visitors or sales. The most relevant aspects for our research were elements manually added by the personnel at the reception desk, concerning the age and precedence of the visitors. Some additional information is automatically generated concerning sales, and date of the ticket generation, different events at the museums, different kind of tickets, etc. The data was cleaned to reflect the aspects more important for the research.

3.3 Develop a prototype of digital tool

Objective: develop a digital tool that could be an improvement over the current supports and that will allow us to understand if the visitor experience can be enhanced with digital tools.

3.3.1 Selecting the more appropriate digital tool

Several Digital tools were considered for enhancing visitors experience, among them the more promising where scenography elements like touchscreens, 3D holograms, virtual reality, augmented reality, and QR codes.

Scenography elements were the first discarded, as they are very expensive to implement and moreover the implementation would interfere with the aesthetic of the museum.

VR and AR represented both a prominent choice, but two main drawbacks were encountered. First, when visitors were asked, if they would find attractive the option to discover the museum with an AR/VR device, most of them reply "YES", but also many people express their discomfort about seeing other people walking with virtual goggles and pointing their phone in every direction to scan the museum. Secondly the Chief Curator of the museum expressed his unfavorable posture on this "invasive technologies", that would distract the visitors from experiencing the real artworks.

The implementation of QR technologies seems to be the better alternative. The chosen format was a QR code activated audio-guide, as it is minimally invasive, as do not changes the aesthetics of the museum, other than the visible QR codes, it also does not prevent the visitor experience the museum with their own eyes, in addition it allows the

user to spend less time in front of information panels and more time observing the artworks, while at the same time listening relevant information.

3.3.2 Design of MAMCO QR code audio guide

The prototype should be a working prototype that allow the tester to scan a code with their own smartphones independently of their operating system and to access to the audio-files that will accompany the visitor through the exhibition. The prototype is composed of two elements, the QR codes that will be strategically placed on the museum' floor and the media content that will be contain on an internet database and be accessible through internet.

3.3.3 Design of the content

The content was mainly extracted from the MAMCO official information support but also from other official sources, like books and official publications. The texts were design with an accessible language on mind, and to be reeded in less than 5 minutes.

3.3.4 Text-to-speech

The texts files were transformed to audio files with the utilization of text-to-speech technology provided by TTSMP3, this technology allows the conversion of text into professional speech, in the selected language. For the prototype of the MAMCO QR audio-guide, the selected language was French as it is the main language used by the visitors of the museum according to MAMCO official statistics, and the observation phases 1 and 2.

The TTSMP3 application allows the developer to generate an MP3 digital file from texts, the digital voice will have an specific accent, intonation and inflection, this can be controlled with some basic coding write alongside to the text. (*Free Text-To-Speech / ttsMP3.com*, no date)

Some examples of the most used commands to create a more natural speech

Adding a break: Mary had a little lamb <break time="1s"/> Whose fleece was white as snow.

Emphasizing words: I already told you I <emphasis level="strong">really like </emphasis> that person.

Speed: For dramatic purposes, you might wish to <prosody rate="slow">slow down the speaking rate of your text.</prosody>

Or if you are in a hurry <prosody rate="fast">your may want to speed it up a bit.</prosody>

3.3.5 Create the visual identity:

The visual identity of the prototype needed to be blended with the visual identity of the museum, therefore the QR codes that were to be installed at the museum, as well as the visuals to be projected on the phone screen, were designed taking the identity of the museum in consideration.

The codes QR were designed to be on the floor, and to be visible without affecting the visual identity of the museum. To achieve that effect the QR codes had a minimalistic stile, contrasting 3 basic colors white black and the same grey-green that covers the museums walls and measuring (18x18cm). The QR codes depicted a letter accompanied of a number implying a chronological order, for example (M1, M2, M3...)

After scanning the codes, the user should be redirected to a website that presented pictures of the artworks displayed at the concerned room, the user could click on the pictures or artworks that interested the most, the clicking on the picture should start the reproduction of the audio-file, this audio-file can be reproduced, paused, or controlled in a familiar way with the touch screen.

Hereafter is a non-working exemplar of the QR coders displayed at the museum.

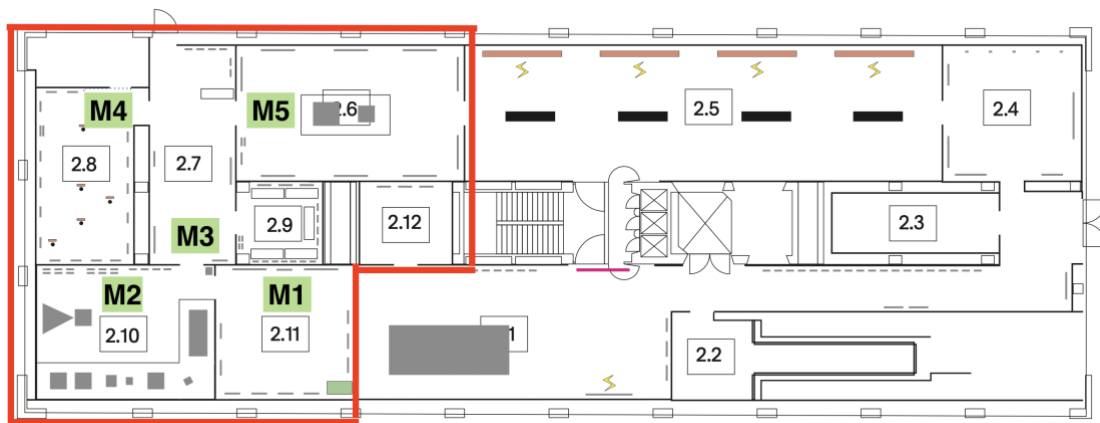


3.3.6 From design to prototype

The prototype was designed on the website SCANOVA, that allows the creation of customize QR codes, with the ability to share any multimedia content such as text, images, documents, audio, videos, social media profiles, map location, coupons, among others. In addition it allows to have several layers of customization, and provides metrics and traceability to understand how the codes are being used. (*Create, Design And Track QR Codes*, no date).

3.3.7 The lay-out of the exhibition

The test was conducted on the second floor, for the exhibition of Geraldo de Barros, this exhibition was spread over 6 room, and a total of 5 QR codes were installed, the reproduction of all the codes lasted around 20 minutes. Each code contains at least one audio-file and the pictures associated to the audio-file. The codes were installed as depicted on the following schema. The M1, M2, M3, M4 and M5 labels indicate the ubication of the codes QR, the visit was designed to last 20-30 minutes, and follows the chronological order from 1 to 5.



3.4 Testing the prototype and developing metrics to understand visitors' satisfaction

Objective, test the prototype and develop the needed metrics to be able to assess customer satisfaction regarding the prototype and the proposed solution of the digital tool.

3.4.1 Testing the prototype

The test was conducted on Jun 19th at the museum. The participants were selected with an open call on Instagram on June 12th. The call offered a free ticket and the possibility to visit the museum and to test a new concept for an audio-guide, the participants were limited to 12 people, respecting the guidelines of the museum for visits outside the opening hours.

The participants were instructed to come to the museum at 10h15 and to bring a smartphone with internet connection and a headset.

The QR codes were installed at the museum on the concerned rooms prior the arrival of the participants.

The test started with a small debriefing of the activity, and an explanation of the functioning of the QR codes.

The participants arrived at the concerned floor at 10h30, and they were free to visit as they pleased for 30 minutes.

Following this period and respecting the opening hours of the museum, 11h, the QR codes were removed, and the visitors were able to visit the rest of the exhibition as they wanted, the participants were instructed to meet again at 11h30 for a final debriefing.

3.4.2 Focus Group and visitors' insights

At 11h30 the participants were asked to meet at the meetings office, there was a small coffee break prepared, visitors spoke over their experience utilizing the audio-guide prototype, and provide their insights, the meeting lasted 30 minutes and the visitors left with a small gift offered as a way of thanking them for their participation.

3.4.3 Questionary of satisfaction

On 21 of June questionnaire was send to the participants of the "MAMCO experience" to gather information regarding demographics, the facility of the utilization of the porotype, the utility compared against other information supports, customer satisfaction, and the easiness following the direction of the visit.

The questionnaire was designed and distributed in Google Forms, and it was closed when all the answer were gathered.

The questionnaire in detail can be seen on the appendix.

4. Results

Over the next paragraphs we will analyze first, the results of the observation techniques, that aimed to better understand MAMCO's visitors, and that were fundamental for the creation of the QR code audio-guide.

Secondly, we will analyze the results of the focus group after the prototype testing and the subsequent questionnaire measuring customer satisfaction.

4.1 Visitor Journey at MAMCO

The understanding of the visitor journey is the product of the two observation phases and the secondary data collection.

4.1.1 Before arriving

Before arriving, the visitor needs to hear about the museum. A study conducted in 2018 indicated that most of people finds out about the museum by the word of mouth 51%, followed by the museum website 15%, and the social networks 11%. (*Kaczmarek, 2018, p. 45*)

During the observation day, it was observed visitors wandering around before the opening, presumably trying to find the museum, this align with the previous study that shows that, 11% of the visitors had trouble finding the museum, among them, the majority were tourist and first timers. (*Kaczmarek, 2018, p. 45*)

The main tool used to facilitate finding the museum was the use of GPS, nonetheless when we look the museum on google maps, it points a misleading point. It does find the entrance to the building complex, but it points the wrong building, offsetting the right emplacement of the entrance of MAMCO by around 50 meters.

4.1.2 The contemporary art building and central hall

Once the visitors arrive to the contemporary arts building, they will find a big metallic door, decorated by a massive artwork. Crossing the door, they will find themselves in big hall, common to the three institutions. Standing in from the entrance, there is the Communum, the centre de la photo de Geneva (CPG) et le centre d'art contemporain de Geneva (CAC). There is also some tables, benches, and restroom facilities. On the right side there is an industrial looking glass door, behind those doors we find the MAMCO.

4.1.3 The reception desk

The visitor will be welcomed by the reception team, facing the reception desk the visitor will find a small giftshop at the right-side, presenting merchandizing and books, and on the left side the staircase and elevators leading to the exhibition.

The visitors will be briefed at the reception desk about the content of the exhibition and the orientation of the visit and be requested to leave their bags and backpack at the designated lockers, they are free to take copy of the MAMCO journal.

The reception desk personnel will register information concerning the age of the visitor, the origin (canton or country) and the ticket pricing (student, AVS, normal fare, etc.). Once that information is registered, the reception agent will issue a ticket and invite the visitors to start the visit.

4.1.4 The staircase and elevator.

The visitor will proceed to leave their bags or start the visit, the museum is covered on artworks, every surface is considered exposable. From the walls to the staircase and sometimes even the elevators.

Many of the visitors stop at the staircase to take a picture and observe the iconic work of Maurizio Nannucci, entitled Art, which is composed by colorful neon depicting the word art on primary colors, inviting the visitors to discover the exhibition.

4.1.5 Discovering the exhibition floors

The visitors will follow their visit through several floors and rooms, on their way they will encounter several information supports, meet member of the security team identifiably by a black MAMCO badge, and Flying guides, easily recognizable with a pink MAMCO badge.

The average visit lasts 53 min 38 sec, or about 13 min 16 sec per floor.

Most of the visitors did not follow the visit on the proposed order, and some of the visitors approached me during the observation phases to ask me for directions.

4.1.5.1 First Floor

The visit begins on the first floor, coming out from the stairs or the elevator, the visitor will find themselves in a big room with walls covered with colorful painting of Verena Lowensberg, and a big information panel. The visitor might read the information and continue the visit. Other than the artworks themselves many visitors take considerable

amount of time looking outside the big windows, on the same room there as a functioning jukebox, part of the exhibition, that can be activated with 0.20/0.50 CHF coins.

The visitor might continue the visit, also is in this floor that visitors will find restrooms, which are also covered with artworks. (Average visit time 21 min 23 sec).

4.1.5.2 Second floor

The visit continues in the second floor, in this floor the visitors will find Geraldo de Barros, one of the main artist of the spring section, and artist of special interest for this project, as the prototype of the MAMCO QR code audio-guide was set to be tested in this space, the visitors would discover, paintings, design furniture, photography, among others. (MAMCO - *Exhibitions - Geraldo de Barros*, no date). The visit continues with an immersive open space covered with luminous sculptures from Mai-Thu Perret. In this floor the visitors will also find two artworks that are highly appreciated by kids, Open House from Mata-Clark (MAMCO - *Collection - Catalogue - Gordon Matta-Clark, Open House*), no date), and the Grote from Silvy Fleury (MAMCO - *Collection - Catalogue - Sylvie Fleury, Be Good, Be Bad, Just Be !, 2008*), both of the pieces are big immersive installation in which the visitor can enter, creating an interactive experience for adults and children. (Average visit time 15 min 00 sec).

4.1.5.3 Third floor

In this floor is presented the work on John Armleder, the Cabinet of Poesy, the ECART archives among others. An area of particular interest for the visitors seems to be a space fitted out as an appartement. The space, is part of an ethnographic reconstruction of the old apartment of Ghislain Mollet-Viéville, the space is furnished with sofas and tables, that the visitor can use, this gives the opportunity to the visitor to take a break on the middle of the exhibition, while still being part of the exhibition. (MAMCO - *Expositions - L'Appartement*, no date). (Average visit time 9 min 56 sec).

4.1.5.4 Fourth floor.

The visitor arrives to the last floor of exhibitions, mainly dedicated to the museum collection, here the visitor can observe the work from Dennis Oppenheim, Siah Armajani as well as the Atelier of Sarkis, this space is a big wood cabin that the visitor can enter, particularly appreciated for children. (MAMCO - *Expositions - Une collection d'espaces* no date). One of the unlikely highlights might be the panoramic view, that offers almost 360 degrees view from Geneva. (Average visit time 6 min 44 sec).

4.1.6 Leaving the exhibition

To leave the museum the visitors might take the elevator or the stairs, the visitor will leave from the same space that they entered. It is not uncommon for visitors stop at the gift shop to look for books and merchandizing. Before leaving the reception of the museums, a fair number of people say goodbye or a few words to the reception personnel, this might be conditioned by the physical proximity, of the reception desk or because they enjoy the exhibition.

4.2 How visitors interact with the provided supports.

While discovering the museum the visitors might find immerses in a world of art and complex conceptual ideas, therefore it is advisable to make use of the provided information. The way that visitors interact with the information supports are synthetized over the next few pages.

Most of the conclusions were drawn from the observation techniques, timed observation techniques, and the analysis of the metadata gathered during those observations

The data generated correspond to 68 observations, from which 65 were used and 3 observations were not taken into consideration as were not complying or contained errors.

4.2.1 MAMCO Journal:

The MAMCO journal, the booklet freely offered at the entrance, it was observed that many visitors took it, nonetheless very few among them used to discover the museum.

This should not be necessarily matter of concern, as this information support was originally made to be more a lecture material than a visit guide, so if visitors take it and read it at home the purpose will still be accomplished.

There are two additional information that seem interesting to point out.

First, a lot of people demonstrate a certain happiness, when they receive the MAMCO journal, perceivable, some people took it almost as an “unexpected gift”.

The material aspect, and the pleasing looking make the MAMCO journal, seems to be an excellent channel of communication and a driver of visitor’ engagement/relationship, because when the journal is kept, it acts as a permanent reminder of the MAMCO as institution. During the observation some people made the remark, “I have the other”, referring to a certain previous unknown edition that they kept. It seems, that people who

has previous editions, come to the new exhibitions to receive the new edition and to have a “complete collection”.

During the timed observation, on 31 percent of the observations, the visitors had an exemplar of the MAMCO journal, being the second most used information support, just after the big information panels.

4.2.2 Big information panels

The big information panels are of the most widely used information support. This can be explained by several factors, the strategic location of the panels, that are easily spotted when the visitor enters the respective floor, or the big size and the aesthetic visuals that implies a sense of importance when compared to the small panels. Most of the visitors stop a few seconds in front of those big panels, very likely they have at least the time to read the name of the main artist, nonetheless very likely most of them do not read the totality of the text.

To understand how long would take to a person to read the text, research was conducted. People were asked to read in a consciousness manner the different texts, no text was reeded more than three times or less than two, the only consign was to read the text integrally at a speed that allows them to understand the information. The time they spent reading was timed, and latter averaged, all the panels have same size and a comparable number of characters, therefore we can assume that a similar time would be required to read and understand the panels. This process was repeated until 24 observations were reached.

The average time to read each of the panels was 2 min, 46 seconds, with a standard deviation of 26 seconds.

During the observation phase and subsequent information an analysis, it was observed that most of the participants spent 1 minute and 12 seconds in front of the big information panels. When compared to the benchmark of 2m46s seems like most of the visitors did not let themselves enough time to read and understand the support. Nonetheless when we consider only the visitors that spent over 20 seconds in front of the panels, the new average amount 2 minutes, and 02 seconds, deriving only 44 seconds from the benchmark, implying very likely, a fast lecture.

From the observer point of view, there are clearly different degrees of interest on the texts, there are the ones that only look the panels and read only the title or the name of

the artist, the ones who start the text, or at least stand in from of the text scanning for interesting information, and finally the one who read the text integrally.

The panels are one of the most determinant factors splitting groups and couples, in this moment personal differences among the visitors are most visible.

The usage rate of the big information panels is the highest, as at least 58 percent of the observed visitors stood for more than 20s in from of them.

4.2.3 Small information panels

The interaction with the small panels is similar as with the big panels, but the trend among different personalities is exacerbated, it important to point out that the “non-reading” rate increases, and many people do not even stop to see the content, on the other hand there is still a small group of visitors that will read most of the information.

The same previously described protocol was applied to understand the time that should take to read the information, and this allowed me to conclude that the average lecture time to fully read and understand the small panels was 39 seconds, with a standard deviation of 15 seconds.

The average time spent per visitors in front of the small panels was 6 seconds, but among the participants that spend more than 20 seconds in front of the small panels the average time was 53 seconds, that when compared with the benchmark of 39 seconds seems like a fair amount of time to read the whole panel.

The usage rate of small panels is very low when compared to big panels as only 10 percent of the visitors stood up in front of the panels for more than 20 seconds.

4.2.4 Technical Information panels

The observation shows that very few people use the technical panels, maybe the “technical nature” makes them boring for the general public.

On the other hand, there is a particular kind of people that concentrates a loot on those small panels, but they seem to be people with previous knowledge about the artist, or maybe artist looking for information concerning the materials or technique, we can infer that the technical panels are mainly used by the people educated and knowledgeable about art, but mainly ignored by the general public.

The usage rate of panels was of 25 percent, but this number only implies that the visitors read, or approached to at least two technical panel during the visit at the concerned floor.

4.2.5 QR code panels

It was observed that the QR code panels were mainly ignored, or perhaps not seen, as the format used to present the QR codes is the same as for the technical information panels, making it difficult to differentiate them, nonetheless, they might be addressed to a very different public. The QR codes only measuring 4x4 cm. are almost invisible to the public, that very rarely spot them. In addition, they do not provide a convergent experience as there are just a few QR codes speeded within the museum.

Regardless of the motives, QR codes in their current format, are largely unused, and when they were used, it creates a less than ideal experience.

Some people were not able to use them, this could be due to connectivity issues, maybe the MAMCO wireless connection or their own mobile connection was not strong enough to charge the media.

The QR codes are mainly used by young and curious people, perceivably more for curiosity than to listen the information.

The usage rate during the timed observation was “zero” and very few people use on the general observations.

4.2.6 Flying Guides,

Although the relative proportion of visitors asking for information to the Flying Guides is relatively low, the retention rate seems to be very high. In other words, few people usually come to the guides, but when they come very frequently engage in discussions. It is common for visitors to follow a tour over several rooms and spaces and even ask the guides to continue the visit in another floor.

Another of the aspect that should not be undermined is the seemingly positive experience that visitors obtain when discovering the museum with a guide, although very difficult to measure only with observation techniques, it was observable that, people laugh and engage in positive exchanges.

In addition, the flying guides tend to generate a more convergent experience for people visiting the museums in groups or in pairs. It is very common for people that arrive at the museum together, split un the middle of the exhibition, this usually happens after the lecture of the information panels or differences on their respective interest. The guide prevents them from splitting, and this directs the experience of the visitors towards a more common experience.

The observation seems to indicate that the visit accompanied of a Flying guide provides for the general public the best experience. I would like to draw the parallel with a study conducted in 2016 at the “Musée d’art et d’histoire de Genève (MAH) from students at the HEG, in which the authors were researching for different media options for people in a visual handicap situation. They concluded that the human interaction remained at the center of a successful mediation, and that human interaction was the main channel to allow to create the link between the artwork and the visual handicap”.(Marchetti et al. 2016). In a similar manner the Flying guides seems to provide one of the best links between the understanding the complex artworks and curious visitors.

The usage rate of the Flying Guides is 15 percent, and the average visitors spend with them is 7 minutes 54 seconds.

4.2.7 Overview of information supports provided by MAMCO

Inf. Support	Usage Rate	Average time
MAMCO Journal	31%	-
Paper support	17%	-
Technical information panels	25%	-
QR codes	0%	-
Big Panels	58%	00:02:02
Small Panels	11%	00:00:53
Flying Guides	15%	00:07:54

4.3 The MAMCO’s mains visitor

Based on statistical information automatically gathered the ticketing system of the museum, the timed observation techniques database, and secondary information, a prototype of visitor was generated. This information was essential to a understand the public, that the prototype of a digital tool should be aimed.

4.3.1 Age group

Based on the MAMCO Visitor statistics from 2019 to 2021, the main portion of the visitors correspond to the 19 - 30, and 31 - 45 years old category, that jointly account for over the half of the visitors in a sample size of 67’569 observations.

4.3.2 Gender

According to the dataset from the timed observations shows that in a sample size of 132 people, 52 percent are female while 48 percent are male.

In a similar manner the study of Lisa Kaczmarek (2018), in a sample of 147 participants the distributions of genders at the museum were 59 percent female, and 41 percent male.

Therefore, we can assume that the distribution of people is split among both genders but with a slightly higher representation of females.

4.3.3 Geographic distribution

Based on this extract from MAMCO visitors' statistics from the years 2019 - 2021 we can observe that most of the visitors come from a geographical area adjacent to Geneva, only Geneva, France, Swiss Cantons, and Vaud represent over 86 percent of the observations. Therefore, most of the visitors are locals or tourists from the neighboring countries and cantons.

Visitor residence	Numbers	Percentage
Genève	35791	55%
France	11752	18%
Autres cantons CH	4499	7%
Vaud	4013	6%
Other european countries	2940	4%
Non europeans	2772	4%

4.3.4 Language

The geographical provenance of the visitors can be used as a proxy to understand language; therefore, we can assume that the most important language is French. In addition, during the observation techniques the most common second language was English. Some less common languages were, German/Swiss German, Spanish and Italian.

4.4 **Synthesis of visitors' journey and visitor prototype**

The observation techniques phase 1 and 2, allowed me to understand the visitor journey and to identify the areas of improvement to be addressed with the prototype of a digital tool. Hereafter we can see some of the main takeaways.

4.4.1 Visitors are not fully taking advantage of the provided information support

Supporting arguments

- Visitors arriving at the museum, find themselves with many sources of information at their disposal, and this situation could be overwhelming, as they don't know which information support to take or use to visit the exhibition.
- Many people take automatically the MAMCO Journal at the entrance, but very few people actually use it while visiting the museum and is very common to find several exemplars left at the museum after closing time.
- People stand a few seconds in front of the information panels without leaving themselves enough time to read them.
- The “flying guides” do not reach the segments more reserved of our population and are not present on-place during the weekdays.
- QR codes in their actual format are largely ignored.

4.4.2 Visitors have a hard time navigating the museum, orientating themselves and following the order of the visit.

Supporting arguments

- Most of the visitors do not follow the proposed order of the visit
- When visitors arrive at the museum, they are briefed with information concerning the beginning of the visit, but from that point to the end of the visit, there are no clear signalization or any visible indication about the direction of the visit.
- At the main staircase, principal point of transit between the floors, there are some directional arrows, remanent of previous exhibitions that point into directions that are not always representative of the real sense of the visit.
- The bad insulation of the museum concerning temperature and humidity, makes necessary the use of humidifiers that prevent the artworks from being damaged, but to avoid the humid air leaving, some doors are kept closed, wrongly implying a direction to some visitors.
- One of the most common questions asked by the visitors concerns the location of toilets, as there are no indications at the museum other than a minimalist image

at the entrance, this is a curatorial choice to avoid visual contamination, but makes hard to orientate for visitors.

4.5 QR code-based audio-guide, testers main insights

Having understood the MAMCO's visitors' main drivers of dissatisfaction, the tested prototype was aimed to solve and improve some of the previously depicted dissatisfactions factors.

4.5.1 Focus Group

The participants of the focus groups were invited to speak about their experience, this was done in a casual manner. I took notes and intervened occasionally in quality of moderator to lead the discussion and avoid off-topic conversations. On the following paragraphs we will find a condensed extract of the main insights.

4.5.1.1 Improved information support

- The audio-guide provided relevant and interesting information,
- The audio-guide is easy to use as it does not need any major effort from the user side, other than scanning the code, that should not take more than 3 seconds.
- The visitor can listen the audio while observing the artworks.
- The user can play the content that they want, as many times as they need
- The extended amount information that can be made available to the visitors.
- Some visitors expressed satisfaction toward the prototype explaining that they have learn more from the visit with the audio-guide, than visiting the rest of the exhibition without it.

4.5.1.2 Improved navigation tool

- Visiting the museum with the QR Code audio-guide provide a coherent experience, the visitors can wander around the museum as they please and scan the elements that they consider interesting.
- The codes QR proved to be very useful to understand the direction of the visit, not even a scan was required as the codes are numerated in a chronological manner.

- Additional directional indication the audio-files could made the visit even easier.

4.5.1.3 Additional positive insights

- It works with any smart device
- It is fun and easy to use
- Good for people with bad eyesight, or people that get tired of reading.

4.5.1.4 Points of improvement

- The prototype was only available in French
- The prototype could be difficult to understand for someone of advance age, *it is important to state that this comment was done for a young member of the focus group (age 18-35), to which one of the older members of the focus group (>65) disagreed, stating that the audio-guide was surprisingly easy to use.”
- The prototype does not work without internet connection
- The audio-guide was not available for the whole museum
- Battery issues could prevent the user from accessing the information.

4.5.2 Survey of Visitor satisfaction

Hereafter we can see the results of the survey, the survey was 13 questions long, and it was responded by the 11 participants of the prototype test.

The survey was distributed in French and the corresponding translations can be seen hereafter.

The two firs questions relate to demographics.

Q1. How old are you?

55% between 18-35, 18% between 35-65, 27% over 65.

Q2 What is your biological gender

64% of the responders were male, and 36% female.

The sample size was 11 observations, the sample was a mixed group of people, representative of the main grope of age at the museum, that is concentrated in the

adulthood. A bigger sample would have been desirable, but the absence the limitations imposed by the museum, and the absence on one of the persons previously registered to the test prevented more participants.

From question 3 to question 11 the questions are aimed to assess satisfaction. The survey was constructed in a way that only 5 choices were proposed. The choices were ranked from best outcome to worst outcome, with different associated weights to assess the degree of satisfaction with the prototype.

The best possible averaged weight per question was 1, the worst possible outcome was (-1), while “zero” means indifference”

Hereafter a table resuming the ponderation system with an example

Range of Answers (EN)	Range of answer (FR)	Weight
Extremely satisfied	Extrêmement satisfait(e)	1
Mostly satisfied	Plutôt satisfait(e)	0.5
No satisfied or dissatisfied	Ni satisfait(e), ni insatisfait(e)	0
Not satisfied	Plutôt insatisfait(e)	-0.5
Very unsatisfied	Très insatisfait(e)	1

The results of the eleven answers were averaged and the results are presented hereafter.

Q3 Overall, how satisfied were you with your last interaction with our prototype?

Average weight: 0.73, Mode: Extremely satisfied (6 occurrences)

Q4 Based on your last interaction with our prototype, would you use it again on a future visit?

Average weight 0.77, Mode: Yes, absolutely (6 occurrences)

Q5 Based on your last interaction with our prototype, would you recommend it to a friend or family member?

Average weight 0.82, Mode: Yes, absolutely (7 occurrences)

The three previous questions were aimed to assess satisfaction, if the tester would be whiling to use again a future visit or recommend it to a friend, it seems pertinent to consider that the tester was satisfied with the prototype.

Q6 How attractive is the prototype compared to other information media currently available at MAMCO, including MAMCO Journal, information panels, paper media?

Average weight 0.68, Mode: Mostly attractive (7 occurrences)

This question was designed to understand how the audio-guide compared to other information supports provided at the museum. While the mode was “Mostly Attractive”, the score was the lowest among the questions, implying that the visitors still consider attractive other information supports. This is not necessarily a point of concern as the audio-guide is not aimed to replace the information panels or the flying guides, but to work in conjunction to them.

Q7 How important is for to you to have good access to information when you visit the museum?

Average weight 0.82, Mode: Extremely important (7 occurrences)

Q8 To what extent is the information offered by the prototype relevant to meet your needs during your visit?

Average weight 0.73, Mode: Mostly pertinent (6 occurrences)

The previous questions are aimed to understand the importance of a good information quality and accessibility for the testers, if a good access to information is important for them and the provided information was considered pertinent, we can infer that a visitor need is being meet.

Q9 How easy is the QR audio-guide to use?

Average weight 0.82, Mode: Extremely easy (9 occurrences)

Designed to measure usability of the product. The question was aimed to understand if the tester over 65 considered particularly difficult to use, and with a sample side of 3 observations, the score was 0.66. Therefore, older people found it harder to use than youngers.

Q10 Does the chronological numbering of QR codes make it easier to navigate in the museum?

Average weight 0.95, Mode: Completely agree (10 occurrences)

Q11 Does using the QR audio-guide improve my experience of visiting the Museum?

Average weight 0.95, Mode: Yes, absolutely (10 occurrences)

The last two questions were aimed to provide an answer to the research question. Can a custom-made digital tool improve visitor experience at the museum? Both questions got a score of 0.95, being the highest score of the survey, meaning that the prototype improve visitor experience by improving information accessibility and facilitate the navigation at the museum.

Questions 12 and 13 are aimed to dig into ideas that have been missed from the prototype and give the users the option to contribute and come up with ideas not explored during the focus group.

Q12 What do you like MOST about the QR code-based audio guide prototype? (FR/EN/SP)

Answers: Interesting information. The fast access to information. The added information can be provided. The easiness to use (with their own device). The novelty factor.

Q13 What do you like LEAST about this prototype audio guide based on QR codes? (FR/EN/SP)

Answers: Not accessible to all generations. The synthesized voice needs to make more pauses when speaking. It should not become more relevant than the artworks. The fact that QR codes are on the floor. The small amounts of QR codes on the museum. The need of internet. The audios were only in French.

4.5.3 Overview of the visitor experience survey

The overall appreciation of the prototype was positive, the weighted average score of all the answers was 0.81, and any score went below 0. Therefore, all the responders show positive appreciation for the prototype and its features. When analyzing the written answer, either positives or negatives, most of the answers were already considered when designing the prototype or spoken during the focus groups.

5. Discussion

5.1 From prototype to a final Mobile Application

Up until now, we have created a prototype of a phone application, and the test has shown prominent results and positive appreciation from the testers, nonetheless the research is aimed to the creation of a mobile application that could do the same as the prototype, and even more.

The final form of the digital tool should be an application that could be downloaded and work in conjunction to the codes QR, the application should download all the data of the exhibition, allowing the user to scan the QR codes and visit the exhibition without the need of a stable internet connection. The application should also renew its content and get actualization at each new exhibition.

Moreover, it should provide a basic home screen, where the visitor could find relevant information like for example direction to the restrooms, to exit the exhibition, to the looker-rooms and instruction on how to connect to Wi-Fi.

In addition, it should add some layers of personalization, for example by providing content in the selected language or specific content for different age groups. As the prototype evolves other layers of personalization could be added, for example by selecting the time that the user wants to dedicate to the visit, the application could propose longer or shorter audio-description. In a similar way the application could test the knowledge of art of the users to provide pertinent information according to the selected parameters.

Finally, upon user accord, it could provide notification regarding the next exhibitions and events, and automatically gather data.

The second part of this system, the QR codes should be still scannable without the application and direct the user towards the audio-file.

This concept of a mobile application considers most of the points of improvement discovered by the testers of the prototype. The only untreated point is the case that the visitor does not have a mobile device, or charge on the mobile device. In these cases, the museum could set up charging stations or give the possibility to rent or borrow a mobile device, like a smartphone, tablet, or similar device.

5.2 Limitation of the study

The small sample size of the prototype testing, the size was constraint principally to the fact that the museum must ensure the integrity of the artworks by limiting the quantity of people that can visit the museum outside the opening hours. A higher sample size could have provided a wider variety of answers and explore more areas of improvement for the prototype.

5.3 Avoiding personal bias

The participants were selected in an open call on Instagram, this was done to avoid personal bias by for example, by selecting, friends or other students. Nonetheless, there is still some bias, as most of the participants of the study knows me personally.

Aiming to minimize the bias the participants were not told that the study was for a bachelor's thesis, they only knew that it was a project for the Haute Ecole de Gestion.

The choice to do not test the prototype with unknown people, was mainly due because during the time of the private visit (the test), I was responsible for the museum and concerned artworks.

In addition, I needed to be sure that the people engaged to come, was going to show up, as I only had 12 available places, any absent would impact the sample size of the prototype testing. Working at the reception desk of the museum, I have seen that when the museum proposes a free activity under previous inscription, it is quite common to see less than the half of the registered people actually show-up for the event. Therefore, the risk was too big to be taken.

The Instagram call, shown to be a good option as the 12 people that were registered showed up that day, sadly one person was not part of the experience as she arrived late.

5.4 Unexpected outcome

The QR audio-guide prototype, showed-up potential to be a good option for people with visual impairments. This point was discussed during the focus group, after the test of the prototype.

Indeed, a QR audio-guide could be an option for people that have difficulties to read the information panels and could easily be adapted to be more descriptive for persons that have a more important visual incapacity.

5.5 A different point of view

The study was born because of the complains from visitors that that expressed their dissatisfaction towards the museum, mainly regarding the difficulty of understanding the concept behind the artworks, the lack of explanations, and difficulties to orientate within the museum.

While this study addresses this problematic by designing concept of a mobile application that overall could deliver better experience for visitors by adding more layers of information, rendering the information easily accessible and creating a system that makes navigation at the museum easier. It is possible that the development of the mobile application would not completely stop complains, as there might be personal limitations or personal preferences behind the dissatisfaction from this small group of visitors.

The museum has largely made the information available and provide qualified personnel to assist with the information or navigation at the museum, nonetheless the observations shave shown that most of the visitors do not read the information or use the provided supports, neither they approach to the museum personnel.

The proposed mobile application has shown promising results improving visitors experience, nonetheless it will still be responsibility of the visitor to make good use of the provided information supports.

5.6 Recommendations

This study shows the benefits that could be brought to the museum by implementing a digital tool capable of enhancing visitors' experience. The creation of a mobile application that work with QR codes will fill the gap leaved by the Flying Guides when they are not present, in addition could make the information accessible to all those people that are interested in the artworks but are not whiling or are unable to read.

If the idea of developing a special mobile application seems non doable in the short term, the museum should work in improving and expanding the actual QR codes offer. First by making them more visible, as it was observed that in the form that QR codes are currently presented at the museum, they are unnoticed by the visitors. Secondly expanding the quantity of codes available at the exhibition, to create a convergent experience, and make codes QR part of the exhibition and not only a novelty within the exhibition. Finally instruct the visitors about the existence and the use of the QR codes at the reception desk.

This study focuses more in particular in only one digital tool, but the museum could explore other technologies, like for example AR. Augmented reality, that has shown big potential, and is currently being used in museums all over the world.

6. Conclusion

In the last section of this study, we come back to the same question that inspired this research.

Can a custom-made digital tool, improve the customer experience at Geneva's Modern and Contemporary Art Museum?

The research started as an answer to unmet needs of visitors that complied at the reception desk of the museum, about difficulties understanding the artwork, the lack of information and the difficulties orientating within the museum.

The literature review provide insights on how other museums and art institutions are enhancing visitors' experiences with digital tools, like for example AR, VR, scenography elements, touch displays, mobile devices, QR codes among others.

We moved to observation techniques, and timed observation techniques to understand the customer journey and how the visitors interact with the museum.

The observation techniques allowed us to conclude that the visitors do not fully take advantage of the provided information supports, by not letting themselves enough time to read information panels, that many people take the journals but do to read them, that QR codes in their actual format are largely ignored, and that the Flying Guides cannot be always present to meet the demands from the visitors.

We also discovered that visitors have hard time following the exhibition on the proposed order, that there are not clear signalizations regarding the direction of the visit, that some indication or signalizations might be misleading and that even public facilities such as restrooms are difficult to find for some of the visitors.

Regarding the visitors, we learned that most of the visitors complete the visit in about 1 hour, that they are from Geneva and Geneva's surrounding cantons and neighbor countries, that the main spoken language is French followed by English, that the main part of the visitors are in their adulthood, and the distributions of genders is fairly speeded between men and women.

With that information on mid, different supports for digital tools were considered for development and testing, but a QR code audio-guide seemed to be the best digital tool to enhance visitors experience and address visitors concerns.

The ideal tool was designed, and a prototype was created. The prototype was a functional audio-guide that worked in combination with QR codes strategically placed on the ground, implying a directional guidance for the visit. The codes could be scanned with the camera of any modern smart device and would start the reproduction of an audio-file contained in an online server; the audio file was easily controllable with the touchscreen of the mobile dispositive.

The prototype was tested at the museum for a group of 11 people, to ensure a reliable setting and a more accurate experience. After the test, the participants opinions were heard in a focus group aiming to understand how the experience was navigating and discovering the exhibition with the prototype.

Finally, over the following weeks a customer experience survey was send to the same participants and their answers analyzed.

Based on the results from this study, we can conclude that a custom-made digital tool, can improve customer experience at Geneva's Modern and Contemporary Art Museum.

First, by improving information accessibility, by providing pertinent and interesting information, being easy to use, allowing the visitors to listen the information while observing the artworks and a control the dispositive in a familiar manner.

Secondly improving the navigation at the museum by providing a coherent experience following the visit with clear signalization that provide guidance in a chronological order, and that can be enhanced by adding additional directional indication on the audio.

Moreover, the audio-guide seems to be fun to use and could provide a good information support for people visual deficiencies.

Bibliography

AGUILERA, Francisco Jose Garcia and CABALLERO, Pablo Daniel Franco, 2019. Evaluation for QR codes in environmental museums. *Global Journal of Information Technology: Emerging Technologies*. 31 October 2019. Vol. 9, no. 2, pp. 29–32. DOI 10.18844/gjit.v9i2.4268.

AZMADI, Aznor Sarah Aqilah, HAMID, Maisarah Abd and HANAFIAH, Mohd Hafiz, 2022. RISE OF THE QR CODE APPLICATION ADOPTION: TOWARDS A CONCEPTUAL POST-COVID-19 SMART SUSTAINABLE TOURISM FRAMEWORK. *International Journal of Social Science Research*. 31 March 2022. Vol. 4, no. 1, pp. 478–488.

BAKER, Dwayne A. and CROMPTON, John L., 2000. Quality, satisfaction and behavioral intentions. *Annals of Tourism Research*. 1 July 2000. Vol. 27, no. 3, pp. 785–804. DOI 10.1016/S0160-7383(99)00108-5.

Create, Design And Track QR Codes, no date. *Scanova*. Online. [Accessed 11 August 2022]. Retrieved from: <http://scanova.io/>

ELGAMMAL, Islam, FERRETTI, Marco, RISITANO, Marcello and SORRENTINO, Annarita, 2020. Does digital technology improve the visitor experience? A comparative study in the museum context. *International Journal of Tourism Policy*. Online. 1 May 2020. [Accessed 19 August 2022]. Retrieved from: <https://www.inderscienceonline.com/doi/10.1504/IJTP.2020.107197world>

FERNANDEZ-LORES, Susana, CRESPO-TEJERO, Natividad and FERNÁNDEZ-HERNÁNDEZ, Ruth, 2022. Driving traffic to the museum: The role of the digital communication tools. *Technological Forecasting and Social Change*. 1 January 2022. Vol. 174, pp. 121273. DOI 10.1016/j.techfore.2021.121273.

Free Text-To-Speech for US English language and MP3 Download | ttsMP3.com, no date. Online. [Accessed 11 August 2022]. Retrieved from: <https://ttsmp3.com/>

FROMMEL, Benedict, 2012. *La Sip 1862-2012. 150 ans de mécanique de précision (French Edition)*. INFOLIO, 2012. ISBN 978-2-88474-267-2.

HE, Zeya, WU, Laurie and LI, Xiang (Robert), 2018. When art meets tech: The role of augmented reality in enhancing museum experiences and purchase intentions. *Tourism Management*. 1 October 2018. Vol. 68, pp. 127–139. DOI 10.1016/j.tourman.2018.03.003.

Il y a un bureau gagnant pour réaménager le BAC genevois, 2022. *Bilan*. Online. [Accessed 25 April 2022]. Retrieved from: <https://www.bilan.ch/story/il-y-a-un-bureau-gagnant-pour-reamenager-le-bac-genevois-694431512454>

KABASSI, Katerina, 2019. Evaluating museum websites using a combination of decision-making theories. *Journal of Heritage Tourism*. 2 November 2019. Vol. 14, no. 5–6, pp. 544–560. DOI 10.1080/1743873X.2019.1574301.

KATHLEEN KUIPER and GLENN D. LOWRY, 2022. museum of modern art - Contemporary challenges | Britannica. Online. 7 January 2022. [Accessed 6 August 2022]. Retrieved from: <https://www.britannica.com/art/museum-of-modern-art-institution/Contemporary-challenges>

KIM, J.H., RITCHIE, J.R. AND TUNG, V.W.S., 2010 ‘, The effect of memorable experience on behavioral intentions in tourism: a structural equation modeling approach’, *Tourism Analysis*, Vol. 15, No. 6, pp.637–648. .

KACZMAREK Lisa, 2018 Le système programmatique du MAMCO, Etude de cas : l’exposition monographique de Vaclav Pozarek. .

Les Amis du Mamco, no date. *Les Amis du Mamco History*. Online. [Accessed 10 August 2022]. Retrieved from: <https://amamco.ch/en/association/historique/>

Mamco / Informations pratiques, no date. Online. [Accessed 10 August 2022]. Retrieved from: <https://archive.mamco.ch/musee.html>

MAMCO Genève - About us, 2022. Online. [Accessed 29 March 2022]. Retrieved from: <https://www.mamco.ch/1319/Museum>

MAMCO Genève - Collection - Catalogue - Gordon Matta-Clark, Open House, 1972 (1985) (1994), no date. Online. [Accessed 15 August 2022]. Retrieved from: <https://www.mamco.ch/fr/1017/catalogue/2857/Gordon-Matta-Clark-Open-House-1972-1985-1994>

MAMCO Genève - Collection - Catalogue, no date. Online. [Accessed 10 August 2022]. Retrieved from: <https://www.mamco.ch/1017/Catalogue>

MAMCO Genève - Collection - Catalogue - Sylvie Fleury, Be Good, Be Bad, Just Be !, 2008, no date. Online. [Accessed 15 August 2022]. Retrieved from: <https://www.mamco.ch/1017/Catalogue/2239/Sylvie-Fleury-Be-Good-Be-Bad-Just-Be-2008>

MAMCO Genève - Exhibitions - Geraldo de Barros, no date. Online. [Accessed 15 August 2022]. Retrieved from: <https://www.mamco.ch/1802/Geraldo-de-Barros>

MAMCO Genève - Expositions - Inventaire, no date. Online. [Accessed 15 August 2022]. Retrieved from: <https://www.mamco.ch/1647/Inventaire>

MAMCO Genève - Expositions - L’Appartement, no date. Online. [Accessed 15 August 2022]. Retrieved from: <https://www.mamco.ch/1298/L-Appartement>

MAMCO Genève - Expositions - Une collection d’espaces, no date. Online. [Accessed 17 August 2022]. Retrieved from: <https://www.mamco.ch/1572/Une-collection-d-espaces>

MAMCO Genève - MAMCO Journal - 2022, no date. Online. [Accessed 10 August 2022]. Retrieved from: <https://www.mamco.ch/1829/2022>

MAMCO Genève - Shop - Publications, no date. Online. [Accessed 10 August 2022]. Retrieved from: <https://www.mamco.ch/1035/Publications>

MARCHETTI, Marco, MENNILLO, Massimiliano, SAUDAN, Manon and POUCHOT, Stéphanie (Dir), 2016. *Musées et accessibilité*. Online. 2016. [Accessed 15 August 2022]. Retrieved from: <https://sonar.ch/global/documents/314563>

MÁS, José M. and MONFORT, Abel, 2021. From the Social Museum to the Digital Social Museum. *aD Research ESIC International Journal of Communication Research*. 1 January 2021. Vol. 24, no. 24, pp. 8–25. DOI 10.7263/adresic-024-01.

SALDANA Iñaki, CELAYA Javier, p. 23 *Museums in the digital age a dosdoce survey.pdf*, 3013. Online. [Accessed 8 August 2022]. Retrieved from: http://www.dosdoce.com/upload/ficheros/noticias/201305/museums_in_the_digital_age__a_dosdoce_survey.pdf

ROBINSON, Helena, 2021. Debating the ‘museum’: a quantitative content analysis of international proposals for a new ICOM museum definition. *International Journal of Heritage Studies*. 2 November 2021. Vol. 27, no. 11, pp. 1163–1178. DOI 10.1080/13527258.2021.1960886.

SERRAVALLE, Francesca, FERRARIS, Alberto, VRONTIS, Demetris, THRASSOU, Alkis and CHRISTOFI, Michael, 2019. Augmented reality in the tourism industry: A multi-stakeholder analysis of museums. *Tourism Management Perspectives*. 1 October 2019. Vol. 32, pp. 100549. DOI 10.1016/j.tmp.2019.07.002.

VAN AALST, Irina and BOOGAARTS, Inez, 2002. From Museum to Mass Entertainment: The Evolution of the Role of Museums in Cities. *European Urban and Regional Studies*. 1 July 2002. Vol. 9, no. 3, pp. 195–209. DOI 10.1177/096977640200900301.

Appendix 1: Timed observation techniques

Google sheets optimized to time visitors' interactions with the provided supports.

- This is a screenshot of how the interface. looked on the phone screen.
- This is the analysis side, not available to the data collector.

12:35 5G

A	B	C
1 Début de la visite	16/08/2022	
2 Etage	1er	
3 Visiteur(s) arrive	<input checked="" type="checkbox"/>	17:48:14
4 Départ dans le bonne direction	<input checked="" type="checkbox"/>	
5 Profil visiteurs (max 5)	Gender m/f	Age (approx.)
6 Visiteur 1 (suivi)	Masculin	18-35
7 Visiteur 2	Feminin	18-35
8 Visiteur 3		
9 Visiteur 4		
10 Visiteur 5		
11 Support d'information utilisé	Suivre uniquement 1 visiteur	
12 MAMCO Journal	<input checked="" type="checkbox"/>	
13 Support Papier	<input type="checkbox"/>	
14 Petit panneaux avec le nom des oeuvres	<input checked="" type="checkbox"/>	
15 Code QR	<input type="checkbox"/>	
16 Grand Panneaux (Poster)	Commence	Fin
17 Panneau 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
18 Panneau 2	<input type="checkbox"/>	<input type="checkbox"/>
19 Panneau 3	<input type="checkbox"/>	<input type="checkbox"/>
20 Panneau 4	<input type="checkbox"/>	<input type="checkbox"/>
21 Panneau 5	<input type="checkbox"/>	<input type="checkbox"/>
22 Petit panneaux (A4)	Commence	Fin
23 Panneau 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
24 Panneau 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
25 Panneau 3	<input type="checkbox"/>	<input type="checkbox"/>
26 Panneau 4	<input type="checkbox"/>	<input type="checkbox"/>
27 Panneau 5	<input type="checkbox"/>	<input type="checkbox"/>
28 Guides Volants	Commence	Fin
29 Visite 1	<input type="checkbox"/>	<input type="checkbox"/>
30 Visite 2	<input type="checkbox"/>	<input type="checkbox"/>
31 Visite 3	<input type="checkbox"/>	<input type="checkbox"/>
32 Fin de la visite	<input checked="" type="checkbox"/>	
33 Commentaires	C'est possible d'écrire en bas	
34		
35 Statistiques de la visite		
36 Utilisation des Grand Panneaux	00:02:38	17%
37 Utilisation Petits Panneaux	00:02:53	18%
38 Temps avec les Guides Volants	00:00:00	0%
39 Temps de la visite	00:15:51	100%
40 Conclusion: Le jour 08/16/2022, 2 visiteur(s) sont parcouru le musée. Parmi eux, 1 femme(s) et 1 homme(s). La visite a eu une durée de 15:51 (min:sec). Pendant la visite les visiteurs ont utilisé les suivants supports d'information: MAMCO Journal, Petit panneaux avec le nom des oeuvres, Grands panneaux d'information (02:38 min:sec), Petits panneaux d'information (02:53 min:sec), Guides volants (00:00 min:sec).		

9 Visiteur 10 Visiteur 11 +

	A	B	C	D	E
1	Début de la visite	16/08/2022			
2	Etage	1er			
3	Visiteur(s) arrive	<input checked="" type="checkbox"/>		17:48:14	
4	Départ dans le bonne direction	<input checked="" type="checkbox"/>			
5	Profil visiteurs (max 5)	Gender m/f	Age (approx.)	Gender m/f	Etage
6	Visiteur 1 (suivi)	Masculin	18-35		
7	Visiteur 2	Feminin	18-35	Masculin	1er
8	Visiteur 3			Feminin	2e
9	Visiteur 4			Age (approx.)	3e
10	Visiteur 5				4e
11	Support d'information utilisé	Suivre uniquement 1 visiteur	<13		
12	MAMCO Journal	<input checked="" type="checkbox"/>	13-18		2
13	Support Papier	<input type="checkbox"/>	18-35		
14	Petit panneaux avec le nom des oeuvres	<input checked="" type="checkbox"/>	35-65		
15	Code QR	<input type="checkbox"/>	>65		
16	Grand Panneaux (Poster)	Commence	Fin		00:02:38
17	Panneau 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	17:48:42	17:51:19
18	Panneau 2	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
19	Panneau 3	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
20	Panneau 4	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
21	Panneau 5	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
22	Petit panneaux (A4)	Commence	Fin		00:02:53
23	Panneau 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	17:56:02	17:57:44
24	Panneau 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	18:00:14	18:01:25
25	Panneau 3	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
26	Panneau 4	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
27	Panneau 5	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
28	Guides Volants	Commence	Fin		00:00:00
29	Visite 1	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
30	Visite 2	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
31	Visite 3	<input type="checkbox"/>	<input type="checkbox"/>	FALSE	FALSE
32	Fin de la visite	<input checked="" type="checkbox"/>			18:04:06
33	Commentaires	C'est possible d'écrire en bas	Floor		
34			Time in		
35	Statistiques de la visite		Good direction		
36	Utilisation des Grand Panneaux	00:02:38	17%	Visiteur 1 (suivi)	Masculin18-35
37	Utilisation Petits Panneaux	00:02:53	18%	Visiteur 2	Feminin18-35
38	Temps avec les Guides Volants	00:00:00	0%	Visiteur 3	
39	Temps de la visite	00:15:51	100%	Visiteur 4	
40	Conclusion: Le jour 08/16/2022, 2 visiteur(s) sont parcouru le musée. Parmi eux, 1 femme(s) et 1 homme(s). La visite a eu une durée de 15:51 (min:sec). Pendant la visite les visiteurs ont utilisé les suivants supports d'information: MAMCO Journal, Petit panneaux avec le nom des oeuvres, Grands panneaux d'information (02:38 min:sec), Petits panneaux d'information (02:53 min:sec), Guides volants (00:00 min:sec).				

The information was gathered with a mobile dispositive, this dispositive allows easily time the observations with a click on the right case. The condensed version of the data gathered during the observation techniques can be seen on the following page.

Abbreviations

MJ: MAMCO Journal

PP: Paper support

TP: Technical Panels

QR: QR codes

BP: Big information Panels

FG: Flying Guides

Remarks

AVG SP/BP Average time that the reader spends per panel.

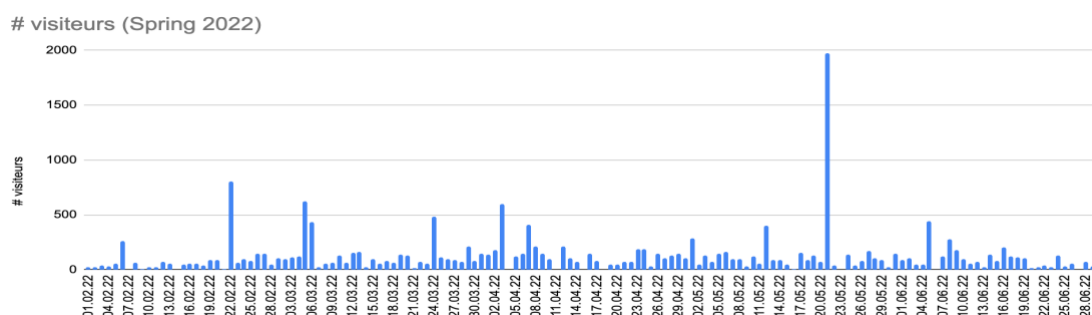
AVG IF: Refers to the fact that for the analysis of the observation techniques, only observation longer than 20 seconds were considered.

Day	Floor	Observe	Start Visit	End Visit	Time of the visit	N° oV	Males	Females	MJ	PP	TP	QR	BP	AVG BP	SP	AVG SP	FG
Jun, 4, 2022	1	1	11:23:37	11:26:54	00:03:17	3	2	1	0	0	0	0	00:00:03	00:00:03	00:00:00	00:00:00	00:03:14
Jun, 4, 2022	1	2	11:24:26	11:45:52	00:21:26	2	1	1	0	0	1	0	00:01:10	00:00:35	00:00:02	00:00:02	00:08:52
Jun, 4, 2022	1	3	11:28:26	11:53:41	00:25:15	2	1	1	1	0	1	0	00:02:43	00:02:43	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	1	4	11:35:39	12:08:01	00:32:22	4	3	1	0	0	1	0	00:03:33	00:03:33	00:00:00	00:00:00	00:03:41
Jun, 4, 2022	1	5	11:44:18	12:08:52	00:24:34	1	1	0	0	0	0	0	00:01:14	00:01:14	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	1	6	12:00:08	12:09:48	00:09:40	2	0	2	0	0	1	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:48
Jun, 4, 2022	1	8	12:59:47	13:11:58	00:12:11	1	1	0	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	1	9	13:00:44	13:34:44	00:34:00	2	0	2	1	0	0	0	00:02:13	00:02:13	00:00:00	00:00:00	00:16:54
Jun, 4, 2022	1	10	13:07:04	13:36:43	00:29:39	2	1	1	1	0	0	0	00:02:00	00:02:00	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	2	12	14:22:00	14:36:53	00:14:53	1	1	0	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:02:08
Jun, 4, 2022	2	13	14:37:08	14:52:25	00:15:17	1	0	1	0	0	0	0	00:02:51	00:02:51	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	2	14	14:43:07	14:52:17	00:09:10	1	0	1	0	0	1	0	00:03:05	00:03:05	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	2	15	14:51:37	14:57:12	00:05:35	5	2	3	0	0	1	0	00:01:05	00:01:05	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	2	16	16:05:25	16:22:36	00:17:11	2	1	1	0	0	0	0	00:01:09	00:01:09	00:03:53	00:01:18	00:00:00
Jun, 4, 2022	2	17	16:09:02	16:44:14	00:35:12	1	1	0	0	0	0	0	00:02:09	00:02:09	00:00:43	00:00:43	00:00:00
Jun, 4, 2022	2	18	16:34:18	16:44:37	00:10:19	1	1	0	0	0	0	0	00:00:05	00:00:05	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	2	19	16:45:12	16:56:18	00:11:06	3	2	1	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	2	20	16:48:57	17:03:09	00:14:12	3	2	1	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	2	21	16:53:06	17:02:54	00:09:48	2	1	1	1	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	2	22	17:01:13	17:22:18	00:21:05	2	0	2	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun, 4, 2022	2	23	17:35:27	17:51:43	00:16:16	2	1	1	1	1	0	0	00:04:20	00:04:20	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	24	11:36:59	11:48:30	00:11:31	2	1	1	1	1	1	0	00:00:00	00:00:00	00:00:00	00:00:00	00:02:21
Jun 5, 2022	4	25	11:43:51	12:03:38	00:19:47	5	3	2	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:17:49
Jun 5, 2022	4	26	11:48:13	11:51:01	00:02:48	1	1	0	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	27	11:50:00	11:56:17	00:06:17	2	2	0	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	28	11:56:29	12:05:24	00:08:55	2	0	2	1	0	0	0	00:02:14	00:01:07	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	29	11:57:10	12:08:10	00:11:00	2	0	2	0	0	0	0	00:03:49	00:01:55	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	30	12:00:41	12:05:44	00:05:03	2	0	2	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	31	12:05:55	12:11:58	00:06:03	2	1	1	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	32	12:09:14	12:22:11	00:12:57	1	1	0	1	1	0	0	00:05:12	00:01:44	00:00:35	00:00:35	00:00:00
Jun 5, 2022	4	33	12:13:49	12:22:00	00:08:11	2	1	1	0	0	0	0	00:01:16	00:01:16	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	34	12:16:29	12:21:55	00:05:26	3	1	2	1	0	0	0	00:01:53	00:01:53	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	35	12:28:37	12:33:25	00:04:48	2	1	1	1	0	1	0	00:02:44	00:02:44	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	36	12:32:44	12:38:17	00:05:33	2	0	2	0	0	0	0	00:03:49	00:03:49	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	37	12:54:09	13:00:51	00:06:42	3	2	1	0	0	0	0	00:01:31	00:01:31	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	38	12:56:43	13:03:43	00:07:00	3	1	2	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	39	13:03:52	13:14:31	00:10:39	2	1	1	1	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	40	13:14:48	13:18:51	00:04:03	1	1	0	1	1	1	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	41	13:19:00	13:24:29	00:05:29	1	1	0	0	0	0	0	00:01:34	00:01:34	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	42	13:21:10	13:32:25	00:11:15	2	1	1	0	0	0	0	00:05:36	00:05:36	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	43	13:24:57	13:32:31	00:07:34	2	1	1	0	0	0	0	00:01:12	00:01:12	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	44	14:16:19	14:20:57	00:04:38	3	2	1	1	1	0	0	00:02:53	00:02:53	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	45	14:19:44	14:24:46	00:05:02	1	0	1	1	1	0	0	00:00:00	00:00:00	00:00:54	00:00:54	00:00:00
Jun 5, 2022	4	46	14:21:41	14:27:06	00:05:25	2	1	1	0	0	0	0	00:03:02	00:03:02	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	47	14:27:10	14:30:20	00:03:10	2	1	1	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	48	14:30:20	14:32:18	00:01:58	2	1	1	0	0	0	0	00:01:30	00:01:30	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	49	14:34:38	14:37:27	00:02:49	2	0	2	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	50	14:37:54	14:42:01	00:04:07	1	0	1	1	1	1	0	00:00:58	00:00:58	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	51	14:39:58	14:43:05	00:03:07	1	0	1	0	0	0	0	00:00:44	00:00:44	00:00:00	00:00:00	00:00:00
Jun 5, 2022	4	52	14:44:11	14:48:07	00:03:56	1	1	0	0	0	1	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	3	53	15:44:52	15:48:12	00:03:20	4	2	2	1	1	1	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	3	54	15:51:47	15:56:51	00:05:04	4	2	2	0	0	0	0	00:00:17	00:00:17	00:00:00	00:00:00	00:00:00
Jun 5, 2022	3	55	15:53:15	15:58:06	00:04:51	2	0	2	0	1	0	0	00:01:31	00:01:31	00:00:00	00:00:00	00:00:00
Jun 5, 2022	3	56	15:59:26	16:10:32	00:11:06	2	1	1	1	1	0	0	00:05:17	00:02:39	00:00:00	00:00:00	00:00:00
Jun 5, 2022	3	57	16:33:30	16:38:20	00:04:50	2	1	1	0	0	0	0	00:03:14	00:03:14	00:00:00	00:00:00	00:00:00
Jun 5, 2022	3	58	16:38:48	16:54:57	00:16:09	2	0	2	0	0	0	0	00:02:46	00:01:23	00:00:00	00:00:00	00:00:00
Jun 5, 2022	3	60	16:55:06	16:59:20	00:04:14	3	0	3	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:03:57
Jun 5, 2022	3	61	16:59:45	17:08:56	00:09:11	4	2	2	1	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
Jun 5, 2022	3	62	17:02:50	17:18:47	00:15:57	2	1	1	1	0	1	0	00:04:43	00:01:34	00:00:33	00:00:33	00:00:00
Jun 5, 2022	3	63	17:09:04	17:20:07	00:11:03	1	0	1	0	0	0	0	00:01:39	00:01:39	00:00:36	00:00:36	00:00:00
Jun 5, 2022	3	64	17:30:10	17:42:02	00:11:52	2	1	1	0	0	1	0	00:00:48	00:00:48	00:00:00	00:00:00	00:00:00
Jun 5, 2022	3	65	17:31:33	17:41:59	00:10:26	1	1	0	0	0	0	0	00:01:25	00:01:25	00:01:35	00:01:35	00:00:00
Jun 5, 2022	3	66	17:32:52	17:42:28	00:09:36	3	2	1	1	0	1	0	00:01:22	00:01:22	00:00:00	00:00:00	00:00:00
Jun 5, 2022	3	67	17:36:09	17:55:35	00:19:26	5	5	0	0	0	0	0	00:00:00	00:00:00	00:00:00	00:00:00	00:19:19
Jun 5, 2022	3	68	17:43:37	17:55:29	00:11:52	1	0	1	0	1	1	0	00:02:57	00:01:29	00:00:19	00:00:19	00:00:00
Floor	1	9			00:21:23								00:01:26	00:01:22	00:00:00	00:00:00	00:03:43
Floor	2	12			00:15:00								00:01:14	00:01:14	00:00:23	00:00:10	00:00:11
Floor	3	15			00:09:56								00:01:44	00:01:09	00:00:12	00:00:12	00:01:33
Floor	4	29			00:06:44								00:01:23	00:01:09	00:00:03	00:00:03	00:00:42
Full exbtn.					00:53:03								00:05:46	00:04:55			

Appendix 2: MAMCO statistiques

MAMCO statistics are confidential in nature, but here we can see some important observations for the project.

Number of visitors Spring 2022

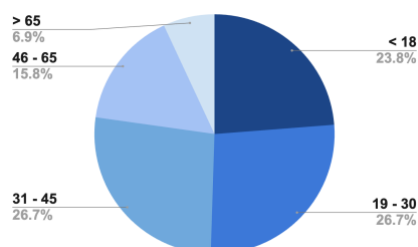


The current exhibition corresponds to the “Spring Season” and took place from the 22 of February of 2022, until the 19 of Jun of 2022, and hosts artworks from different artists. Verena Loewensberg (Rétrospective), Geraldo de Barros, Jo Baer, Jackie Winsor, “&” (exhibition organized by John Armleder), Denis Oppenheim, and Angeles Marco, among others.

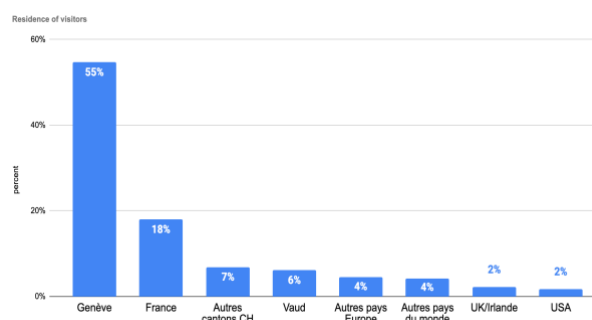
The exhibition was on view for 115 days and it was visited by 16901 people averaging a 150 visitors per day,

Visitors Profile, (outside special events): The data correspond to 67'569 observations taken during the years 2019-2021

Age of the visitors



Provenance of the visitors



Appendix 3 (CONFIDENTIAL): Prototype testing

Appendix 4: Satisfaction survey

Presentation of the survey

Prototype Audioguide MAMCO basé sur des QR codes

Exposition - Geraldo de Barros

Dans le cadre de ma thèse de Bachelor à la Haute Ecole de Gestion de Genève, je cherche à comprendre comment améliorer l'expérience des visiteurs au MAMCO le Musée d'Art Moderne et Contemporain de Genève.

Suite à votre participation au test du prototype d'audioguide basé sur les codes QR le dimanche 19 juin au MAMCO quelques questions sur ce sujet vont vous être posées.

Ce questionnaire vous prendra moins de 5 minutes. Vous pouvez répondre directement en cliquant sur l'écran.

Important à savoir qu'il n'y a pas de bonnes ou de mauvaises réponses. Simplement, je vous demande d'être spontané.

En cliquant sur le bouton ci-dessous, vous reconnaissez avoir lu et compris les déclarations et remarques suivantes :

- Votre participation à cette étude est volontaire.
- Vous avez 18 ans ou plus.
- Les données collectées ainsi que vos réponses ou commentaires seront traitées de manière anonyme et confidentielle.
- Vous remplirez le questionnaire de manière consciencieuse.
- Vous pouvez mettre fin au questionnaire à tout moment pour n'importe quelle raison.

Si vous avez des questions sur l'étude, n'hésitez pas à me contacter à l'adresse électronique suivante : franco-matias.osses-vidal@etu.hesge.ch

Je vous remercie pour vos réponses.

Hereafter you will find the survey questions and a part of the analysis

Satisfaction survey

[illegible]

The survey was closed with a thanks note.

Merci d'avoir pris le temps de participer à cette enquête.

Votre réponse a été enregistrée.