



# iPads for museums: serving visitors and professional communities

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Museums have recently started to use iPads both to enhance visitors' experiences and to perform audience research. This report presents an overview of the contexts in which iPads and tablets in general have been used in the museum field so far.

Photography by Geoff Friend, Powerhouse Museum - Sydney (AU)

## **Summary**

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## 1. Introduction

Tablet computing is an emerging technology that is rapidly spreading all around the world. iPads and tablets in general combine the portability of smartphones with the more advanced multimedia and processing functionalities of laptops (*Educause* 2011). Moreover, they function both as platforms that deliver content and as tools that allow the user a certain degree of interaction. Also, the size of the screen suits both an individual use and a socially shared digital experience.

Due to this peculiar set of characteristics, museums have recently started to employ tablets to facilitate the achievement of specific objectives, with special regard to the provision of experiences that facilitate engagement, social interaction and ultimately learning.

Museum professionals are now increasingly stressing the need to develop new ways of engaging not only individual visitors during, before and after their experience in the museum premises, but also people who visit museums with a companion or in a group. In fact, museum visits are for the most part social experiences, and *"designing technology that fits with how the majority of people already use museums is going to be more successful than trying to force fit individual applications to social experiences"* (Simon 2010). (fig.1)



**Fig. 1 iPads as tools that may facilitate social interaction  
(Monte Verità, Switzerland)**

(<http://prezi.com/ozmvj0vkqwhi/informal-learning-and-cultural-understanding-through-the-use-of-mobile-devices/>)

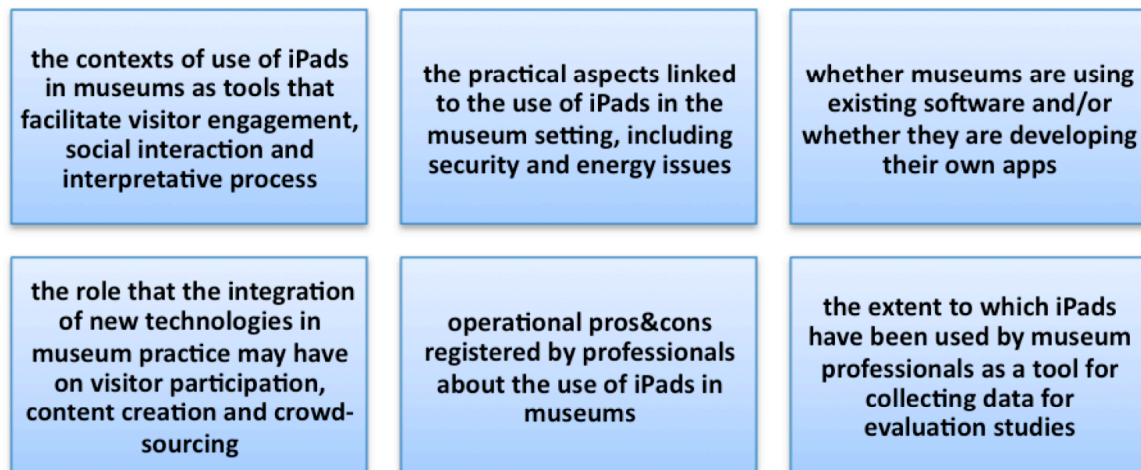
Moreover, considering that a core museum target audience such as families and older adults is becoming more and more familiar with tablets thanks to their intuitive interfaces (*Businessweek* 2011), the integration of tablets in museum practices could be seen as a way to foster engagement and social interaction in keeping with visitors' abilities and preferences. In addition, tablets could enhance the museum experience of visitors with disabilities: for example, people who need larger text or spoken labels could benefit from the use of these devices in museums (*NZMuseums* 2010; Stempien 2011).

Finally, the specific characteristics of tablets may suit the needs of museum professionals too, and evaluators and audience advocates have already started to use these devices for research.

This report is intended as a working document offering an overview of museum contexts in which tablets have been used so far. Given the current scarcity of evaluation studies and relevant literature, research has been conducted through interviews with museum professionals and an extensive recourse to online sources. Considering that iPads seem to currently dominate the tablet market, the report mainly focuses on the use of these devices.

The report is structured as follows: paragraphs 1-4 analyse the use of iPads as interpretative tools; paragraph 5 analyses the potential value of iPads for the community of museum evaluators; final remarks complete the report.

The intended outcome of the research is to understand (tab.1):



**Tab.1 Intended outcomes of the research**

## **2. iPads as interactive tools for museum interpretation**

Due to their specific characteristics, iPads and tablets potentially enable multimedia experiences that may facilitate not only visitors' engagement and enjoyment, but also their meaning-making process and the sharing of the museum experience in a social context. Since iPads and tablets are versatile by definition, they can be employed as interpretative tools in different contexts and in a variety of ways.

Moreover, interpretation can take advantage of the handheld nature of the devices and can occur through iPads provided by museums or through visitors' personal iPads that support applications developed by museums for enhancing visitors' experiences before, after and during the museum visit.

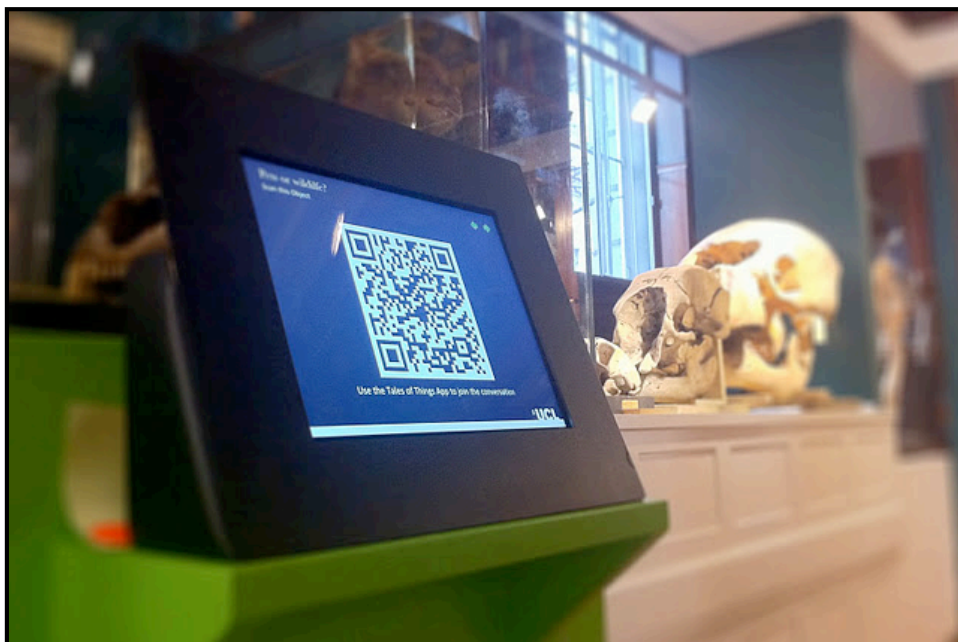
The following paragraphs summarise the variety of uses of iPads in the museum field that has emerged from our research, paying particular attention to the degree of interaction and participation enabled by the devices and their context of use.



**A) Integration of iPads in the galleries & in the exhibition environment:** the devices support applications specifically developed by the museum or deliver content provided by the museum to enable visitors to further explore the topics related to the collections, the building and the objects on display. iPads are located in specific areas of the exhibition environment and offer a free-choice opportunity to engage with collections and temporary exhibitions. Their installation can take the form of:

**a) digital labels:** iPads are generally located near the objects on display they refer to, like at the Oakland Museum of California (Oakland, USA); they can be used either to replace traditional printed labels or to integrate them, providing additional multimedia content. They can be used to allow a certain degree of interaction, too.

About this point, the case of the University College London (UK) is particularly worth noting: at the Petrie Museum of Egyptian Archaeology, an iPad allows a user without a smartphone to leave messages about an artefact on display (Eden 2011), whereas at the Grant Museum of Zoology visitors can leave their thoughts about an object *"on an iPad to create a digital, 'living' label that subsequent visitors can read and respond to. By downloading a free application on an iPhone or Android phone, visitors will be able to see rolling updates to the digital label after they leave the museum, or via Twitter"* (Digitalurban 2011) (fig. 2 and 3).



**Fig. 2 iPads as digital labels enabling visitor interaction  
(Grant Museum of Zoology, University College London, UK)**

(<http://www.digitalurban.org/2011/03/can-dodo-tweet-qrator-museum-ipad-app.html>)



**Fig 3. iPads as digital labels allowing visitor content creation  
(Grant Museum of Zoology, University College London, UK)**

(<http://www.digitalurban.org/2011/03/can-dodo-tweet-qrator-museum-ipad-app.html>)

**b) Kiosk-like devices available in specific sections of the exhibition environment:**  
iPads are secured into a kiosk and they look like touch-screens (fig.4 and 5);



**Fig.4 Visitor interacting with an iPad secured in a kiosk-like setting  
(The New Mexico Museum of Natural History & Science, Albuquerque, USA)**

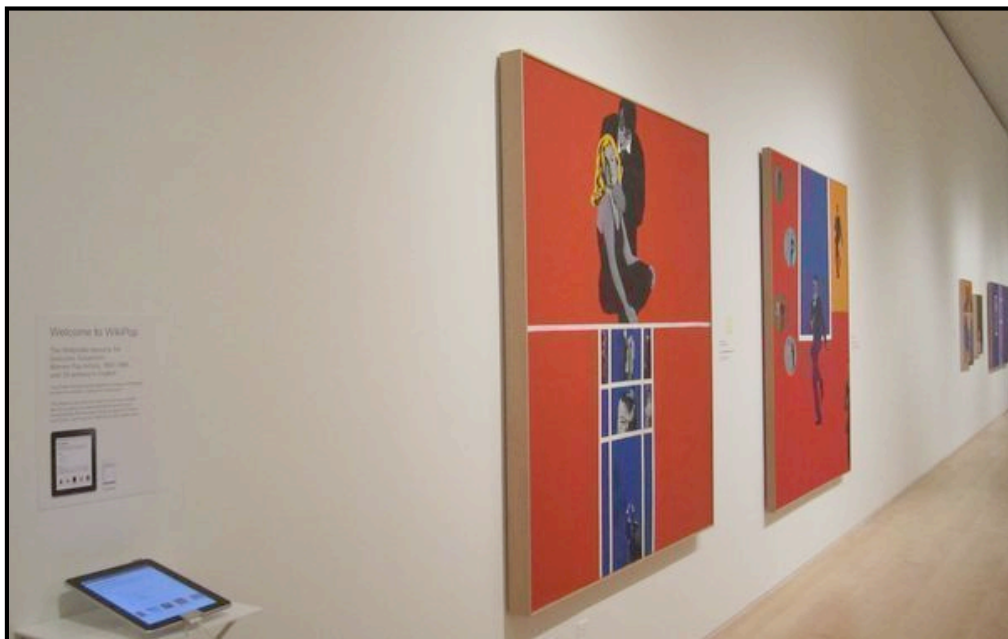
(<http://ipadkioskmount.com/2011/ipad-enclosure-museum-exhibit/>)



**Fig. 5 iPad integrated in the exhibition environment using a kiosk-like setting (Batashoe Museum, Toronto, Canada)**

(Courtesy of Dr. Lynda Kelly)

**c) Partially handheld devices available in specific sections of the exhibition environment:** the devices can be fully handheld by visitors, but their use is limited to specific areas of the exhibition environment. This restriction is usually due to security reasons and energy provision. The determination to make the iPads available near specific objects or exhibition elements without compromising the handheld characteristics of the devices has been registered too. Devices are generally secured to a surface through cables (fig.6 and 7).



**Fig.6 iPad on shelves in the museum setting: a partially handheld device (Brooklyn Museum, NYC, USA)**

(<http://www.brooklynmuseum.org/community/blogosphere/2010/10/14/welcome-to-wikipop-25-articles-in-english-on-ipads-in-the-gallery/>)





**Fig. 7 Children handling iPads while playing the *WaterWorx* game (Powerhouse Museum, Sydney, Australia)**

(<http://www.freshandnew.org/2010/11/05/the-honeypot-effect-more-on-waterworx-the-powerhouse-museums-ipad-interactive/>)

Finally, it must be added that iPads have recently been used as devices enabling the display of **digital works of art** created using an iPad itself: for instance, at the Royal Ontario Museum in Toronto (Canada) the exhibition *Fresh Flowers* features approximately 200 iPhone and iPad drawings displayed on 20 iPads and 20 iPod Touches (Royal Ontario Museum 2011) (fig.8). In this case, visitors are invited not to touch the devices.



**Fig. 8 iPads can be used as tools that allow the creation and the display of digital works of art (Royal Ontario Museum, Toronto, Canada)**

(<http://www.rom.on.ca/hockney/#>)



**B) iPads as fully hand-held devices used in the galleries by visitors:** the devices are hired/borrowed at the museum information desk, before entering the exhibits; security measures may apply. However, if the museum has developed an app that can be downloaded on site or online, visitors can handle and use their personal tablet devices, too; in this case, visitors must be aware that applications compatible with only one operative system may have been developed by the museum; generally speaking, apps developed for iPads seem to be the most commonly used in the museum field (fig.9).



**Fig.9 A child using an iPad as an interpretative tool in the museum environment (American Museum of Natural History, NYC, USA)**

([http://www.nj.com/entertainment/index.ssf/2010/08/digital\\_directions\\_help\\_explor.html](http://www.nj.com/entertainment/index.ssf/2010/08/digital_directions_help_explor.html))

**C) iPads as interpretative tools used by museum educators and docents during group tours:** the devices are mainly used by museum educators and docents in order to provide visitors with additional multimedia content that may facilitate fun, engagement and understanding. Multimedia resources are managed by docents, thus a continuous physical interaction with the device is not forced onto visitors; however, a temporary physical contact with the device is often encouraged. Generally speaking, iPads are used during group tours as handheld devices that can convey multimedia content such as photos, images, audios and videos; as far as we know, applications specifically developed by museums are not generally used in this context; different kinds of software already available on the market are used instead (fig.10 and 11).



**Fig.10 Docent using an iPad as an interpretative tool at Monte Verità (Switzerland)**

(<http://prezi.com/ozmvj0vkqwhi/informal-learning-and-cultural-understanding-through-the-use-of-mobile-devices/>)



**Fig. 11 Visitor temporarily using an iPad during a group tour at Monte Verità (Switzerland)**

(<http://prezi.com/ozmvj0vkqwhi/informal-learning-and-cultural-understanding-through-the-use-of-mobile-devices/>)

✓ *Examples of museums and cultural institutions that have used iPads during group tours:*

- Museo Monte Verità, Ascona (Switzerland)
- San Antonio Museum of Art, San Antonio (USA)
- Minneapolis Institute of Art, Minneapolis (USA)
- Kalamazoo Institute of Arts, Kalamazoo (USA)
- Museums which contributed to the blogpost available at:  
[http://www.museumsonario.com/en/whats\\_new\\_archive\\_35/0/140.html?print=true&](http://www.museumsonario.com/en/whats_new_archive_35/0/140.html?print=true&)<sup>1</sup>

✓ *Software and resources that can be used: Best Album and File App, which allow to "upload and organize the information in folders with clear labels that contain the relevant content for different objects or tour stops" (MuseumEd).* For instance, content can include videos and still images related to objects and themes in the collection, audios, maps and photos.

Audio features can facilitate the creation of an immersive experience, even though technical problems may occur and their use may be problematic especially in crowded galleries and with larger groups (Isaacson et al. 2011).

Photos and images in general have been described as more effective (Isaacson et al. 2011; Sayre 2011); if videos are used, they are best if kept between 30 and 60 seconds (Isaacson et al. 2011).

Maps make a very good and effective tool to provide context to the objects presented in the tour; moreover, they can be useful in presenting past/present comparisons (*MuseumEd*; McGuire and Wetterlund 2011; Isaacson et al. 2011).

The provision of linear and non-linear access to the content (i.e the content can be used and shown to the group if the docent thinks that the group needs it, otherwise he/she decides to skip it) should be recommended (Sayre 2011).

*Adobe Ideas* app can be used to investigate composition, whereas *Keynote* app can be useful to show the similarities of composition (*MuseumEd*).

The *FaceTime* application has capacities to connect a tour group with an artist or a specialist in real time and space, thanks to video calling (McGuire and Wetterlund 2011). The use of the iPad camera can be useful for docents to scan QR codes and have access to additional content (Isaacson et al. 2011).

✓ *Operational good practices:* in order to enhance the effectiveness of the device, docents should make a judicious use of the iPad, avoiding to make it the focal point of the tour; they should display the screen at a chest-high level, flip the screen to an appropriate layout and hold the iPad away from visitors when locating content (Isaacson et al. 2011; Sayre 2011).

✓ *Operational pros:* iPads allow to integrate all forms of media during the tour; their features may help focus visitors' attention into smaller details. Screen size, brightness and audio have been judged appropriate for groups of 10-15 people; the large multi-touch screen allows more than one person to interact with it; compact dimension and light weight permit to carry it comfortably in out-door tours, too; the screen is suitable for outdoor usages, provided it is used in the shadow (Sala et al. 2011).

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<sup>1</sup> This blog page includes feedback from museum professionals belonging to several museums, but it was not possible to clearly identify the name of the professionals and the museums themselves. I apologise for any quotation that has not been fully acknowledged in the report.

- ✓ *Operational cons:* audio can represent a weak part and not be very effective; it may be difficult to see the iPad screen in the sun; some visitors may find it disturbing to keep passing the device to each other throughout the whole tour (Sala et al. 2011). Especially for groups of children/teens, it can be frustrating having only one device: thus, it would be even more effective having more than one so everyone can get a turn to use it (*MuseumEd*)
- ✓ *Professional development issues:* docents can contribute alerting museum staff about new content that might be relevant for the tour and thus could be upload onto the iPads (*MuseumEd*). Content can be downloaded into docents' personal iPads, if they own one.
- ✓ *Visitors' feedback:* visitors are generally very engaged and excited by iPad-based content, showing enthusiasm and giving very good feedback; however, it must be noted that a balanced use of the device and the ability of the docent to use the content appropriately during the tour influence visitors' feedback and satisfaction (Sala et al. 2011). Great success and effectiveness has been registered when used during a composition activity, both to show how compositions overlap and to open discussion (*MuseumEd*).

**D) iPads used during structured educational experiences:** the devices are used in learning contexts such as workshops. An example is provided by the San Antonio Museum of Art, which invited children older than 6 to interpret Buddhist art drawing on iPads (*Midea 2011*). Other examples are then offered by the Australian Museum in Sydney, where iPad-based drawing workshops have been organized for children of stages 2 and 3 (Nathan Slawitschka, personal communication). Interestingly, these activities have been deemed positive especially for children attending stage 3: in fact, whereas at stage 1 and 2 children do not seem concerned about their drawing capabilities, at stage 3 some children are inhibited in the drawing process since they think they are not good drawers; educators have reported that the use of iPads during drawing activities helped these children feel more comfortable during the drawing process, registering a certain degree of progress both in terms of drawing skills and self-esteem (Jenny Horder, personal communication). Moreover, the Australian Museum has recently run an educational activity addressed to Year 6 students entailing the use of iPads as tools that facilitate not only the encounter with objects on display but also the development of a significant personal meaning-making process: in fact, students were encouraged to use iPads to take pictures of the aboriginal objects displayed in the galleries and then they were invited to record their impressions as to how those objects reminded them of the personal objects they had brought to the museum for the day activity (Wheeler 2011) (fig.12).



**Fig. 12 Students engage with collections using iPads**

**(Australian Museum, Sydney, AU)**

(<http://australianmuseum.net.au/blogpost/Teacher-Talk/Students-use-iPads-in-new-My-Cultural-Object-learning-program>)



The potential of iPads for learning has also been the focus of some professional development workshops addressed to teachers at the Smithsonian National Postal Museum in Washington D.C. (Meade 2011).

## **2.1 Personal interaction with the devices**

The analysis of the case-studies presented in this report suggests that the use of iPads made available in the gallery setting is generally not mediated by staff: this means that visitors can use them by themselves, as long as they want and going along with their own personal interests and learning paths. A mediated use of iPads has been found during group tours and in the context of structured educational activities: for instance, at the Children's Museum in Houston the use of iPads is staff-facilitated, i.e. staff use an app to demonstrate air-flow in a workshop area and to explain concepts to visitors (Larson 2011).

## **2.2 iPads as tools enabling social interaction**

Researchers have stressed that museum visits are frequently social experiences and that learning may be facilitated by the social context itself (Falk and Dierking 1992). As a consequence, the provision of conditions that aim at facilitating social interaction as a way to promote learning in museums has become a fundamental issue for museum educators and exhibition developers. Based on this assumption and considering the speedy development of new technologies that allow different levels of interaction, it is worth investigating what role new technologies such as iPads may play in the museum context to foster engagement, social interaction and understanding. As mentioned in other sections of this report, this field of research is still rather underdeveloped and an extensive literature about the topic does not exist yet. However, this paragraph will summarise a sample of good practices and experiences personally communicated by professionals or retrieved on the internet.

Observational studies carried out at the Brooklyn Museum (USA) have pointed out that iPads were often used by more than one person at a time; S. Bernstein, Chief of Technology at the Brooklyn Museum, interpreted the phenomenon as following: "*Given most people come to museums with other people, the iPads turned out to be a social device which engaged people in a way that seemed natural to their visit*" (Bernstein 2011) (fig.13). B. Sievers - who technically developed the system used to deliver the content through the iPad- has underlined that given their physical characteristics and portability, iPads can move from person to person, avoiding one of the big problems occurring with mouse and keyboard-based interactive kiosks, i.e. "*a situation where one person is in charge of what happens and everybody else is just along for the ride*" (Sievers 2010). Opportunities for social interaction between family members have been underlined too (Chan 2010), with special reference to iPads hired/borrowed at the front desk, since they can be fully handheld and shared by the members of the group. The author reports a scenario where visitors "*pass the device between family members to show each other*" (Chan 2010).



**Fig. 13 iPad as a tool facilitating social interaction at the Brooklyn Museum (New York City, USA)**

(<http://www.brooklynmuseum.org/community/blogosphere/2011/01/18/wikipop-ipads-and-visitor-metrics/>)

In regard to iPads used in a group tour context, evaluation studies have underlined that *"visitors always cared about sharing content (through the device) with the other participants, even when they did not know each other: the action of passing the iPad spurred the dialogue among the group components"* (Sala et al. 2011).

### **2.3 iPads as tools for focusing visitors' attention**

The use of iPads in the gallery may also be beneficial for the following reason: the Powerhouse Museum in Sydney (Australia) found that *"the presence of this particular interactive experience in Ecologic acts as a drawcard and a retainer for the exhibition itself"*. And also: *"the iPad deployment is a means to refocus both visitor attention and development resources on content and engagement – not display technologies. Also, it picks up on the visitors' own understanding of these devices and uses it to piggyback on those behaviours – whilst allowing us to leverage the existing consumer interest in the device in the short term"* (Chan 2010a) (fig.14).



**Fig. 14 iPads can help focusing visitors' attention (Powerhouse Museum, Sydney, AU)**

(<http://www.powerhousemuseum.com/dmsblog/index.php/2010/11/01/waterworx-our-first-in-gallery-ipad-interactive>)

### 3. Practical aspects

The use of iPads in the museum setting still represents a groundbreaking step in the exhibition development and it entails some practical aspects that need to be considered before deciding of using these devices. Cost aside, the following paragraphs summarise the practical issues commonly addressed by museum professionals.

#### 3.1 Energy issues

In order to be fully operational, iPads need either to be connected to a source of energy or to have a charged battery. On this point, museum professionals have reported that the battery is enough to last all day if iPads are unplugged even just at opening time (Powerhouse Museum, Australia). Other museums have preferred to secure the iPads and use power cables so that they can remain charged (The New Mexico Museum of Natural History & Science, USA). The 5w energy consumption required by iPads has been deemed perfect for sustainability (The Green Centre- UK).

#### 3.2 Security measures in the context of use of the devices

In order to protect iPads from damage and to prevent theft, museums have adopted various security measures. This paragraph presents the security measures adopted by museums in accordance to the physical context of use of the devices:

***a) iPads & tablets as interpretative tools installed in the galleries (kiosk-like setting/iPads used as digital labels):***

- ✓ iPad is secured with a STAYPad metal security enclosure (<http://www.staypad.com/photos.html#video>) attached to a swing arm device (the Burlingame Museum of Pez Memorabilia, USA)
- ✓ iPad is enclosed (<http://ipadkioskmount.com/2011/ipad-enclosure-museum-exhibit/>) and mounted with the power cable running down into the casework so that the iPad can remain charged. The enclosure can be custom powder coated to match the overall exhibit colors (The New Mexico Museum of Natural History & Science, USA)

***b) iPads as interpretative tools that can be fully or partially handheld by visitors in the galleries:***

- ✓ use of the same alarm system adopted in the Apple stores to prevent theft (SK-T6X-W from Se-Kure, <http://www.se-kure.com/page6.htm>); devices can be picked up and played with by museum visitors (Brooklyn Museum, USA)
- ✓ iPads are tethered with steel cable and the cases are secured. OtterBox Defender cases ([http://www.otterbox.com/iPad-Defender-Series-Case/APL2-IPAD1,default,pd.html?dwvar\\_APL2-IPAD1\\_color=20&start=1&cgid=apple-ipad-cases](http://www.otterbox.com/iPad-Defender-Series-Case/APL2-IPAD1,default,pd.html?dwvar_APL2-IPAD1_color=20&start=1&cgid=apple-ipad-cases)) have been adapted to protect the iPads (Powerhouse Museum, Australia)

***c) iPad as a free-choice interpretative tool hired/borrowed by visitors at the museum entrance:*** visitors must leave their current drivers license or passport as security at the museum entrance (New Plymouth Museum Puke Ariki, New Zealand; Museo del Fumetto, Italy). Moreover, credit cards may also be required as a way of ensuring that the

iPads will be returned (Detroit Institute of Art, USA). When hired, a fee applies: for instance, the New Plymouth Museum Puke Ariki has put a rental fee of \$10 for non-members and \$5 for members; moreover, users must be over 16 years of age.

**d) iPad used as an interpretative tool during group tours:** iPads are stored in a locked cabinet in the docent resource room; school programs staff checks, charges, and updates the iPads as needed (*MuseumEd*).

At this stage of the research, dedicated staff has never been mentioned as a way to prevent theft or damage.

### 3.3 Security measures and system settings

Security measures may concern not only the physicality of iPads, but also their navigability and the access to the system settings.

For instance, at the Powerhouse Museum (Sydney, Australia), *"iPads are not connected to wifi and their system settings are locked. Also, the app itself has been coded not to allow sleep mode which means it stays upfront and cannot be escaped without removing the casing, which is secured"* (Chan 2010a).

### 3.4 Integrating iPads into the exhibition environment

The paragraph about security measures has underlined how iPads can be integrated in the museum environment. If located on shelves, iPads need to guarantee the maximum comfort of use to their users; in order to facilitate the spreading of good practice, the Brooklyn Museum in New York has shared its experience: *"the top of the shelf was at 36" and the ring the iPad sat on had a 3" outer diameter; 1 1/4" @ front; 1 7/8" @ back, which gives about a 12.5 degree rake"* (Bernstein 2011).

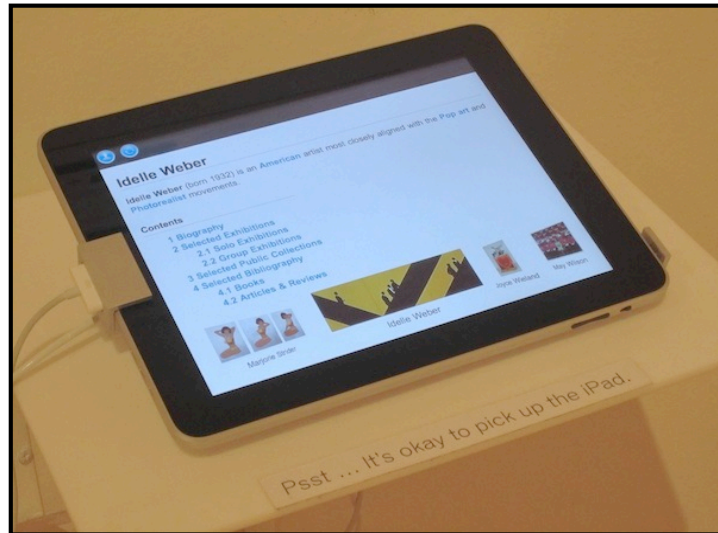
This quotation from S. Bernstein underlines how the location of the devices can influence visitors' engagement (fig.15):

***"Units that were placed in the galleries to be utilized standing were overall more popular than the units placed in a seating area at the end of the exhibition.***

*On average, wall units were used for ten minutes with visitors viewing 11.18 wiki articles, while units near seating were used for eight minutes with visitors taking a look at 9.55 wiki articles.*

*I don't want to jump to too many conclusions remembering that the very end of an exhibition is less trafficked than beginning/middle and it's possible these numbers wash out in the end, but **it may point to visitors wanting the resource near the works of art.** The top 26 articles were exclusively our featured artists; people stayed within our exhibition framework for most of the time. visitors who were standing seemed intrigued by articles about other museums. At the seated units, visitors were more likely to browse deeper in subject matter. After opening, it became clear that **visitors were apprehensive about picking up the device.** we found most visitors were using it on the stand instead of cradling the device. After adding some signage guards reported more visitors picking them up, but it's interesting to remember **that in a museum setting old habits die hard and even with iPads people were cautious to touch too much"** (Bernstein 2011).*





**Fig. 15 Encouraging visitors to use iPads available in the galleries (Brooklyn Museum, NYC, USA)**

(<http://www.brooklynmuseum.org/community/blogosphere/2011/01/18/wikipop-ipads-and-visitor-metrics/>)

#### **4. Developing applications to foster audience participation**

iPads are physical platforms that allow users to access some content, delivered through texts, maps, sounds, videos, games, and so on. As Stated by Silvia Filippini Fanton, digital media consultant, *"mobile interpretation [...] is about the user experience and particularly the content. Museums should focus on telling a story that answers questions, creates emotions, inspires a response"* (Billings 2010). Coherently with their goals, museums have developed applications that allow different degrees of engagement and visitor interaction.

This section of the report summarises the most common types of iPad applications developed by museums.

##### **4.1 Interaction enabled by iPad applications**

The most part of iPad apps developed by museums fall in one of the following groups:

**a) the app encourages the exploration of the museum galleries/special exhibitions:** the app allows visitors to explore the museum premises and its collections; users can find practical information and access to additional content such as texts, audios, photos and videos; it may also provide indications for way-finding and insight into the artistic process. Apps of this kind can be related to temporary exhibitions, too. Moreover, some of them can offer a tour-like experience enjoyable both in the premises of the museum and outside.

✓ *Sample of museums that have adopted this kind of application:*

- Detroit Institute of Art, Detroit (USA): it has developed a multimedia tour of the Diego Rivera Detroit Industry murals. The tour includes interviews with scholars, historic photos and film footage of Rivera creating the frescoes.

- New Plymouth Museum, Puke Ariki (New Zealand): *"users enjoy an artist's tour of the exhibition, audio catalogue labels, and video footage. The application also enables the user to peel back each layer (or stage) of a painting's image with a simple flick over its touch-screen; granting insight into McLean's artistic process"* (NZMuseums 2010).

- Museum of Modern Art, New York (USA): *AB EX NY*. The app allows users to view high-resolution images of selected Abstract Expressionist works; multimedia maps, videos and a glossary enrich the experience. Favourite works of art can be shared on Twitter.

- American Museum of Natural History, New York (USA): *AMNH Explorer*. It *"can identify your location, give you directions in the museum and provide explanatory text and images of major objects"* (Rothstein 2010) (fig.16).



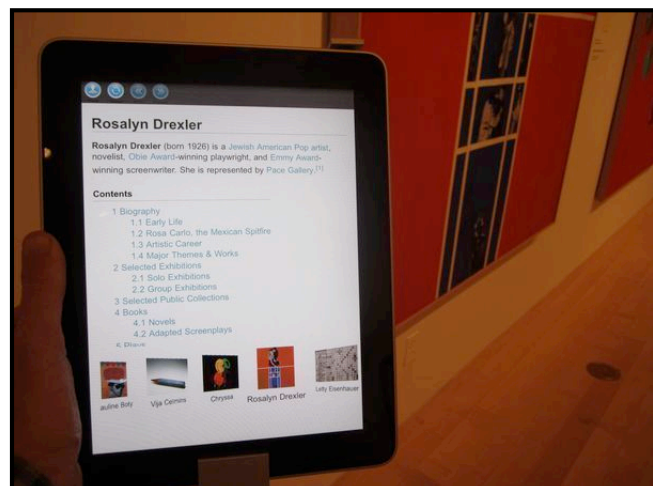
**Fig.16 iPad apps can facilitate the exploration of museum premises and collections (American Museum of Natural History, NYC, USA)**

(<http://www.nytimes.com/2010/10/02/arts/design/02apps.html?pagewanted=all>)

A special example is represented by *WikiPop*, an interactive developed by the Brooklyn Museum to give additional content about its Seductive Subversion exhibition: the content was firstly delivered through Wikipedia, and then adapted to the iPad platform (Bernstein 2010) (fig. 17).

**Fig. 17 Internet & iPads: delivering content through several platforms (Brooklyn Museum, NYC, USA)**

(<http://www.brooklynmuseum.org/community/blogosphere/2010/10/14/welcome-to-wikipop-25-articles-in-english-on-ipads-in-the-gallery/>)



**b) the app is a game related to museum collections or to a temporary exhibition:** this kind of app seems particularly relevant, since on the one hand games can facilitate learning and on the other one they are top-seller apps (Astic et al. 2011).

✓ *Sample of museums that have adopted this kind of application:*

- Powerhouse Museum, Sydney (Australia): *WaterWorx*. The game was developed in 2010 and was intended to convey the difficulty of managing an urban water system. The app was deployed to a table of 8 iPads.

- Mercedes Benz Museum in Stuttgart (Germany): *Sports Car*. Using the app, visitors are not only able to take a virtual tour through the exhibit, but also to "experience neat gimmicks along the way. With the help of an iPad, hard core race fans and casual museum goers alike, get the opportunity to "floor it" using a virtual gas pedal and enjoy the sounds of finely tuned German sports cars" (PadGadget 2010). App originally developed for in-gallery use; now downloadable from iTunes.

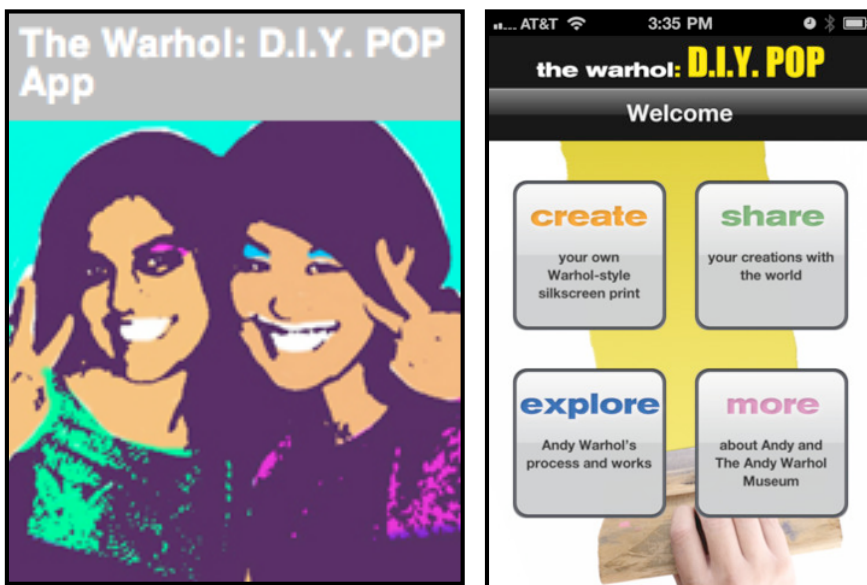
- Smithsonian Institution, Washington DC (USA): *Artifact or Fiction*. Users guess the answer to a fun question about the Smithsonian collection.

**c) the app enables and encourages the creation of user-generated content:** museums may develop apps that do not only function as interpretative tools, but that allow users to generate and share content.

✓ *Sample of museums that have adopted this kind of application:*

- New Walk Museum & Art Gallery, Leicester (UK): *Digital Interpretation Guide*, developed for the Gerhard Richter exhibition. It "aims to help the gallery visitor interpret the artworks and to inspire visitors to consider and contribute their own creative responses to the iPad art works. Visitors can submit their own interpretations of the artworks" (Harriman 2011). This is an on gallery app available at designed times.

- The Andy Warhol Museum, Pittsburgh (USA): *The Warhol: D.I.Y. POP*. It allows users to transform their own photos in Warhol-style pictures; users can share their creations through social media and even displayed in the museum (fig.18 and 19).



**Fig. 18 and 19**  
**The D.I.Y. POP**  
**app encourages**  
**users' creativity**

(<http://www.warhol.org/diypop/>)

## 4.2 The development of apps: participatory design and design for participation

Development of apps is usually done by IT experts under the supervision of museum staff, who set objectives, content, and so on. However, some museums have already gone further and have incorporated the voice of the audience in the design process, applying to the IT sector what is known as "participatory design". An example is offered by the New Walk Museum & Art Gallery in Leicester (UK), which has recently developed an iPad *Digital Interpretation Guide* in collaboration with people aged 10-21, who contributed to develop the app through a series of workshops held with artists and designers (Herriman 2011).

At the Powerhouse Museum in Sydney (Australia), the game *WaterWorx* was "developed using an iterative and agile methodology, begun by a process that they call 'considered design'. This brought together stakeholders and potential users all the way through the development process with 'real working prototypes' being delivered along the way – something which is pretty common for how websites and web applications are made, but is still unfortunately not common practice for exhibition development." (Chan 2010a). This example is particularly interesting for the museum community, since it seems to show how formative evaluation can be beneficial also to enhance visitors' engagement.

## 4.3 Development of apps as a way to generate revenues?

In order to develop apps for iPads and tablets, museums need to spend economic and human resources. Even though the provision of free high-quality digital experiences may be considered as a service provided by museums to visitors in order to fulfil their public mission, issues of sustainability do arise. As noted by S. Billings, "although most museum iPad apps have so far been offered for free, there is the possibility of using Apple's App Store as a mechanism for generating revenue from multimedia content, something that would have been all but impossible with traditional gallery kiosk applications" (Billings 2010). These potentialities have been recognised by several museums so far; for instance, the Powerhouse Museum in Sydney has moved for the following hypothesis about the *WaterWorx* game available in its galleries: "the game might be re-engineered for longer term and repeat play – and released to the AppStore down the track" (Chan 2010a).

✓ *Sample of museums that have released apps through the AppStore free of charge:*

- Museum Victoria, Melbourne (Australia): *Field guide app*
- Melbourne Museum, Melbourne (Australia): *Please touch the exhibit*
- Air Defence Museum, Bagotville (Canada): *The Air Defence Museum*
- MACRO Museo d'Arte Contemporanea di Roma, Roma (Italy): *MACRO*
- The Museum of Modern Art, New York (USA): *MoMA AB EX NY*; *MoMA Books*
- American Museum of Natural History, New York (USA): *Cosmic Discoveries*; *Explorer*; *Beyond Planet Earth Augmented Reality*
- Musée du Louvre, Paris (France): *Musée du Louvre*
- San Francisco Museum of Modern Art, San Francisco (USA): *Rooftop Sculpture Garden*
- Smithsonian Institution, Washington DC (USA): *Infinity of Nations*; *Leafsnap*; *Set in Style*

✓ *Sample of museums that have released apps through the AppStore at some cost:*

- The Andy Warhol Museum, Pittsburgh (USA): *The Warhol: Art.* (US\$ 3.99); *The Warhol: D.I.Y. POP* (US\$ 1.99).
- Eiseibunko Museum, Tokyo (Japan): *Samurai Art* (US\$ 7.99)
- Galleria degli Uffizi, Firenze (Italy): *Uffizi* (€ 1.59); *Uffizi Touch* (€ 9.99)
- Guggenheim Bilbao, Bilbao (Spain): *Guggenheim Bilbao* (US\$ 3.99)



- American Museum of Natural History, New York (USA): *Dinosaurs iPad* (US\$ 1.99)
- Smithsonian Institution, Washington DC (USA): *It's Tyrannosaurus Rex* (US\$2.99); *Artifact or Fiction* (US\$2.99);
- Victoria&Albert Museum, London (USA): *The Cult of Beauty* (£ 3.29); *Figures&Fiction* (£ 9.99); *John Constable Oil Sketches* (£ 5.99); *Medieval and Renaissance Galleries Guide* (£ 1.99)

## 5. Serving visitors and the museum community: iPads for evaluation and research

The use of iPads and tablet computers in the museum setting may be beneficial not only to engage visitors and enhance their experience, but also to conduct evaluation studies. In fact, iPads have special characteristics that potentially can help evaluators in their activities: they are hand-held devices, they can support several softwares, and ultimately they are multimedia tools.

As far as we know, research in this field has not been carried out yet, but the browsing of blogs and web-sites addressed to museum professionals combined with personal communications received by colleagues shows that iPads are actually starting to be used as means to collect data for evaluation studies.

More precisely, we have identified the following areas of use:

**a) iPads & tablets as data collection tools used for interviewing visitors:** the devices are used by the evaluator during the interview process and answers are inputted using a software installed in the device itself. According to research, this method can be valuable for collecting and analysing both qualitative and quantitative data.

- ✓ *Museums that have adopted this method and context of the evaluation:*
  - Burke Museum of Natural History and Culture (Seattle, USA), post-visit interviews
  - Woodland Park Zoo (Seattle, USA), interviews
  - Denver Museum of Nature and Science (Denver, USA), interviews for all sort of audiences
- ✓ *Software used: iFormBuilder*
- ✓ *Operational pros:* it allows to collect audio responses
- ✓ *Operational cons:* problems with the audio function have been reported (Kathryn Owen - Woodland Park Zoo, personal communication)
- ✓ *Professional development pros:* the use of iPads has been deemed relevant to commit staff to evaluation; moreover, the choice of using iPads as a data collection tool has pushed staff to learn how to use the software, enhancing their IT competences
- ✓ *More opportunities we see:* iPads could be also used for audio and/or video-recording interviews, creating a multimedia repertoire potentially useful both for qualitative analysis and for the multimedia output pursued by museums. Consent for the use of the audiovisual material could be agreed by the interviewed people signing digital forms available on the iPad.

**b) iPads & tablets as data collection tools for surveys:** the devices are used by the visitor in order to fill in the digital forms and to provide the data required by the evaluator. Research points out that iPads are generally provided by the museum itself, but personal iPads belonging to visitors may be used too if the survey takes an online format.

- ✓ *Museums that have adopted this method and context of the evaluation:*
  - Science Museum of Minnesota (St. Paul, USA), family program surveys
  - Vancouver Aquarium (Vancouver, Canada), surveys
  - Ohio Historical Society (Columbus, USA), surveys
  - Denver Museum of Nature and Science (Denver, USA), surveys
  - Children's Museum (Houston, USA), weekly visitor surveys
- ✓ *Evaluators and independent researchers that have adopted this method and context of the evaluation:* Jennifer Borland, Rockman et al consulting company (Indianapolis, USA), surveys
- ✓ *Softwares used:*
  - on-line format: *Survey Monkey* and/or *Survey Gizmo*. *Survey Gizmo* has been particularly appreciated because "it has a number of options for designing the look and feel of surveys and you can create surveys specifically for mobile devices. You can also set the pixel width of all surveys to ensure that they're readable on the iPad" (Molly Phipps - Science Museum of Minnesota, personal communication)
  - off-line format: *iSurvey*
- ✓ *Operational pros:*
  - iPad acts as a conversation starter;
  - it keeps things smooth because it is easy to use and people get excited about it;
  - the data are immediately collected in the system and people who process data from paper to computer are thus not needed (*MuseumEd*);
  - deemed particularly valuable for numeric and closed ended questions (Karen Howe - Vancouver Aquarium, personal communication).
  - *iSurvey* has been particularly appreciated because it works offline, overcoming the lack of wireless connection in several museum spaces; moreover, professionals "have found it to be really intuitive with users" (Kathleen Tinworth - Denver Museum of Nature and Science, personal communication)
- ✓ *Operational cons:* "if you don't use a software developed for iPads, you need to be online in order to access the forms or submit data" (Jennifer Borland, personal communication).
- ✓ *Training and professional development pros:* "training for novices takes a relatively short period of time, e.g. half an hour" (Jennifer Borland, personal communication).
- ✓ *Other operational pros we see:* inputting the answers directly into the system shortens the time span that usually exists between the end of the data collection activity, the elaboration of the graphs and the communication of the results; moreover, some online softwares elaborate real-time reports too
- ✓ *Weaknesses we see:* if only one or few iPads are available, forms can be filled in by only one person at a time.

**c) iPads & tablet computers used for visitor timing and tracking studies:** the devices are used by evaluators as drawing tablets and visitors' path and behaviour are sketched and recorded accordingly.

- ✓ *Museums that have adopted this method and context of the evaluation:*
  - Shedd Aquarium (Chicago, USA), timing and tracking
  - Australian Museum (Sydney, Australia), timing and tracking
- ✓ *Software used: iFormBuilder, SketchBook*
- ✓ *Operational pros:* automatic time-stamping *"takes a little extra effort and some very basic programming but I think it has a lot of potential for timing and tracking studies"* (Jennifer Borland, personal communication)
- ✓ *Operational cons we see:* the process of writing observational notes on the tablet using a digital pen can be more difficult than using a pencil on a paper
- ✓ *Other operational pros we see:*
  - lighting allows to easily carry out the tracking study in shadowy environments;
  - mistakes and inaccuracies can be easily amended without making the paper untidy;
  - it is easy to shift from one layer to another when using *SketchBook*

**d) iPads & tablet computers used as multimedia tools for evaluating exhibition elements:** evaluators capitalize on the multimedia potentialities of the devices and they use them to evaluate exhibition elements such as videos.

- ✓ *Museums that have adopted this method and context of the evaluation:*
  - Science Museum of Minnesota (St. Paul, USA), front-end study: staff used 8 iPads to show visitors an 8-minute movie and asked their reaction to the content. The same museum has used iPads in order to test out an early version of an online quiz, too: staff loaded the page on the iPad and handed it over for visitors to use (Molly Phipps, personal communication).
- ✓ *Operational pros:* museum professionals have expressed very positive comments about the use of iPads in this context; most of all, the iPad has been particularly appreciated as long as it is a device that is big enough for multiple people to see and that can also be handheld (Molly Phipps, personal communication). These characteristics make iPads preferable to laptops.

**Areas of future employment:** museums professionals have stated that they are planning to use these devices for concept mapping (Kathryn Owen-Woodland Park Zoo, personal communication) and to introduce drawings as responses to a question (Jennifer Borland, personal communication).

The **obstacles** that have been mentioned by museum professionals for the adoption of iPads for evaluation purposes are mainly costs, the lack of Wi-Fi connection (even though it is not absolutely essential for using many of the iPad functions) and the feeling that they would not interface with Windows databases (Lynda Wilson - Shedd Aquarium, personal communication).

Even though museums may not have employed iPads for evaluation purposes so far, the use of tablet computers as handheld devices that allow to conduct research is attested: for instance, they were used in the past in order to develop **knowledge and understanding** about animals' behaviour, collecting data through Noldus software (Shedd Aquarium).

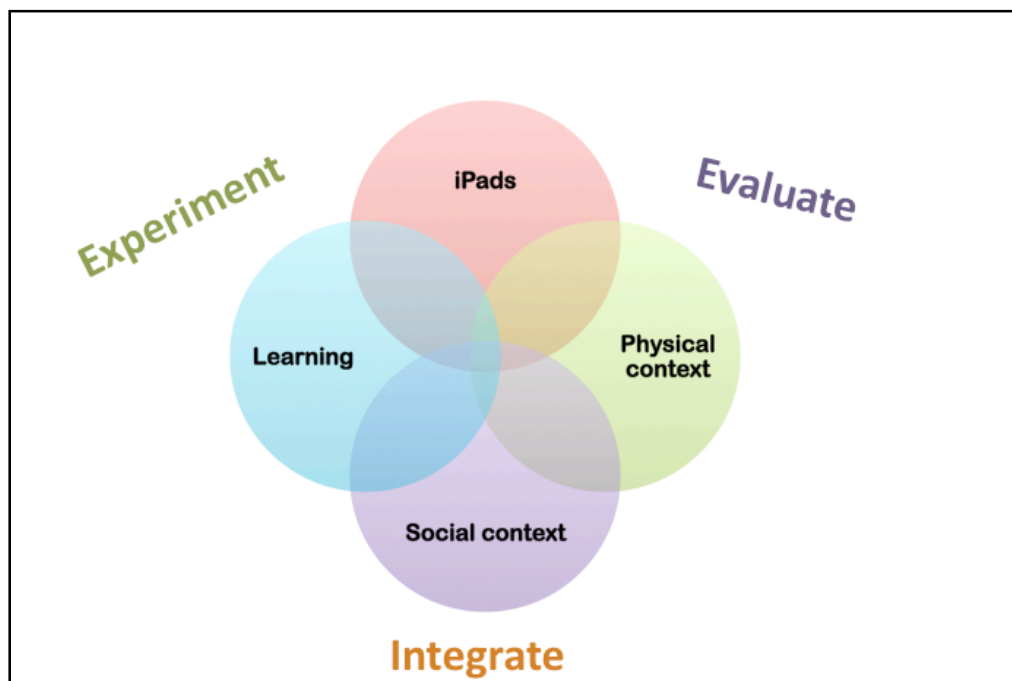
## 6. Final remarks

As anticipated in the introduction, this report is intended as a working document subject to further development and open to contributions, and it should be considered as a starting point to foster reflection and analysis about the use of iPads in museums.

In fact, it is possible that the use of iPads as interpretative devices in the galleries and in group tours has been underestimated because of the lack of shared information among museum professionals. The iPad applications listed in this report must be considered just as examples, since the market is rapidly developing and it is hardly possible to track all the downloadable apps for several reasons: firstly, they are not always very well advertised on museum websites; secondly, they are tagged under different names - such as education, tourism, leisure, and so on - in the online stores; thirdly, apps developed to be exclusively used in the gallery setting may not be advertised at all.

It is also very likely that museums other than the ones listed in this report are using iPads for evaluation studies: however, these activities may not be perceivable due to the lack of information on the web or of personal connection with evaluators. This last consideration rises a professional issue that is twofold: on the one hand, it underlines the necessity to expand the evaluation community in the museum field; on the other one, it indicates a necessity for evaluators to share and communicate results in order to facilitate the diffusion of best practices and the development of a meta-reflection on the methods used in evaluation studies as well.

Finally, it can be added that since the role of iPads for the facilitation of social interaction and learning in the museum context has not been fully investigated yet, further research should be devoted to this topic, following a cycle that combines experimentation, evaluation and integration of the results (tab.2).



**Tab.2 iPads, social interaction and learning: further steps of research**



## APPENDIX 1

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## **APPENDIX 2**

### **Museums mentioned in the report**

Air Defence Museum, Bagotville (Canada)

Australian Museum, Sydney (Australia)

American Museum of Natural History, New York City (USA)

Batashoe Museum, Toronto (Canada)

Brooklyn Museum, New York City (USA)

Burke Museum of Natural History and Culture, Seattle (USA)

Children's Museum, Houston (USA)

Denver Museum of Nature and Science (Denver, USA)

Detroit Institute of Art, Detroit (USA)

Eiseibunko Museum, Tokyo (Japan)

Galleria degli Uffizi, Firenze (Italy)

Guggenheim Bilbao, Bilbao (Spain)

Grant Museum of Zoology, London (UK)

Kalamazoo Institute of Arts, Kalamazoo (USA)

MACRO Museo d'Arte Contemporanea di Roma, Roma (Italy)

Melbourne Museum, Melbourne (Australia)

Mercedes Benz Museum, Stuttgart (Germany)

Minneapolis Institute of Art, Minneapolis (USA)

Monte Verità, Ascona (Switzerland)

Musée du Louvre, Paris (France)

Museo del Fumetto, Lucca (Italy)

Museum of Modern Art, New York City (USA)

Museum Victoria, Melbourne (Australia)  
New Plymouth Museum, Puke Ariki (New Zealand)  
New Walk Museum & Art Gallery, Leicester (UK)  
Oakland Museum of California, Oakland (USA)  
Ohio Historical Society, Columbus (USA)  
Petrie Museum of Egyptian Archaeology, London (UK)  
Powerhouse Museum, Sydney (Australia)  
Royal Ontario Museum, Toronto (Canada)  
San Antonio Museum of Art, San Antonio (USA)  
San Francisco Museum of Modern Art, San Francisco (USA)  
Science Museum of Minnesota, St. Paul (USA)  
Shedd Aquarium (Chicago, USA)  
Smithsonian Institution, Washington DC (USA)  
Vancouver Aquarium, Vancouver (Canada)  
The Andy Warhol Museum, Pittsburgh (USA)  
The Burlingame Museum of Pez Memorabilia, Burlingame (USA)  
The Green Centre, Brighton (UK)  
The New Mexico Museum of Natural History & Science, Albuquerque (USA)  
Victoria&Albert Museum, London (UK)  
Woodland Park Zoo, Seattle (USA)



## **APPENDIX 3**

### **Additional resources**

#### ***Applications and games***

<http://www.powerhousemuseum.com/dmsblog/index.php/2010/11/01/waterworx-our-first-in-gallery-ipad-interactive/>: discover how *WaterWorx*, the game developed by the Powerhouse Museum in Sydney (AU), works

<http://www.powerhousemuseum.com/dmsblog/index.php/2010/11/05/the-honeypot-effect-more-on-waterworx-the-powerhouse-museums-ipad-interactive/>: discover how visitors engage with iPads and *WaterWorx*

<http://www.padgadget.com/2010/05/06/mercedes-uses-ipads/>: have a look at *Sports Cars*, the app developed by the Mercedes Benz Museum in Stuttgart (Germany)

<http://museumvictoria.com.au/melbournemuseum/discoverycentre/please-touch-the-exhibit/>: explore the promotional video that the Melbourne Museum, Melbourne (AU) has released about its *Please Touch the Exhibit*

#### ***Using iPads with group tours***

<http://prezi.com/ozmvj0vkqwhi/informal-learning-and-cultural-understanding-through-the-use-of-mobile-devices/>: evaluation study about the use of iPads during group tours at Monte Verità (Switzerland)

[http://www.youtube.com/watch?v=jHr\\_799DFII&feature=results\\_video&playnext=1&list=PL67C4344E95CDF96D](http://www.youtube.com/watch?v=jHr_799DFII&feature=results_video&playnext=1&list=PL67C4344E95CDF96D): strengths, weaknesses, opportunities and threats concerning the integration of iPads into docent tours

#### ***Security systems:***

<http://www.staypad.com/photos.html#video>: examples of security cases for iPads

<http://ipadkioskmount.com/2011/ipad-enclosure-museum-exhibit/>: examples of iPad kiosk enclosures