
IMMERSIVE LEARNING – LEARNING PATTERNS INSIDE DIGITAL CULTURAL IMMERSIVE EXPERIENCES IN SITU

Patrizia Schettino, Università della Svizzera italiana, Switzerland

Abstract

The paper presents a categorization of visitors learning patterns inside the immersive environment PLACE-Hampi, designed by Sarah Kenderdine and Jeffrey Shaw. The paper is focused on how visitors learnt about a new technology, the immersive platform PLACE. It is based on the qualitative data analysis in NVivo of 92 interviews and observation of 500 visitors inside three different exhibitions in Germany and Australia. The methodology used is a combination of four different qualitative methods: grounded theory, digital ethnography, narrative inquiry and case study.

Introduction

How visitors can learn about a new platform inside a museum?

The paper presents the patterns about visitors' learning a new technology inside the museum space. Those patterns emerged from qualitative data analysis done on interviews and observations inside the immersive environments PLACE-Hampi. The paper is structured in this way: the 2nd paragraph, I summarized some of the key approaches to learning evaluation in museums, the 3rd paragraph is about the case study PLACE-Hampi, the following paragraph summarize the methodology, the last paragraphs presents the results, in the conclusions, a possible development of this research is described.

Approaches to learning in museums

“Museums are public and social places of learning” (Crowley, Pierroux, & Knutson, 2014). One of the key missions of a museum is to offer visitors a learning experience and learning is one of the main reasons why people go to museums (Hooper-Greenhill, 1999). Learning can be formal (structured activities with evaluation and testing of new skills, knowledge, etc.) or informal (all other forms of learning, occasioned by everyday life, which are neither structured nor planned). Learning in a museum can be seen as a combination of formal and informal learning: museums can be used by teachers for formal learning on a specific topic with guided tours and a test at school later or the museum can be used as a playground for informal learning by individual visitors, groups, couples and families. Museums often offer activities addressed to *specific users*, for example children, the disabled, families. Learning in museums is often seen as being closely linked to the concept of fun, a combination of informal learning and different levels of entertainment.

The word *edutainment* (Falk & Dierking, 2000) has been coined to express this mix of learning and having fun. Being “in the flow” is a highly positive state of mind, experienced by people when they are highly focused, highly concentrated, doing activities such as playing a game, meditating, etc. (Oxford Online Dictionaries, n.d.) it is a possible mental status also during museum exploration and spontaneous informal immersive learning activities and is linked to wellbeing and pleasure. Flow is also one of the components of *immersion*.

I will not present all the general theories about learning here but will focus on some approaches used by museums to evaluate learning and on the definition of immersion emerging from my PhD thesis (Csíkszentmihályi, 1990). To understand what people learn during museum visits, the educational departments of museums and academics in the field of museum studies and education have identified *outcomes* that can be tested before and after a museum visit.

One of the key academics in this area is Hooper-Greenhill who has written many publications, reports and papers about learning in museums. Based on the *Learning Impact Research Project, phase 1* (2001-2002), she and her team identified a list of *learning outcomes*, divided into five main groups (GLO): (a) knowledge and understanding, (b) attitudes and values, (c) skills, (d) activities, behaviours and progression, (e) enjoyment, inspiration and creativity (Hooper-Greenhill, 2002; Moussouri, 2002). GLO was tested in fifteen institutions during phase two of the project, before and after a visit. Researchers, museum staff and also school teachers, using a qualitative, quantitative or mixed method, observations, structured and unstructured interviews, focus groups, individual surveys, etc. can use these categories of *outcomes* to describe what people learn during a visit to a museum. Some of these outcomes, such as engagement, can also be tested over a long period of time in longitudinal studies (follow-up interviews).

Friedman et al. (2008) propose a framework to evaluate different forms of informal learning which also includes a list of possible learning outcomes for museums. In my opinion, Friedman et al.’s list (2008) being a simplified version of GLO, is a tool that can be used more by museum practitioners than in academic research. Hooper-Greenhill’s GLO has also been included in one of the final reports about *measuring the impact of the museum* (Bollo, 2013) in the LEM project (The Learning Museum Network Project) as one of the main approaches to evaluating the *personal impact* on visitors.

Falk and Dierking (2000) point out that people remember and organize knowledge through stories and underscore the importance of understanding learning in context, in the museum. Narratives are in general data collected by researchers who use the *narrative inquiry* method (Czarniawska, 2004) (for more details see the section on methodology). Collecting and expressing *visitors’ voices* is one of the roles of educators at the *museum frontier*, the museum collaborating with other institutions in the city (Golding, 2009) with inclusive and participatory practices. The approach of the School of Museum Studies at the University of Leicester to research on learning in museums is based on Hooper-Greenhill’s GLO and has been used in several studies conducted in museums and galleries (Hooper-Greenhill et al.,

2001; Hooper-Greenhill & Moussouri, 2001) in combination with grounded theory methods or GTM (Strauss & Corbin, 1998; Charmaz, 2006).

The limit of these studies is that it is not clear how they combined GLO with the patterns emerging from the data (I will describe GTM in the section on methodology) or how they defined the final categories from initial, intermediate and final *coding* (Birks & Mills, 2011).

The research presented in this paper is an attempt to show how GTM has been used in a coherent way to develop categories from data about visitors' learning patterns. The research is based on data collected in three different exhibitions where the immersive environment PLACE-Hampi has been included.

PLACE-Hampi

PLACE-Hampi allows visitors to explore 360 degree digital panoramas in an interactive way. “The panorama of the nineteenth century could be described as a long circular set that surrounded the spectator and often included props inserted between the viewer and the plane of the image, complete with dynamic (and natural) lighting effects” (Kenderdine, 2007). The panorama made its debut in the late 1700s as the *first true mass medium* (Oettermann, 1997). This was invented during the Industrial Revolution in the UK. This technology lost popularity during the early twentieth century; however, the model can be found also after this period, used for military purposes, in electronic arts (e.g. experiments in the entertainment industry such as Disney's Circorama, 1958), and for research. Since the middle 1980s artists such as Jeffrey Shaw have been working with panoramas and with augmented devices for panoramic images to extend narratives. Shaw's works, PLACE A User's Manual and PLACE-Ruhr, “reframed the traditional panorama within the new one of the virtual reality” (Kenderdine, 2007). As Oliver Grau (2003) wrote, “the platform (PLACE) is in the tradition of panoramas but innovates the way they can be explored, with a new interaction design paradigm”.

Sarah Kenderdine (Kenderline & Schettino, 2011) describes PLACE-Hampi in this way: PLACE-Hampi is

“a vibrant theatre for embodied participation in the drama of Hindu mythology focused at the most significant archaeological, historical and sacred locations of the World Heritage site Vijayanagara (Hampi), South India. The installation's aesthetic and representational features constitute a new approach to the rendering of cultural experience, and give the participants a dramatic appreciation of the many layered significations of this site. In PLACE-Hampi, using a motorized platform, the user can rotate the projected image within an immersive 9-meter diameter 360-degree screen, and explore high-resolution augmented stereoscopic panoramas showing many of Hampi's most significant locations. The scenography within PLACE-Hampi shows a virtually representative boulder strewn landscape that is populated by a constellation of 18 cylinders, each one of which being a high-resolution 360-degree stereoscopic photographic panorama”.

Methodology

The method used in this research is a combination of four different methods (grounded theory, digital ethnography, case study, narrative inquiry) and can be summarized as an embodied constructivist GTM digital ethnography in situ:

- *Embodied*: the researcher is in the immersive environment with the visitor, without taking notes or recording a video; the notes are written up immediately after each visitor observation session;
- *Constructivist GTM ethnography*: the researcher uses visitor observation and triangulates the observation with the same visitors; the research process follows the constructivist Grounded Theory Method or GTM (Charmaz, 2006) the researcher is aware of the potential bias in the interpretation of the experience; the researcher takes into account cultural diversity in his/her data collection and analysis;
- *Digital*: the researcher analyzes immersive digital projects in situ; this can be considered a subfield of digital ethnography (Boellstorff, 2012) the immersive environment is not online but in situ, part of an exhibition in a museum. This research is an attempt to define a methodology for the qualitative analysis of an immersive experience in situ.

In this case study, the data (notes from observations, tracking of visitor paths, interviews, comment cards) were collected when PLACE-Hampi was at the Ancient Hampi exhibition in Melbourne, Australia, in 2009 and 2010.

Results

Adopting a grounded theory approach, during the intermediate phase of the coding process I compared categories emerging from data with categories from previous theories. When I realized that learning patterns were also emerging from my narratives, I compared my codes with the theories that I mentioned in the first paragraph. I will summarize some of the preliminary results in the following paragraph.

Visitors, before learning about the content of PLACE-Hampi, had to learn how to move in the room (learn about the space), how to interact with other people learning a role (Schettino, 2003) and how to use the PLACE platform (learning about the technology). From my observations and interviews, the following types of learners of technology emerged (this is an example of categorizing by *type of users* (Strauss & Corbin, 1998)):

- the self-learner by doing (the visitor learnt by trying and making mistakes);
- the self-learner by imitating (the visitor learnt from another visitor, by observing and repeating);
- the peer helped (the visitor was helped or asked for help from another visitor);
- the customer service guided (the visitor was helped or asked for help from a member of the staff).

I will present four examples of quotations from interviews to show how I defined these categories and coded them from the visitors' indirect narrative about their learning. I never asked them directly "what did you learn?" but extracted a description of how they learnt from their narratives and then defined the four types of learners, based on their learning strategy.

Self-explorer by doing:

P: Was it easy for you to understand how to use the platform?

I: Not as easy as I would have liked, I did the wrong things at the start, the information given doesn't really explain much. I took things as they came ... it was hard before I realized that you have to go into the circle thing... the directions could be a little bit better. It was quite slow to learn, you feel that you shouldn't take too much time because the other people want to see, but when I realized how to do it it was realllly good... I had the feeling that I was really standing there...

P: So you understood the mechanism, that you have to zoom in in order...

I: Yes, to get in... and it was kind of exciting ... at the end it was fine, I got it. It was not explained that you have to zoom in in order to enter all these worlds...so it was a little bit confusing... then I thought that maybe I wasn't supposed to only go round...maybe I have to go in... and when I did, it was good..

P: You had your "ah ah" moment!

I: (laughing) yeh, I had it...

My interpretation:

This Australian woman, originally from Australia and with long term home Australia, is describing her process of self-learning how to drive the platform. She says that at a certain point she had the intuition that she had to choose a panorama and not just move around in the virtual landscape. She expresses her excitement from that point on and she also mentions the sense of immersion and presence (she felt as if she was in the scene). She came to the museum alone and entered the room when it was empty, with no members of staff present, and learnt by exploring.

Self-learner by imitation

Imitator

I: Oh yes, I drove the platform. I observed the young boy before me. Who is the dancer?

My interpretation:

An older woman originally from Scotland (she mentioned Scotland as her home, not the UK) with long-term home Australia (she is close to obtaining Australian citizenship) says that she learnt by observing a younger visitor before her. She was able to use the platform easily but she asked me about the Shiva animation, “Who is the dancer?”. She was not able to see any difference between the videos and the animations and thought that the animation of Shiva was a movie with a real person. When I explained that the image was a computer animation, based on the movement of a real dancer (a woman, not a man), she decided to go back into the exhibition to see for herself. In the next quotation there is an example of what *learning by being helped by other visitors* means.

Peer helped

P: What do you remember about this experience?

I: We looked at the pictures before going into the dark room... And we made the platform work, my son was with me on the platform, turning round. I used the arrows to go in and out. It was quite easy. The first time that we went very close to an image and discovered that we can be a part of the image, it was exciting, finding out how it worked, and it was very nice to have this 360 immersive experience, be close to the place and see the details and it was nice to find the computer animations, the Gods, and we collected them. Ok, we found the elephants, then we found Ganesha and the rest of them, the one we didn't find was Garuda...we did not know where Garuda was and we did not find him. We worked with the illuminated board in front of us, it showed where we were in terms of the site, with a circle as the symbol of where you can go in and work with the 360 degree experience...and I also found a button that gives the Sanskrit text with the names of where we probably were, but I think that at this stage it would be nice to have an English text that gives us an idea of where we are in the site...

P: The Sanskrit text is part of the mythology so it is not about the different temples; but I agree with you that it is not explained in English, so you can only appreciate it aesthetically but you don't know...

I: So we made the assumption that it was where we were because I did not understand the meaning of the Sanskrit text...

My interpretation:

This is an example of collaborative learning and navigation. The Australian mother describes how she and her son learnt how to drive the platform. They entered a panorama by mistake and thus understood the interaction model. The mother also describes a possible way of navigating the content, looking for animations. She also talks about the excitement she felt after learning how to drive by exploring. In my observation notes I wrote about the communication between the mother and the son, who moved very slowly in the virtual landscape. From his way of driving and interacting with his mother I thought he must have some sort of disability. The mother confirmed this in her narrative. The son learnt to drive by exploring but also with the guidance of other visitors, in this case a member of his family. Two people with different abilities used the platform together, dividing the main action into two (one used the zoom and selected the panoramas, the other drove the platform, rotating inside the panorama). The woman also mentions detailed elements of the interface and how she interpreted them (the map, the Sanskrit button).

Customer service guided

P: Did you learn by yourself or did someone help you?

I: An instructor told me to press this button, back and forward... and turn... it is easy to learn, also for my daughter...

P: She operated the platform...

I: Yes and she is only 5 years old...and it is good...

My interpretation

A visitor with original and long-term home Hong Kong, in Australia for a holiday, says both that the family was guided by the customer service staff and that it was easy both for parents and for young children to learn how to use the platform (he described the essential elements of the navigation).

The quote from the interview demonstrates the concept of learning thanks to the help received from the customer service staff.

Conclusions

This categorization describes how visitors learn about a new technology and a new space. My categorization by learning strategy offers a way of analyzing this specific aspect of learning in immersive environments: it can be used to compare the learning process at PLACE-Hampi with the *immersive learning* of other platforms. The results are encouraging for museums, and for the designers too, because they show that visitors can learn about a completely new technology, adopting different strategies. Comparing what the designers said in their interview and what they wrote about explorative learning and the role of the customer service

staff (called ‘helpers’ by Shaw during the interview), the results show that visitors can use different strategies to learn how to use the technology; they collaborate, as intended by the designers and to the satisfaction of museum managers. The role of the customer service staff is still very important even when they decide to leave visitors alone to explore and collaborate with each other.

References

1. Birks, M., & Mills, J. (2011). *Grounded Theory, A Practical Guide*. London: Sage.
2. Boellstorff, T. (2012). Rethinking digital anthropology. In D. Miller & H.A. Horst (Eds.), *Digital anthropology* (pp. 39-60). London: Berg.
3. Bollo, A. (2013). *Measuring the impact of the museum*. The Learning Museum Network Project. Retrieved from http://www.economiadellacultura.it/index.php?option=com_content&view=article&id=505%3Aalessandro-bollo-measuring-museum-impacts-nellambito-del-progetto-europeo-lem&catid=23%3Aa-proposito-di-&Itemid=1&lang=it
4. Charmaz, K. (2006). *Constructing Grounded Theory, a practical guide through qualitative analysis*. London: Sage.
5. Crowley, K., Pierroux, P., & Knutson, K. (2014). Informal Learning in Museums. In K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences, Chapter 23* (pp. 461-478). Cambridge: Cambridge University Press.
6. Csíkszentmihályi, M. (1990). *Flow: The Psychology of Optimal Experience*. New York: Harper and Row.
7. Czarniawska, B. (2004). *Narratives in Social Science*. London: Sage.
8. Falk, J. H., & Dierking, L. D. (2000). *Learning from Museum, visitor experience and the making of meaning*. Oxford: Altamira Press.
9. Friedman, A. J. (Ed.) (2008). *Framework for evaluating impacts of Informal Science Educational Projects*. Retrieved from http://www.informalscience.org/sites/default/files/Eval_Framework
10. Golding, V. (2009). *Learning at the museum frontiers: identity, race and power*. Surrey: Ashgate Publishing.
11. Grau, O. (2003). *From Illusion to Immersion*. Cambridge: MIT Press.
12. Hooper-Greenhill, E. (Ed.) (1999). *The Educational Role of the Museum* (2nd ed.). Abingdon: Routledge.
13. Hooper-Greenhill, E. (2002). *Developing a scheme for finding evidence of the outcomes and impact of learning in museums, archives and libraries: the conceptual framework*. Retrieved from <http://www2.le.ac.uk/departments/museumstudies/rcmg/projects/lirp-1-2/LIRP%20analysis%20paper%201.pdf>

14. Hooper-Greenhill, E., Hawthorne, E., Moussouri, T., & Riley, R. (2001). *Making meaning in art museums 1: visitors' interpretive strategies at Wolverhampton Art Gallery*. Leicester: RCMG. Retrieved from <http://www2.le.ac.uk/departments/museumstudies/rcmg/projects/making-meaning-in-art-museums-1/Making%20meaning%201.pdf>
15. Hooper-Greenhill, E., & Moussouri, T. (2001). *Making meaning in art museums 2: visitors' interpretive strategies at Nottingham Castle Museum and Art Gallery*. Leicester: RCMG. Retrieved from <http://www2.le.ac.uk/departments/museumstudies/rcmg/projects/making-meaning-in-art-museums-2-1/Making%20Meaning%202.pdf>
16. Kenderdine, S. (2007). Speaking in Rama: Panoramic vision in cultural heritage visualization. In F. Cameron & S. Kenderdine (Eds.), *Digital Cultural Heritage: a critical discourse* (pp. 301-332). Cambridge, Massachusetts: MIT Press.
17. Kenderline, S., & Schettino, P. (2011). PLACE-Hampi: Interactive Cinem and New Narratives of Inclusive Cultural Experience. *Inclusive Museums Journal*, 3(3), 141-156.
18. Moussouri, T. (2002). *A context for the development of learning outcomes in museums, libraries and archives*. Retrieved from <http://www2.le.ac.uk/departments/museumstudies/rcmg/projects/lirp-1-2/LIRP%20analysis%20paper%202.pdf>
19. Oettermann, S., (1997). *The panorama. History of a Mass Medium*. New York: Zone Book.
20. Oxford Online Dictionaries (n.d.). *Edutainment*. Retrieved from <http://www.oxforddictionaries.com/definition/english/edutainment>
21. Schettino, P. (2003). Rethinking the Digital Media Design Process in Museums. *Design Principles and Practices: An International Journal – Annual Review*, 7, 1-18.
22. Strauss, A., & Corbin, J. (1998). *Basics of Qualitative Research. Techniques and procedures for developing Grounded Theory* (2nd ed.). London-New Delhi: Sage.

Acknowledgment

Thanks to Sarah Kenderdine, Jeffrey Shaw and Immigration Museums to the access to the field. Thanks to the Swiss National Science Foundation for grant and the possibility to visit Australian institutions.