Exhibiting Emotion: Capturing Visitors' Emotional Responses to Museum Artefacts

Genevieve Alelis, Ania Bobrowicz, and Chee Siang Ang

School of Engineering and Digital Arts
University of Kent, Jennison Building, Canterbury, Kent, CT2 7NT UK
{ga209,a.bobrowicz,C.S.Ang}@kent.ac.uk

Abstract. The museum provides the perfect setting for the convergence of culture, reflection, personal connections, and communication, and many museums supplement these visitor experiences through the use of Human-Computer Interaction (HCI) systems. While there has been past HCI research on various combinations of these four areas, the overall goal of this study is to explore the emotional links museum visitors make while encompassing all four areas through the use of engaging HCI technologies. This paper reports on the results of a study carried out at the Powell-Cotton Museum, a local ethnographic museum located in south-east Kent, UK. Using structured interviews and thematic analysis, visitors' emotional responses to museum artefacts were analysed. Findings suggest that when given the task of providing emotional responses to artefacts, visitors are motivated to find meaningful and personal connections.

Keywords: cultural artefacts, emotion, heritage, meaning-making, story-telling.

1 Introduction

While the understanding of visitors' requirements and learning has always been an important part of a museum's focus and research, recent studies on emotions have proven that designing for emotion is a valid form of learning; by integrating emotion with learning objectives, museums can create a more personal experience which can lead to repeat visits, donations in the form of time and money, and free advertising by content visitors [1,2]. Studies focusing on the emotions experienced both within and outside a museum have analyzed how objects and products affected participants; however, results thus far have not been applied to HCI systems in a heritage environment or considered the personal stories behind the connections. Due to an individual's specific background, these applications are ideal as the differences result in unique and even contrasting ways of connecting with an object.

Although previous applications allow visitors to select their emotional response through an interface, they are limited in the feedback they accept in addition to lacking the capacity to assist with understanding the cause of an emotion. Museums have increasingly invested in mobile devices and they should be utilized to their full advantage of allowing visitors to share many different configurations of responses. The aim

of this study is to determine how museum visitors emotionally engage with artefacts, the results of which will be used to develop a mobile system that supports the understanding of emotions through personal connections and stories. This paper will first present previous research on the influence of objects on emotions and the diverse HCI implementations of measuring emotions. Next, the methodology used to gather and analyse the data will be discussed, followed by the results. Finally, a conclusion will be drawn and potential applications will be suggested.

2   Related Work

2.1   Influence of Objects on Emotions

There have been prior investigations regarding emotional responses to objects both within and outside of the museum context; this includes the emotions generated solely by images of products without taking into consideration the application of the product [3], discussions on the types of situations where an object influenced emotions [4], visitors' understanding of and responses to exhibitions [5], and museums that design exhibits in order to generate a specific emotional response from the audience [1]. To date, research focusing on discovering the connections between an individual's personal history and an emotional response to an object is lacking. When an audience consists of people with different backgrounds and experiences, it is likely that they will have various opinions and interpretations of an object. Similarly, research shows that an object does not have one inherent meaning; rather, it is an individual who applies meaning to it based on personal connections made through memories, culture, and beliefs [6]. Correspondingly, recent results confirm that emotion is generated through the internal representation of an object, with assistance from its aesthetic properties and what they signify [7]. Falk and Dierking observed that "the dominant motivation for humans is meaning-making" and as such, recommend that museums combine emotion with learning into their exhibits [8]. A combination of these concepts which can be applied to objects in any environment can be found in the framework for product experience consisting of three levels: aesthetic experience, experience of meaning, and emotional experience [9]. This framework relies on the user being able to interact with the product in some way. Each of these levels overlaps to shape the experience between a user and product, allowing the visitor to be more pro-active when interacting with artefacts, whether directly or indirectly though technology.

2.2   HCI Implementations of Measuring Emotion

Within a museum, early implementations of engaging technology which let visitors reflect on their visit and share their interpretations with others were successful in encouraging interactions with the exhibits. In the PEACH project which took place in Italy's Buonconsiglio Castle, the goal of the designers was to create a guiding system that can personalize a visit through the interpretation of visitors' feelings. This implementation of

a mobile device was non-obtrusive with an easy to understand interface. Several modes of emotional input were tested before deciding on one which gave the user two-degrees of freedom, either positive or negative, by requiring them to indicate their "degree of interest" through the movement of a slider either to the left towards a sad face icon or the right towards a happy face icon. This met the requirements researchers had of enabling users to easily express their approval using an intuitive, transparent system [10,11]. However, this system was bound by fixed selection choices; a better system would acknowledge the breadth and depth of potential feedback by accommodating a more unrestricted yet streamlined form of participation.

Obtaining visitors' reactions to a particular exhibit in a museum through text was one of the main elements of the ArtLinks system at the Herbert F. Johnson Museum of Art at Cornell University, which aimed to help users make connections to the exhibit as well as with other visitors, encourage reflection, and do this with transparency. It was found that for some users, using text to express their opinions to the exhibit "caused them to have a more cognitive and less emotional reaction than they otherwise would" [12].

Encompassing both tagging and navigational tools, the MobiTags system in the Johnson Museum of Art at Cornell University was a web application designed to "integrate social, spatial, and semantic navigation". Through the process of selecting or inputting tags, visitors were encouraged to find themes and understand collections but the tags were not specifically related to how the object made them feel; visitors could choose or input any tag depending on their opinion of the object [13].-

Outside of a museum setting, emotion-capturing HCI research was also being explored. In the MobiMood system, Russell's Circumplex Model of Affect [14] was used to represent the different moods available for users to select through buttons on the interface but while users can input both the intensity of each mood together with a custom mood, this system is limited in the type of engagement it gives the user [15]. Russell's Circumplex Model of Affect influenced the MoodSense interface through its use of two sliders representing the two dimensions of pleasantness and arousal, and the resulting emotion is characterized on the screen as the values change. This appears to be a more engaging system than the MobiMood system but it still does not deliver diverse interaction with the system other than repeatedly moving the sliders [16]. Likewise, the Pictorial Mood Reporting Instrument (PMRI) modeled its system on Russell's Circumplex Model of Affect by creating a character with facial expressions representing nine different moods and arranging them in a two dimensional circular space, but certain expressions either overlap or are indistinguishable with another, which can cause problems when using this system for response reporting [17]. iFelt was one of the few systems that incorporates Ekman's [18], Russell's, and Plutchik's [19] emotion findings; the basic emotions were represented by different colours which were then organized into a circular spatial model. In turn, this was an engaging and interactive system. Currently, it only classifies emotional responses to movies but it shows that these three emotion models can work together to create an informative, visual interface [20].

3   Methodology

Eleven females and nine males participated in the study over the time period between July 2012 and August 2012 at the Powell-Cotton Museum. Visitors who were at least 18 years old were invited to participate. All were informed of the entire process when they were asked to participate, including the expected duration of the one-on-one interview which would take no longer than 20 minutes. Emphasis was placed on voluntary participation, freedom to withdraw from the study at any time, and agreement to have the interview audio recorded.

An Emotional Response Log was then provided to each visitor at the start of the visit along with simple instructions on how to complete it. The Emotional Response Log, an A5-sized booklet, was designed to be a portable yet informative method of capturing visitor responses. In the log, visitors were instructed to provide their initial emotional responses for up to 5 different museum artefacts to which they felt a strong reaction. The log contained the following sections: Gallery Number, Artefact Name or Number, Emotion Felt, and Additional Comments. Within the Emotion Felt section there were six emotions listed: Anger, Disgust, Fear, Happy, Sad, and Surprise, which was taken from Ekman's research on universal facial expressions of emotions [18]. Two additional options were added: "Indifferent" captured any responses that were neutral and "Other" allowed visitors to write any emotions that were not already listed. Visitors were asked to circle as many emotions as they felt in response to an artefact. After they finished their visit, they were directed to a quiet area of the museum where the interview and filling of the demographic questionnaire and consent form took place.

A demographic questionnaire of ten questions was intended to obtain an overview of the type of visitors that participated and seek information about whether or not they have access to a smartphone. Each of the five interview questions was designed to give the participants an opportunity to explain why they chose certain artefacts and felt particular emotional responses when viewing them. Further aims were to discover any personal connections and stories visitors remembered while feeling the emotions. Data was collected from visitors who completed the Emotional Response Log and participated in the interview. Information was kept anonymous and given only a number to associate the Emotional Response Log, interview responses, demographic questionnaire, and consent form to the same participant.

Overall, the interviews totaled 231 minutes, providing 26 different emotional responses to 55 unique artefacts. These interviews were transcribed, uploaded into the qualitative data analysis software NVivo, and read in order to gain an understanding of the responses. Thematic analysis was used to identify patterns in the data by iteratively creating a node in NVivo for each new theme that emerged until no further themes could be found within the interviews [21]. The themes were then organized into high-level themes and subthemes using thematic analysis techniques [22]. The coding scheme was validated by an external researcher who read a sampling of interviews and coded them according to the scheme; the results corresponded to the original coding and themes.

4   Findings and Discussion

In total, twenty museum visitors participated by completing the Emotional Response Log and one-on-one interview. A summary of the demographics is presented in Table 1.

Table 1. Participant Demographics Summary

Demographic Variables		# of Participants
Gender	Female	11
	Male	9
Age	18-24	4
	25-34	3
	35-44	2
	45-54	5
	55-64	5
	65+	1
Access to smartphone?	Yes	11
	No	9
Type of smartphone	Android	1
	Blackberry	3
	iPhone	7

4.1   Themes

The themes discovered when visitors described how the artefacts affected them can be categorized as Attitude Towards the Past, Learning Opportunity, Linking the Past with Present Equivalent, New Experience, and Personal History. Each theme represents a personal connection made with an artefact which resulted in the emotion(s) felt, with some categories overlapping to provide unique visitor experiences. More often than not, an interview consisted of several themes.

Attitude Towards the Past

The Attitude Towards the Past theme represents visitors' impressions of the time period when the artefacts were collected or created. This can be further divided into Ethics and Ingenuity, two subthemes that represent the negative and positive feelings towards the past respectively. Seventeen participants' interviews included references to ethics while 10 mentioned ingenuity when speaking about an artefact. Under Ethics, three main arguments occur: Blame, Life Unfulfilled, and Senseless Result. Participants placed blame on several different motives: Educational Purposes, Entitlement, and Ignorance. Some of the educational purposes mentioned were for scientific reasons and preservation for the future:

"[T]oday's tigers, […] they're not many of them, so whenever you see a tiger that was shot for any purpose whatsoever, it makes you [feel] mixed feelings, sad, obviously at the time it was done, back in the 1800s, 19th century, th[is] was the done

thing because people didn't know what impact that would have on nature and the species and everything else…I suppose it was a positive thing, it was done for science […] so that justifies some of it"

There was a sense of bitterness when visitors talked about entitlement regarding people who had the means to obtain these types of artefacts:

"I would imagine that when [hunter and collector Major Powell-Cotton] set out, at that time it was regarded as a great adventure and there was so much wildlife that they would think, ok, so you kill a couple hundred elephants, so what […]so I think you have to accept what's in the cages is a reflection of its time […] But I suppose if you were representative of the British Empire, you were rich, you did what you wanted to"

Ignorance was mentioned by 10 visitors, the most out of the subthemes under Blame. In particular, a few stated that in some cases, this ignorance could have led to extinction. Visitors whose emotions were linked to Life Unfulfilled claimed that the ownership of the artefact interfered with a way of life or killed a living being. Fifteen visitors had comments which fell under this subtheme.

Last, Senseless Result contains comments relating to how meaningless the resulting artefact was to them compared to the means required to obtain in, since all that was left were trophies, or as a few participants mentioned, just a head separated from the body.

Learning Opportunity

Learning Opportunity indicates that visitors either learned new information during their visit or viewed an object that made them think. A total of 19 participants had stories which were related to a learning opportunity, with some gaining knowledge and others providing commentary on why certain artefacts were thought-provoking. Some of these thought-provoking items produced meaningful reflection which connected the design of the artefact with an intended message:

"I thought it was a good play on things, first of all, porcelain, quite delicate, and the gun shape, really just contrasting between delicates and violence and stuff like that. I think it was really good because it voiced how a war would be if that makes sense, so delicate like people and stuff, them being the porcelain and the gun shape being the armies"

Other artefacts raised questions that the museum did not answer through their display or exhibit label, such as how or why an artefact was made or used:

"I was a bit dumbfounded as to how it was used. There wasn't enough for me, explanations…why, how it could be used. It was so big, if I was to pick it up I would fall over, so there must be some sort of stand or support system for it, or maybe they put it

on their shoulder when they fired it. It's huge, so it's a slight sort-of, hmmm, that's amazing but how do they do it"

Visitors did not learn new information without also experiencing an additional theme, which is understandable since learning involves the application of the new knowledge.

Linking the Past with Present Equivalent

Linking the Past with Present Equivalent explains how visitors either associated an artefact to a modern day equivalent object or task or interacted with a modern equivalent of the artefact viewed. Fifteen participants made this connection between the past and present.

Associations made between the artefact viewed and a modern equivalent typically involved ordinary objects that can be found in everyday life, such as cooking tools, jewelry, pipes, and decorative items:

"[I]t was called a meat cutting board, and I was fascinated to see […] it was only the 1900s, but I was so fascinated to see that in those countries that their meat they used actually had a tenderizer on it as well […] and it was being used […]in villages by the women to prepare dinner in the same way we would use in our modern day kitchens"

Interactions were usually situated in zoos or on safaris, where it is common to see comparable animals alive in surroundings similar to the displays.

New Experience

New Experience describes the different ways visitors experienced something new in the museum; they could have had no prior knowledge of or experience with the artefact, they might see the artefact as unexpected, or they could have had a vicarious experience. In total, 12 participants said they had a new experience during their visit. Of that number, most visitors felt they were seeing something they most likely will never see in real life, particularly the animals. They also imagined themselves picking up the artefacts or using them, which affected the way they felt about the artefact:

"[I]n my younger years, days before going to university I did work in various jobs in factories and so therefore I'm aware of spending hours doing a job like that at a machine and also building up skills, so there's a part of me wondering what I would have felt like if I would have been operating the thing and how tired I would have felt, that's all, so there's a bit of empathy with them"

Some artefacts were unexpected because of their size in the museum, regardless of whether or not they were larger or smaller than expected. Other items were unexpected because visitors thought they seemed out of place within the museum, such as a "wig for men". In addition, there were items in which visitors had never seen before

or did not know exist, meaning they either had no prior knowledge or experience with them. These unexpected and new artefacts positively affected emotional responses.

Personal History

Personal History is related to one's identity and includes factors that make each individual different. All 20 of the participants mentioned stories which fall within this theme, the only theme to involve everyone. The subthemes include Childhood, Job, Knowledge Acquired, and Sense of Self. When visitors recalled memories of their childhood, they usually viewed the artefacts positively whether the artefact was intact, such as whole animals, or whether it was just a leg bone. One's past job was also brought up by a few visitors as a connection when viewing an artefact, which affected them positively. Even if the past job was in the army and the artefact lead to death, if the deaths had a positive role in history, then the general feeling was positive:

> "[I]t's a bit difficult to explain, things bring back, when I read, look up things like luger guns I think of all the people the Germans or the SS killed with lugers in the war [...] so very positive, that's why these things, I know all about these things and what effect they've had on human beings in this world, and what, guns may have a positive role in the war"

Knowledge Acquired was mentioned by 13 visitors and encompasses the following subthemes: Books, Media (as in TV or Film), Prior Knowledge in General, and School. Artefacts such as weapons and animals were predictably associated with this theme as it is not common to encounter them or learn about them elsewhere. These subthemes encouraged comparisons between what was learned and what was in front of them, prompting a wide variety of emotions. Recognizing a version of an artefact from a television show or film seemed to have a positive effect on the visitors while seeing one from a documentary or news program had a negative or neutral effect. Sense of Self was mentioned by 13 visitors and includes Family, Female or Motherhood, Opinion or Subconscious, and Residency. Since these are tied to identity, the strength of the emotions felt was strong irrespective of the type of emotion experienced.

4.2   Emotions

When specifying the emotions felt, there were those who felt many of the listed emotions, those who wrote in an unlisted emotion, and those who said they did not feel any emotions. As expected, there were artefacts that caused conflicting emotions, such as the animals in various states of totality and weapons, and others that were universally positive, such as the wig for men. There were some artefacts which produced no emotional response at all from some visitors, causing them to circle "Indifferent" on the Emotional Response Log or state that they felt nothing. However, during the interviews, it was evident that the artefacts left an impression on them. One individual said they selected "Indifferent" when viewing the dioramas because the

animals were killed a long time ago but mentioned that he felt surprise upon seeing how large, detailed, and realistic the displays were.

In all, 11 out of the 55 unique artefacts chosen by visitors (20%) caused either indifference or no emotional response from the participant. These items were appreciated for their craftsmanship or simply because of object recognition, but seeing many of the same types of items grouped together or previously seeing similar items in other museums did not create a new experience. It can be surmised by the detail and variety of responses that the Emotional Response Log did not interfere with a visit and in fact, when combined with reflection through the interview, enhanced their overall visit.

This preliminary study will provide the basis needed to develop an engaging application which will enhance a museum experience and facilitate an understanding of why visitors are emotionally drawn to certain artefacts.

5   Conclusion and Future Work

In general, findings suggest that when given the task of providing emotional responses to artefacts, visitors are motivated to find meaningful and personal connections without relying heavily on curators, exhibit labels, and arrangement of objects. Future work on this research will include the development of a mobile device which will allow visitors to understand their emotions in response to viewing museum collections after carefully thinking about how an object makes them feel, recalling a related memory, or connecting it to something personal in their lives. The inclusion of a contextual visualization will allow the sharing of responses with others along with the comparison of emotions regarding the same artifacts and even view personal connections and stories. These results can be applied to various types of museums as well as mobile devices involving user-product relationships where the need for personalization and emotional connections is a fundamental part of the design.

References

1. Gadsby, J.: The Effect of Encouraging Emotional Value in Museum Experiences. Museological Review 15, 1–13 (2011)
2. Suchy, S.: Museum Management: Emotional Value and Community Engagement. In: INTERCOM 2006, Taiwan (2006)
3. Desmet, P.: Designing Emotions: Delft University of Technology, Department of Industrial Design (2002)
4. Hiort af Ornäs, V.: Emotive User-Artefact Relations. Paper read at 3rd Nordcode Seminar & Workshop, Lyngby, Denmark, Technical University of Denmark, April 28-30 (2004)

5. Krmpotich, C., Anderson, D.: Collaborative Exhibitions and Visitor Reactions: The Case of Nitsitapiisinni: Our Way of Life. Curator: The Museum Journal 48(4), 377–405 (2005)
6. Weil, S.E.: The Museum and the Public. In: Making Museums Matter. Smithsonian Institution Press, Washington (2002)
7. van Gorp, T., Adams, E.: Design for Emotion. Elsevier Science (2012)
8. Falk, J.H., Dierking, L.D.: Learning from Museums: Visitor Experiences and the Making of Meaning. AltaMira Press (2000)
9. Desmet, P., Hekkert, P.: Framework of Product Experience (2007)
10. Goren-Bar, D., Graziola, I., Kuflik, T., Pianesi, F., Rocchi, C., Stock, O., Zancanaro, M.: I like it – An Affective Interface for a Multimodal Museum Guide. Paper read at In CHI Workshop on Evaluating Affective Interfaces, CHI (2005)
11. Rocchi, C., Stock, O., Zancanaro, M.: Adaptivity in Museum Mobile Guides: The Peach Experience. Paper Read at Proceedings of the Mobile Guide 2006, Turin, Italy (2006)
12. Cosley, D., Lewenstein, J., Herman, A., Holloway, J., Baxter, J., Nomura, S., Boehner, K., Gay, G.: ArtLinks: Fostering Social Awareness and Reflection in Museums. In: Proceedings of the Twenty-Sixth Annual SIGCHI Conference on Human Factors in Computing Systems. ACM, Florence (2008)
13. Cosley, D., Baxter, J., Lee, I., Alson, B., Nomura, S., Adams, B., Sarabu, C., Gay, G.: A Tag in The Hand: Supporting Semantic, Social, and Spatial Navigation in Museums. In: Proceedings of the 27th International Conference on Human Factors in Computing Systems. ACM, Boston (2009)
14. Russell, J.: A Circumplex Model of Affect. Journal of Personality and Social Psychology 39, 1161–1178 (1980)
15. Church, K., Hoggan, E., Oliver, N.: A Study of Mobile Mood Awareness and Communication Through MobiMood. Paper read at Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries (2010)
16. LiKamWa, R., Liu, Y., Lane, N.D., Zhong, L.: Can Your Smartphone Infer Your Mood? Paper read at in PhoneSense 2011, Seattle, Washington (2011)
17. Vastenburg, M., Herrera, N.R., Van Bel, D., Desmet, P.: PMRI: Development of a Pictorial Mood Reporting Instrument. In: Proceedings of the 2011 Annual Conference Extended Abstracts on Human Factors in Computing Systems. ACM, Vancouver (2011)
18. Ekman, P.: Universals and Cultural Differences in Facial Expressions of Emotion. University of California (1971)
19. Plutchik, R.: The Nature of Emotions. American Scientist 89(4), 344 (2001)
20. Oliveira, E., Martins, P., Chambel, T.: iFelt: Accessing Movies Through Our Emotions. In: Procedddings of the 9th International Interactive Conference on Interactive Television. ACM, Lisbon (2011)
21. Aronson, J.: A Pragmatic View of Thematic Analysis. The Qualitative Report 2, 1 (1994)
22. Ryan, G., Bernard, R.: Techniques to Identify Themes. Field Methods 15, 85–109 (2003)