A phenomenological design analysis of audience experience in digitally augmented exhibitions

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Abstract: The museum is undergoing profound changes in the way it conceptualises its audiences. The providers of augmented spaces and interactive media seldom reflect on audience practices (beyond usage) and on attendant potential new ways of interacting and being.

A phenomenological analysis of audience experience of the PLACE-hampi, a digital immersive exhibition provides new knowledge of audience behaviour, modes of interaction and detailed discussion on technological, virtual, individual and social outcomes. Along with this analyses an interactive artifact visualizing audience experience designed employing aesthetic visualisation semiotics drawn from the principles of information design, computational aesthetics and human centred design is argued as a relevant adjunct to a digital exhibition. This artifact known as the Coda proposes a dynamic and evolving post installation activity. It draws audience participation and provides a space for experiential and cognitive debriefing. The data in its visual new media form provides a conceptual map of the exhibition experience. It constitutes audience research that is contiguous with the installation in medial and experiential terms. The data yielded can inform stakeholders about the epistemological, curatorial and cognitive effects of a new media installation.

Key words: audience experience, co creation, human centered design, interactive visualisation, digital augmented exhibition

1. Introduction

The way designers conceptualise museum exhibition audiences is changing. In reframing their nature and practices, museums have come to understand their audience as plural in its composition [13]. The ‘appearance’ of the audience in the philosophical domains of museology and design is an important concurrence [32]. Over the last ten years, a move towards an inclusive and interpretive paradigm of practice concerned with better understanding people has affected a number of disciplines within the museum, including audience research, museum pedagogy and exhibition evaluation [32][21]. With the adoption of advanced technology, the spaces of the contemporary or ‘new museum’ are wired and mutable, possessing many forms of digital technology including new transdisciplinary cultural practices [38]. Along with this change the museum also seeks to stage experiences, here the concept of ‘experience’ suggest a human centred approach that has seen a shift in
audiences role from passive recipient to an active participant in the overall scheme of the design process [16,12,40, 30].

Human centred design (HCD) philosophy argues for an egalitarian, inclusive and participatory process one where traditional roles of designer as all knowing author has reconfigured into a brokering role facilitating and communicating across communities of practice [54,27,28]. Interdisciplinary technological co creative practices demonstrated in user-centred design, participatory design, co-design and co-creation activities share a common premise for a collaborative, egalitarian and creative design process [52].

Contemporary interdisciplinary digital virtual exhibition platforms that are becoming part of the museums curatorial program requires stakeholders to consider “using the language and experience of the audience.”[12] Although stakeholders such as designers, content providers, curators, artists and museum professionals acknowledge that audience research should be integrated into the design and production programme there still seems to be little understanding nor a critical approach addressing the relationship between the digital mediated exhibition and the audience response [48].

Sharon Macdonald argues that although museum audience research encompasses issues of media, sociality and space and recognises an active pluralist audience, “that there has not yet developed a significant language in which to describe and analyse the phenomena on which they focus” [32] Evidently, the work of sketching out this horizon and of finding a language for a technological phenomenology presents a daunting task indeed. Macdonald also suggests that devising an ‘affective syntax’ of exhibitions or a common set of rules seems a rather complex project [33]. Nonetheless, such work eventually will greatly contribute to the ways humans view and interact with technology. Design is the contemporary arena where the encounter between user and machine, human and interface and (on a larger scale) between technical system and human environments is negotiated. Importantly, the way to assess technology is shifting, while the functional criteria become complemented by phenomenological criteria. The shift is thus from a notion of “How is it used?” to “How does it feel to use?” Design values have moved from “objects to experiences, from procedure to situation, and from behaviour to intent ”[37]. McCullough explains that the investigation into the ‘phenomenology of engagement’ is evident in the work of designers who build technologies and digital artifacts around the everyday [36].

It is remarkable, however, that the phenomena of experience in design research have attracted seemingly little descriptive and analytic focus whereas schematic frameworks and experimental toolkits dominate research methods.

Audience experience evaluations across diverse spectra of digital augmented exhibitions in the public domain are sparse and varied. Authors of these spaces acknowledge audience research [21] yet it remains as an accumulation of tacit knowledge acquired through the experience of practice that is unfortunately not easily obtained. Heritage and museum professionals working with digital technologies also undertake audience analyses yet limitations are evident as studies are conducted in labs and protocols and guidelines are not consistent. Assessments are primarily technology focused with little emphasis pertaining to audience’s thoughts, feelings and actions [1,5, 9,11, 47].

Presence research attributed to the study of virtual environments is concerned with ones experience of being in “one place or environment, even when one is physically situated in another”[57]. Presence research
once employed traditional cognitive models of evaluation has started to include social, non-verbal and contextual information. Traditional investigation of perceptual deviations to do with physical affect such as nausea, legibility and interface tasks are no longer central to the research as new research of inner-presence pertains to the “understanding and management of the causal texture of both the physical and social worlds not necessarily linked to the experience of a medium”[44]. Inner presence an emerging term is a psychosocial view, comprising the psychology of presence related to the body and the embodiment process, human action and its organization in the environment. Therefore “understanding, measuring and describing inherent characteristics of presence include perception, cognition, interaction, emotion and affect”[44].

In the context of this paper the audience’s experience of digital augmented exhibition environments from an interdisciplinary design perspective has initiated a number of questions.

If in our analysis of an experience of a digitally augmented, interactive semi-immersive exhibition what can we learn about such an environment? What are the ramifications of the spatio-temporal factors of experience? What meaning is made of the content, the interactive infrastructure, and participative and performative levels of interactivity? What do we know about whether or not there is a sense of fulfillment or completion for the audience user-participant? What influence does the physical structure of the space have on an experience and does this effect the way the screen content is accessed and received? In what ways does the body receive the sensory information, is it comfortable or uncomfortable, and how easily, if at all, can this be articulated? What notable emotions related to the experience of the exhibition does the audience encounter?

This paper aims to enrich the discussion pertaining to the world of the audience in a digital augmented interactive visualization exhibition platform (digital container). A study of PLACE-hampi consisted of a questionnaire that was conducted in conjunction with the exhibition, Spark to Pixel at the Martin-Gropius-Bau, Berlin, 2007 [60, 61]. The questionnaire was designed to generate a mix of quantitative and qualitative information about audience experience in the PLACE Hampi exhibit. PLACE- Hampi based on an interactive projection system, invented by Jeffrey Shaw in 1995, has today integrated stereoscopic 3D projection amongst other features [61]. Its main attraction is the motorised platform that lets the viewer rotate in their projected point of view in 360 degree within its large cylindrical screen enabling a multi-media multi-sensory presentation of the archaeological, historical, and sacred locations at the site of the World Heritage of Vijayanagar in Hampi, southern India [22, 23,24,25, 26, 61].

An analysis of the findings bought new information pertaining to the audience’s world within the exhibition space [60]. Findings from the study inform the creative and experimental framework of the Coda. Furthermore findings about the social and the co-experiential aspects of the exhibition audience inspired the visualisation of the audience experience enabled by an interactive artifact. This artifact known as the Coda is proposed as an adjunct to a digital container exhibition. The Coda aims to provide a post exhibition debrief whilst facilitating for stakeholders of a digital exhibition project a creative participatory avenue in the exploratory, generative and evaluative phases of research and design [17]. The Coda provides an abstract and experimental visualisation of an equally abstract and difficult to qualify expression, namely ones experience of the exhibition.
The Coda, a phenomenological analyses of audience experiences as seen in new practices, both singular and social, intends to ‘emerge not from the designers of the system, but from the actions of its users’ [8]. The Coda is in essence an interactive that can be applied in a number of forms, projected, on screen, on line, on a PDA within a space in close proximity to the main exhibition site. The Coda is designed to be engaging and highly participatory a type of “exploratory experiment,” where action by the designer enables the discovery of “evolving intentions” and unintended consequences”[53]. Participation in the Coda is proposed as the vehicle for engagement, discussion and analyses. And in keeping with HCD principles makes room for discussion with participants who have the power to alter designs and ultimately educate the designer. Information displayed from the Coda represented as a mix of data and abstract patterns does not aim to provide a distinctive set of tools nor a universal set of answers. The Coda by design relies on creativity and experimentation thus drawing on levels of metaphor and abstraction reflecting interpretations of experience, discussed further in detail. The Coda’s fundamental purpose is a visual catalyst contributing to the much needed discussion, theorization, empirical investigation and analysis of the qualitative aspects related to place, space and systems of an experience in the digital domain.

2.A phenomenological approach to audience experience

2.1 Understanding an experience

The difficulty with experience, however, is that we can only experience our own life, what is received by our own consciousness. We can never know completely another’s experiences, even though we have many clues and make inferences all the time.[55]

While a discussion of experience would not appear to require specialist knowledge, since it is a universal concept that we can all relate to on some level, a concise understanding, framing and conceptualisation of the term is not easily accomplished. In the context of the author’s investigation, the concept of experience is described as qualitative aspects of human thought, activity and behaviour. Here experience is defined as a synthesis between abstract reasoning and the senses. It enables the designer to identify and make useful the difference between the learnt and the felt, between intuition and formal knowledge, and between the objective and analytic and subjective perspectives.

Evidently, the complex and abstract nature of a user’s inner life frequently places limits on the HCD designer’s aim of extrapolating the meaning of experiences in a process of reciprocal, mutual and shared understanding. Its fleeting and effusive character and its unclear temporal nature – the fact that experience seems suspended in time between presence and its memory- make difficult any attempt at defining experience. As Wilhelm Dilthey argues,

the relationship between experience and its expressions is always problematic […] and the relationship is clearly dialogic and dialectical, for experience structures expressions, in that we understand other people and their expressions on the basis of our own experience and self-understanding [7].
Furthermore, Turner and Bruner in their interpretation of Dilthey stress that the structure of experience is a hermeneutical and reciprocal process in which is revealed the intimate connection between experience and representing experience: “experience structures expressions and expressions structure experience”[55]. Dewey’s account of ‘an experience’ serves as a workable context informing the meaning attributed to the design of the Coda and analysis of audiences. An experience is defined by a clear start, completion and a cohesive trajectory. Dewey thus clearly distinguishes an experience as marked by a sense of fulfillment, unity and completion [6]. It is this working definition of experience in conjunction with a pragmatic phenomenological framework that forms the context for drawing specific insights about the audience experience in the digital container. A phenomenological account proposes that the task for researchers is “to make manifest the incessant tangle or reflexivity of action, situation, and reality in the various modes of being in the world.”[43] Phenomenological studies undertake analyses of small groups, social situations and organizations using a number of qualitative techniques, methods are employed to uncover the subjects “life world”.

User/audience experience research today is becoming part of the design program. Experience research and in particular the term user experience as it originated from industry such as HCI, product development and design is yet to have a single unifying definition. Where the digital field is concerned, such disciplines as information design, interaction design, interior exhibition design, installation design, interface design, game design, and architecture have not begun to correspond with one another, nor established a common discourse about the phenomena of ‘experience’.

McCarthy and Wright’s focus on ‘felt-life’ includes a deconstruction of experience into four threads: compositional, sensory, emotional and spatial-temporal [35]. Victor Margolin provides a classification of experiences in relation to the way in which people interact with designed products as being categorizing, operational, inventive, aesthetic and social [31].

Overbeeke and Wensveen focus on the influence of aesthetics, interaction, and the behaviours that inform feedback and feed-forward. They identify influences on interaction in relation to action through time, location, direction, modality, dynamics and expression [41] [42]. Paul Dourish argues that traditional methods in HCI are no longer sustainable and that a holistic embodied approach to the human experience must be considered in our interactions with technology [8]. Elizabeth Sanders contends that “experiencing is a constructive activity” hence the argument for co design and co creative activities [51]. What seems generally agreed on is that experience research seeks to investigate the user beyond the functional dimension of a design project.

2.2 Coda- interaction/user experience methods

The following outlines a selection of methods employed to investigate the phenomenon of ‘an experience’.

Visualising and discussing abstract emotions are represented not only through ethnographic transcripts but also visual frameworks. James Russell’s spatial visualisation map designed in the 1980s is a self-reporting tool representing emotions [47]. Russell’s theory and method are used in contemporary interface design such as the eMoto mobile interface. Designers developed the eMoto system to let users express their emotions in the communication process. The eMoto system attempts to “engage users both cognitively and physically using a
tangible interface, allowing for affective gestures that are mirrored in the expressions produced by the system”[10]. Ideally the design does not invite a single emotion to a user expression but rather as a series of mixed or blended states, and Russell argues that affective states rather than being independent are interrelated in systematic clusters. The use of colour and pressuring action on the mobile interface was the participatory vehicle for selecting an emotion in conjunction with the text response. Russell’s map of emotions visualized as a dynamic between arousal and valence was mapped over the colour wheel interface.

Elizabeth Sanders’ co-design framework in the generative phase of design and development aims for a mutual language between designer and user. The premise of the design language is “built upon aesthetics of experience rather than on an aesthetics of form.” For Sanders, to access people’s feelings and ideas, enables designers to establish resonance. Resonance, in Sanders’ terminology, is the ability to be in synch with users and to be able to respond to their changing needs and aspirations. Sanders and her team have designed customised emotional and cognitive toolkits. Ultimately, for Sanders the process of investigation is constitutive of reciprocal learning and of positive collaborative outcomes [49][50].

The framework that follows aims to assist designer’s consider the qualities of experiences and its relevance to the user. One of the goals outlined in product design methodology is for designers “to understand how to embody new qualities of experience”[51]. Here the components of experience: sub-consciousness, cognition, narrative, and storytelling are considered.

Katherine Isbister et al’s iterative prototype of The Sensual Evaluation Instrument aims to enable designers to engage in scaled user testing of emotional experiences, irrespective of system, artifact or service [20]. They argue that although there is some non-representational work on sensing emotion there is little systematic work done to asses the specific emotional effects of various materials. Their research demonstrated a real time self report method that engaged in non-verbal, affective responses to a computer game. Sculptured biomorphic shapes were employed in conjunction with a psychological mapping system. Eight objects were crafted to suggest the following list of emotions such as confusion, frustration, fear, happiness, surprise, satisfaction, contentment, stress, and flow that later was expanded upon. The shapes were not a direct representation of the emotion but rather intended to express a family of similar emotions for each shape.

As this tool is not derivative of a questionnaire and reliant on sensory abstract elements, levels of ambiguity can be positively and negatively interpreted. Ambiguity in the process is argued as being more receptive to co-designing the interpretation of the experience between user and designer as this method crosses cultural boundaries and ultimately solicits a richer response. The authors claim that their evaluation instrument manages to reveal unsaid hidden emotional and embodied experiences.

Overbeeke et al argue that “for too long psychologists have led designers to make overly cognitive designs.” They suggest integrating fun and beauty in interaction and focusing on the expressive and experiential qualities of interaction [42].
3.2 Background

In 2007 the relationship between the experiences of the space (PLACE Hampi) and the dynamics of the digital container was the primary subject of a study. A questionnaire formed part of that study [59]. Key concepts pertaining to an experience as part of the questionnaire focused around “specific propositions, questions, or activities”[58] of the digital container developed by the author were clustered thematically and listed as follows:

- Orientation / navigation / negotiation / time in the space / spatio-temporal
- Bodily experience of the space / embodiment
- Relationship between user and screen content
- Relationship between user and interface usability / participation / orientation
- Level of immersion (“being there”, presence, sense of travel)
- Flow (time spent, level of involvement)
- Social experience levels: individual and co-experience

Following on from this study two major issues informed/fueled the proposition of the interactive artifact. Firstly post analysis of the questionnaire the social and largely co experiential life of the audience in the digital container was revealed. Secondly anecdotal discussion with the participants revealed that they had hoped for follow-ups or further discussion given the extensive and somewhat grueling length of the questionnaire. The lack of opportunity to share, discuss and learn what others had to say about the exhibition, directly after the exhibition became a predominant criticism post the questionnaire. The designer saw the opportunity for a co-creational activity for all stakeholders employing the language of interaction design and computational aesthetics to provide an abstract, visual platform to portray elements of the exhibition experience.

4. About the Coda

In the context of digitally augmented spaces, audience experience research can become integrated into the installation experience as a post installation ‘Visualising Experience Coda’.

As in HCD, in co-design and in participatory design practice, the designer is required to bring together non-design stakeholders as the advocate for the audience. The audience experience can become a conversational tool to communicate across disciplinary boundaries and across the stakeholders’ embedded knowledge’s and practices.

The findings provide a series of designerly observations that relate the technological capability of the PLACE platform to its effective experiential dimension. The work of visualising experience brings together a number of disparate elements. Visualisation can overcome the limitations of text-based questionnaires that can be laborious to interpret and counter-intuitive to the post-installation emotive make-up of the audience. Using a visual language and an easily understood metaphoric concept, a post-installation Coda can utilise the representational potential of digital media native to the installation in order to enable participatory audience feedback. Here it draws not only on the audience’s experience of the installation, but also on the everyday creativity of audience participants in making visible, legible and tangible their personal reception of a work.
The psychology of participation means that, following the installation, the audience can debrief cognitively while interacting with an easy-to-use and easy-to-understand visual interface. Similarly, seeing their own experience visualised in relation to other audience member’s experiential expressions stimulates and furthers the co-experiential aspect and creates a sense of communal meaning making. The visitor/participant/audience member is no longer atomised, but can understand his or her own reception in the context of others. At the same time the continual evolution of the Coda makes conceivable a non-local, possibly transnational, possibly online virtual, extension of the installation where the duration of the work is not limited by the museum location.

Current work on the Coda uses Processing [13,15]. The Coda, in collaboration with the author was designed and coded by Indae Hwang [61]. The physical interface consists of mouse and touch screen connected to customized data projection. Designs of both physical and virtual interface are aimed at intuitive participation and the existence of a terminal is compelling in itself; no instructions are needed. The cognitive difficulty of the Coda is designed to be significantly less than that of the installation.

The two interface design iterations titled “field” (figure 1) and “body” (figure 2) demonstrate examples of interactive co-experience. Both designs are developed in regard to aesthetic visualisation semiotics drawn from the principles of information design, computational aesthetics and user centred design [63]. The two themes have been chosen to illustrate the capacity of computational aesthetics and making meaning of data. The interface motifs and iconographic display can be designed to correspond to the exhibition or installation for the purpose of thematic consistency.

Figure 1: Screen grab of interface titled ‘field’

In the current Coda the interface ‘field’ is a virtual field comprising virtual flowers that grow over time. A flower represents a single participant’s responses, while the field represents all such responses in a collective form. The attributes of the flower (height, colour, petal shape) depend on the responses prompted by the dialogue boxes. The virtual field exists in real time. The progress of time is represented by the background
sky changing from night to day illustrated by colour hues. Here nature iconography is used to express and illustrate visitor experiences and to elicit a phenomenological spectrum of responses.

While the ‘field’ interface of the Coda researches emotional and cognitive states, the ‘body’ interface focuses on embodiment and physical reception of the installation. The interface ‘body’ specifically questions bodily responses of the work over time. The virtual on-screen body maps colour-coded ‘visual’, ‘aural’ and ‘spatial’ visitor responses. These responses are further divided into age and gender statistics. The embodiment responses over time form colour clusters. These clusters reveal physical sensorial reception patterns. The interfaces are designed to provide a real-time enjoyable activity in the presence of other visitors and co-participants. Interface responses become visible in real time and are represented in correspondence to all other responses. The interface thus “encourages us to leave our isolated self and interact with a greater social group.”

The following conceptual diagram (figure 3) represents the interface in situ.
The interfaces collect and contain valuable audience experience data. Stakeholders and designer can discern patterns of data over time, can monitor the fluctuations and experiential progress of an installation, and the real-time data can be deployed in rapid re-design processes. The data in its visual form, as images, provides a conceptual map of the exhibition experience. The continual evolution of the data (as more and more responses are fed into the interface) also provides an installation experience history that “makes the human response a contantly active and evolving interface” [3].

The Coda represents a dynamic and evolving post installation artifact. It draws audience participation and provides a space for experiential and cognitive debriefing. It constitutes audience research that is contiguous with the installation in medial and experiential terms. The data yielded can inform stakeholders about the epistemological, curatorial and cognitive effects of a new media installation, and the ways in which audiences interact and make meaning of the new digital worlds.

One of the key finding of the 2007 case study is the co-experiential aspect of PLACE. In the data a distinct sense of ‘togetherness’ among the audience, and some tacit and overt forms of collaboration and conflict become visible. Indeed the co-experience potential is significant and stands in marked contrast to conventional museum visitor behaviour. Interface use here constitutes the intersection of intimate personal reception of the work, and the social dynamics of PLACE. Thus, PLACE technology and co-experience are not only not opposing factors, but are deeply interconnected. While the technology allows the displacement of self-awareness, the interface use generates levels of performativity.

Subsequently, “vibrancy”, interface negotiation and dwelling dispersion combine to produce hitherto unknown modes of operation, modes that were not explicitly designed for, namely, performative co-experiential ways of being in the space.

Given this information this paper further seeks to investigate these important issues over time, over a number of exhibitions and across varying cultures. The Coda aims to facilitate this enquiry albeit on an abstract and contentious form of ‘experiential and qualitative data collection.

5. Conclusions
The ‘experiential’ data can serve a number of functions. Firstly, it can enrich the stakeholders’ future co-design work, because data is present at the outset of a project. In the case of PLACE, the data should be eminently useful in conversations between content providers, artists and curators. Furthermore this conversation can be ongoing as technology allows. In addition, this can overcome the traditional separation between content providers and the audience, because the data can illustrate to non-artist stakeholders how audiences, and under what conditions, interact in PLACE.
5. References and Citations


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