

POSTCOLONIAL DESIGN INTERVENTIONS: MIXED REALITY DESIGN FOR REVEALING HISTORIES OF SLAVERY AND THEIR LEGACIES IN COPENHAGEN

ENGAGEMENTS , CONTROVERSIES

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ABSTRACT

This article reveals a multi layered design process that occurs at the intersection between postcolonial/decolonial theory and a version of digital sketching called Embodied Digital Sketching (EDS). The result of this particular intersection of theory and practice is called *Bitter & Sweet*, a Mixed Reality design prototype using cultural heritage material. Postcolonial and decolonial strategies informed both analytic and practical phases of the design process. A further contribution to the design field is the reminder that design interventions in the current political and economic climate are frequently bi-directional: designers may enact, but simultaneously external events intervene in design processes. *Bitter & Sweet* reveals intersecting layers of power and control when design processes deal with sensitive cultural topics.

INTRODUCTION

Cultural heritage institutions increasingly look to mobile digital applications to display existing archives and to expand the scope of visitor participation. This paper discusses the historical context, political climate, design process and technological experimentation which led to the *Bitter & Sweet* event - a Mixed Reality (MR) intervention presented at the Royal Cast collection in Copenhagen (part of National Gallery of Denmark) in early 2016. We argue that both the public event and the design processes can be seen as design interventions addressing colonial traces in Denmark. Therefore we use the plural form of interventions rather than the singular. With politically and socially motivated design there is rarely just one intervention, but a series of small adjustments, positionings and provocations.

The design process we developed for this project is an integration of embodied interaction and digital sketching called Embodied Digital Sketching (EDS). The bodies included those of the public who attended the event, the designers and stakeholders, but also media bodies, a plaster cast of an African head in the collection and other enslaved bodies largely absent but hinted at in archives or by the building itself. The delicacy required in unearthing painful histories and the complexity of dealing with fragmented traces and partial archives, where absence is more evident than presence, impacted the design choices of media, interaction models and technological platform. All these considerations were integrated into the Mixed Reality experience for the final event.

The contributions to design research offered by this paper are 1) a practical application of postcolonial/decolonial theories, 2) the method of Embodied Digital Sketching (EDS), and 3) a Mixed Reality prototype for a heritage institution.

DECOLONIALITY ENACTED

In design research, postcolonial studies and theories are valuable for providing frameworks to handle analysis or interpretation (Irani and Dourish 2009; Taylor 2011) or for signalling the global dynamics of power and wealth (Irani et al 2010; Mainsah and Morrison 2014). Decolonial theory extends these possibilities by offering even stronger emphases on the practice of epistemic disobedience (Mignolo 2009) – subverting, rethinking and undoing inherited colonial notions of how, where, and in whom knowledge is produced. Our approach grounded these critiques into practical and performative parts of the design process. We used digitized archival material and mobile devices experimentally to help sense, document, locate, and bear witness to the colonial past. Postcolonial and decolonial discourses have pinpointed that conditions of coloniality were reproduced using technologies of control (language, torture, restraint, distorted representations, surveillance) (Browne, 2015; LaCapra 1991). Engaging with such histories, and the lives of formerly enslaved and colonised peoples, requires sensitivity and care. This awareness critically informed our ideation, urging us to explore how Augmented Reality/Mixed Reality (AR/MR) techniques and technologies could be used in a reparative way, to actualise co-presence and share power between Non-Western and Western bodies, histories and knowledge productions at a specific site of memory (Pratt 2008).

DESIGN BRIEF: ARCHIVAL INTERVENTIONS

The Royal Cast Collection of the Danish National Gallery, comprises plaster casts of Western classical sculptures charting the evolution of European aesthetic ideals about the human body, from antiquity to the Renaissance. Since inception in 1895, the collection has been an important resource for historians and artists. In 1984 the cast collection was rehoused into the West India Warehouse (Vestindisk Pakhus) along Copenhagen harbour. This 18th century building was constructed specifically to store commodities such as rum, coffee and sugar produced by enslaved Africans in Denmark's Caribbean plantations and has thus become a resonant site for emergent interest in colonial history. However, the colonial past is contested, and an uncomfortable and polarising topic in Danish public debate (McEachrane 2014). It is therefore approached with caution, particularly in cultural heritage institutions (Odumusu 2015).

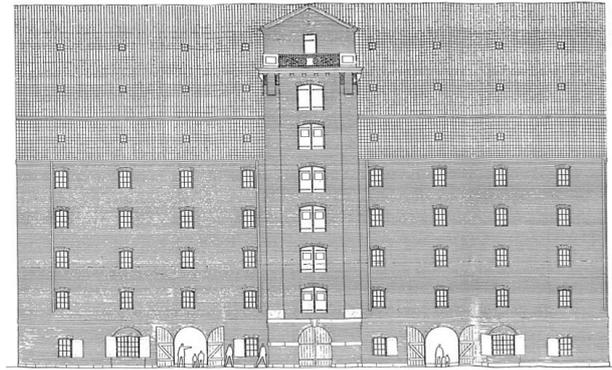


Figure 1: An architectural drawing of the West India Warehouse

From a design perspective sensitive to politics of representation and historical amnesia, both the building and the collection of plaster casts provided critical entry points for engaging with questions of who is present and who is absent in Danish museum spaces, and whose voices matter in historical narratives (Goodnow and Akman 2008; Bastian 2003). In effect, the *Bitter & Sweet* design brief responded to cultural and material *absences*, both within and around the West India warehouse.

Our aim was to find ways to activate the building's original memories and intervene in the public's habitual engagement with the site as an extended gallery space. Intervention is defined in the spirit of design activism but with less emphasis on disruption and more on subtle negotiation and relational choreographies (Kozel 2017). We produced moments of encounter with the building's colonial memories, whilst also subverting power relations and representational strategies encoded within the physical cast collection. The opposing taste perceptions of "bitter" and "sweet" are sensorial provocations, effective for linking the material products of trade once stored and administrated in the house, with a longer history of human memories and experiences forged (consciously and unconsciously) by the Slave Trade. In this way "bitter" and "sweet" speak concurrently of the local and the global, which are indelibly intertwined.

MIXED REALITY (MR)

The project called for an interconnection in our design between the place, digitized archival content and the user's own bodily presence on site. This strong emphasis on location prompted the use of mobile Augmented and Mixed Reality (AR/MR) technologies. With advances in AR/MR applications for mobile media such as smartphones and tablet computers, applications are able to re-present ever more complex combinations of digital data with site-specific information (Billinghurst and Lee 2014), leading to important re-evaluations of the understanding of what constitutes AR/MR design on the one hand, and locative, site-specific experiences on the other (Braz and Pereira 2008; Rouse et al 2015).

Our design strategy took into account these AR/MR advances in combination with priorities for cultural heritage in terms of audience expansion and archival digitization, and critical and embodied engagement by individual users. Handheld devices with GPS and cameras support the layering of the users' view of the environment around them with digital material, placing them *into* the material (Barba et al 2010). However, AR/MR experiences remain limited and ad hoc in design for cultural heritage (Barba et al 2010). The research and development for *Bitter & Sweet* explored how interaction design processes can be used to integrate locative digital technologies with digitized archival material, delivering cultural content in ways that place importance on the site and its cultural, political, economic, and affective histories.

The selection of an AR/MR framework for the *Bitter & Sweet* design process addressed the following key concerns 1) use of a non-proprietary, open standards development environment; 2) ensuring a secure data flow; 3) maintaining material storage on our own servers; 4) providing aesthetic control over the presentation of the visual and sonic material. An additional design-based concern was ease of development in a mature ecosystem that provides sustainable and transferable material over time.

ARGON

We chose to work with Argon, a JavaScript framework which works as a browser for AR applications (Speiginer et al 2015). Argon is a developing authoring environment created in the Augmented Environments Lab at Georgia Tech, now in its 4th iteration, with a focus on prototyping and sketching of AR experiences. Argon's open source framework, as well as the open co-development possibilities with the development team, due to prior work with them, provided us with the appropriate design context for the interventions we wished to make into the institutional practices that shaped the site.

AR/MR LAYERING

The integration of the site—the building and the individual spots within and outside it—with the digital content in a AR/MR application necessitates an understanding of how the position of the device, the digital content and the site-specific context can interact in the design. As Engberg and Bolter have argued, design processes in mixed reality involve thorough investigation of the embodied aspects of users' interaction with AR/MR systems *in situ* (Engberg and Bolter 2015). Even AR/MR concepts that center on the user as an embodied, perceiving and thinking subject will need to account for additional elements that are involved in the process, such as socio-historically and culturally rich sites, or the aesthetic or performative modes of interaction (Ventä-Olkkonen et al 2014). In *Bitter & Sweet* this allowed us to shift the gaze onto the building and cast collection's history—by way of mediated layers—with a decolonial awareness.

In addition, advances in AR/MR research have not yet sufficiently explored the designer's process of embodied experience and digital sketching with and through layering technologies that profoundly alter the designer's experience of the site. AR/MR, then, does not only become the medium for the design, but an integral part of the design environment and process. In our work we chose to focus on Mixed Reality. MR seems to be a more nuanced variation of the principle of augmentation behind AR, and is more appropriate for the many layers and complex situatedness of the *Bitter & Sweet* prototype.

EMBODIED DIGITAL SKETCHING

Sketching, as a form of representation and externalizing of concepts, interfaces and ideas is a powerful stage in design processes (Buxton 2007). It offers the affordances of illustrating thought and supporting iterative prototyping by externalizing nascent ideas. With obvious connections to the hand through drawing, doodling, outlining, it has the virtues of being quick, intuitive, embodied, and versatile (Löwgren 2004).

Two expansions on the basic practice of sketching were necessary for the *Bitter & Sweet* design process: 1) sketching had to be understood as digital sketching, a variation of digital prototyping (Tholander 2008), and 2) sketching had to involve not just arm and hand but the full body (Márquez Segura 2016)—including bodily motion, senses and affective states. As such, we call our design method *embodied digital sketching (EDS)*.

Embodied Digital Sketching is an approach to digital sketching which allows for the sketches themselves to be in digital format (such as DIY electronics, mobile devices, video and audio, social media platforms, etc) not just pen on paper. This means using digital technologies and tools of varying degrees of functionality to experiment with qualities of experience, participation or media manipulation. This can result in a non-linear or even patchy sequence of technological development, with priorities seeming to be the reverse of smooth and efficient laboratory driven processes. These sketches may use mocked up or "Wizard-of-Oz" configurations (Lee and Billinghamurst 2008), experiment with material conditions (Benford and Giannachi 2011) or invite affective responses (Kozel 2012). They may respond to the question "What if?" Finally, digital sketches can be used *in situ*, which means they can be brought into the location where the design interventions will take place, with the bodies of the designers becoming filters for design decisions.

The embodied quality of EDS invites reference to Dourish's location of embodied interaction in social and physical reality (Dourish 2001). While Dourish's use of the term embodiment at the time did not embrace bodies as much as his phenomenological perspective might have suggested (Dourish 2013), his emphasis on situatedness laid the groundwork for a link between designing to support everyday situated practices and

designing to disrupt or challenge embodied realities. This latter is the space for intervention that we build upon in *Bitter & Sweet*. Our design process experimented with the expressive, affective, theoretical and social dimensions of the traces of slavery, at the same time as developing the technology.

Embodiment as a term is frequently used to describe stages of the design process that occur outside the design studio, or it is used to qualify interaction with a device reliant on a sensory interface such as a Kinect. Márquez Segura et al's framing of embodied sketching (Márquez Segura et al 2016) as a design practice that inserts the body into early design stages, as a way of supporting ideation and spurring creativity through play, is a helpful expansion of somaesthetics (Schiphorst 2009) and bodystorming (Oulasvirta et al 2003) in interaction design. However embodied digital sketching in *Bitter & Sweet* has different design objectives and spans the design process in different ways. We intended to use a specific mobile networked technology at a specific institution within the cultural heritage sector. As such, our ideation phase was already further developed prior to the embodied digital sketching process.

Another important quality of EDS is that this methodology opens the scope for embodiment and shared experiences in *both* the design process *and* the event produced, with a further phenomenological twist: the bodies in the broad sweep of the design process, from development to audience participation include the designers' bodies, audience members' bodies but also the bodies of the historical figures existing in archival format - as plaster casts, in written documents and in cultural memories. This process is intended to support a subtle shift to affective and imaginative engagement with colonial histories and their legacies. Bodies, living and dead, are both present and enmeshed in power relations.

Several phases of the design process will be outlined to illustrate Embodied Digital Sketching as a way of integrating decolonial strategies with embodied design processes and to reveal the processes leading to the Mixed Reality event.

PHASES OF THE DESIGN PROCESS

The first visit to the building housing the Cast Collection took the form of a tour led by curator Henrik Holm, who ironically describes the collection as "White Man's White Art" because the casts are all made from white plaster. This stage we called *listening to the architecture*. The building was filled with hundreds of full-bodied, torso and head casts. There was a striking contrast between the overwhelming 'whiteness' of the collection and the 'blackness' implied by the history of slavery embedded in the site. Specific zones in the building came into sharper relief than others. On the second floor, in an area filled with tightly organised shelves containing casts of busts and heads, two heads

were pinpointed as potentially representing people phenotypically recognised as African.

Subsequent visits to the warehouse were characterised by *digital sensing*. We photographed and videoed extensively, but our use of photography went beyond documentation. Instead the camera became an affective and embodied lens to our own experiences of the building and the collection, including our awareness of how certain stories and histories were hidden or silenced. The photographic and videographic devices became extensions of our own embodied experiences.

The affective qualities of the space intensified with each visit. The dryness of the environment became overwhelming. The clutter of plaster casts created a sort of compression: as if these silent bodies could not speak but they could swarm around and press down upon us, drowning us in their unspoken histories. There was a jumble of bodies, disconnected limbs and decapitated heads. Figures stood, sat, reclined, or threatened to tip over. The many unseeing casts seemed to watch us. This phase was one of *being overwhelmed or compressed by the material*.



Figure 2: A view inside the West India Warehouse

The next phase was one of *urgency*, when politics intervened in our process. After six months of developing the collaboration with the Royal Cast Collection, we suddenly heard that changes within the Danish cultural sector impacted our institutional partner forcing the collection to permanently close to the public at the end of the month. These external circumstances radically impacted our design process, causing it to take on a greater sense of urgency. *Bitter & Sweet* became even more clearly a design intervention rather than simply a designed MR experience. We were intervening in a political situation that had intervened in our process.

If we were to sustain the integrity of the original project brief, rooted in the politics of visibility, other design directions needed to be explored. This phase was one of *performing an intervention*. One of the African heads became a focal point in our design process. Our initial idea was to use him as a marker to trigger media on a

mobile device but to keep him located where he had been for decades: embedded in the crowd of other casts, modestly and unobtrusively, in the gloom of shelves in the second floor back gallery. After the news of the collection's closure we shifted design strategies and decided to make a material intervention with regard to the placement and agency of the head: What if he could look at us and out at the world? We moved him to a prominent window at the front of the warehouse.



Figure 3: Head of an Ethiopian man from the cast collection.

It is impossible to know how long the head will stay in his new location, so we decided to have his AR media be triggered both locally and by GPS location, knowing that these coordinates would not change even with substantial modification (or even destruction) of the building.

PUBLIC EVENT, 28 FEBRUARY 2016

The first two contributions of this paper to the design research field—a practical application of postcolonial/decolonial theories and the method of Embodied Digital Sketching (EDS)—were discussed in the first parts of this paper. In this final section three of the five points from the MR prototype will be described concisely to ground the concepts and method.

The technological prototypes had full augmented reality functionality but lacked a user-friendly interface and designed navigation for users to locate the media. Since the audience could not be fully autonomous, we designers inserted ourselves into the public intervention, performing the role of guides or facilitators for the experience. We choreographed a group tour of the MR points, where a point was a relational composition of: the location within or outside the warehouse, the cast, the technology, the visual or sonic media, the designers' mediating presence and the audience interaction.

POINT 1: REPRESENTATIONS.

Participants gathered outside the building in front of the window where the African head had been placed after our intervention of moving him. The Argon experience comprised video representing mixed archival fragments: footage (evidence) of our moving the cast; still images depicting black subjects from historical European paintings; and an audio reading from the introduction to Ralph Ellison's *Invisible Man* (1952). This text specifically meditates on issues of power, bias and erasure so central to this project.



Figure 4: Lorenz Lönberg, Portrait of Heinrich Carl Schimmelmann with a portrait of his wife Caroline Tugendreich, and an enslaved African servant, c.1773. Museum of National History at Frederiksberg Castle.

The participants huddled together outside in the cold to access the augmented layers which appeared through the image recognition function of Argon: a small sign in front of the cast provided the most reliable image recognition for the varying lighting conditions. The recording was heard from multiple devices.



Figure 5: Participants outside the window with the cast head.

POINT 2: INNER TOUCH.

Augmented Reality is effective for not just adding but peeling away layers, in this case reminding us that some of these casts once were people with actual bodies and organs. A phenomenological aspect of our embodied decolonial approach is to imagine the deceased as somatically present, but through relatively ephemeral materialities such as memories or empathic resonance. This is consistent with the “What if?” dimension of embodied digital sketching mentioned above, for example “What if this seemingly inert cast had an inner life, internal organs? Would I react differently to it? Would it become a her?” A still from medical MRI scan was used as the media layer, triggered by a small hand drawing of the spine from the digital archival material. It was fixed to the belly of the cast of a female figure. She gazed outwards while we gazed into her.



Figure 6: Participants gather close to the full body cast holding their devices up to the track image on her body.

The small image used for Argon recognition and the affordances of the application itself caused people to place their devices very close to the abdomen of the statue and move their hands to travel across the image. Even though the video was of a 2D MRI scan, a 3D effect was produced by the motion of the device and the visual perception and imagination of the users. This media was silent, but density and texture came to play as the media imagery dissolved the solidity of the plaster, and the web-like texture of the MRI opened space beneath the smooth and dusty surface. Not quite tactile, but almost. People tended to approach this trigger point one by one, giving each other a few moments to reflect and explore. The image was held in the device for a few moments after breaking the connection.



Figure 7: MRI scan of human torso from <https://radiopaedia.org>, an open-edit radiology resource. Image credit: Dr Usman Bashir, Radiopaedia.org, rID: 18394.

POINT 3: OUT OF PLACE.

The figure of the Sugar loaf man is above the doorway to Nyhavn 11, a short walk from the Cast Collection. GPS triggered audio plays in Argon when the user stands in front of the building. The audio is a combination of the Danish rhyme about the figure, known as Peter Sukkertop, and a reading from the English version of Helen Bannerman’s 1899 children’s book *Little Black Sambo*. The story, which is still popular in Denmark, represents one of the most pervasive forms of colonial conditioning of children. Included here, it purposefully racializes the Peter Sukkertop nursery rhyme in the Argon audio.

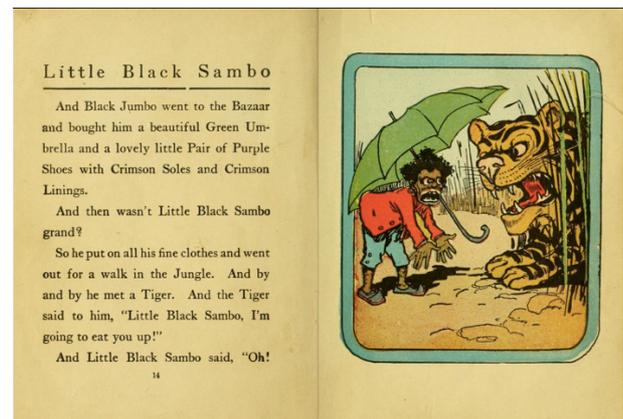


Figure 8. Illustration from Bannerman, H., Neil, J.R. (illus), 1908. *The story of Little Black Sambo*. Chicago: The Reilly & Lee Co. Scanned for open common by archive.org.

The figures of Sambo and Sukkertop are intrinsically connected, by colonial history and through the ritual of reading. This link is emphasised through location and the mediation.



Figure 9. Screenshot of the Argon screen with Nyhavn 11 in view.

CONCLUSION

The Bitter & Sweet event occurred on the last day the Royal Cast Collection was open to the public, making it a design intervention entangled with the warehouse's uncertain fate as a Danish heritage landmark. The audience attended the event with mixed feelings, some had entered the space for the first time, others were Copenhagen residents who were unaware of the building's closure. Most knew a little of the building's colonial history but had not been directly exposed to memories contained by the space itself. Thus the intervention took on further meanings within the context of the site as an evolving archive. The traces left by the design process and intervention are layered. They include: shifting institutional power dynamics concerning presence/absence, centre/margins, and who has the right to speak/act; revealing a previously hidden artefact (the African head); creating a new publicly accessible archive in the form of a digitized documentary and augmented media; and the accumulated conversations and movements produced by the entire process.

Embodied interaction as a subfield of interaction design did not just characterise the final event or apply to the ideation phase early in the design process, but helped to shape a new method called Embodied Digital Sketching (EDS). This method spans phases from prototype development to public engagement. Embodiment also informs the voice and style in which this paper is written. Similarly, design intervention did not just occur during the moment of the final event where the public engaged with the designed experience, but interventions were important stages of the ongoing design process. We enacted interventions and politics intervened into our processes. With cultural power comes responsibility, and as designers we inevitably wield power through our physical presence and with our designs. We decided to integrate decolonial sensitivity with embodied design processes to see if MR techniques and technologies could be used in a reparative way. The research and interventions continue.

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